

THE ONLINE AND OFFLINE PROCESSING OF *THIS*,
THAT AND *IT* BY NATIVE SPEAKERS OF ENGLISH
AND BY TURKISH NON-NATIVE SPEAKERS OF
ENGLISH

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ABSTRACT

THE ONLINE AND OFFLINE PROCESSING OF *THIS*, *THAT* AND *IT* BY NATIVE SPEAKERS OF ENGLISH AND BY TURKISH NON-NATIVE SPEAKERS OF ENGLISH

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This thesis explores the online processing of *this*, *it* and *that* in English and compares the processing strategies of Turkish non-native speakers (NNSs) with those of native speakers of English (NSs) by running three independent groups of online reading and norming experiments. The first group of eye-tracking experiments, together with Turkish and English corpus studies, test the deictic access of *this* and *that* to the left and right frontiers. The results for the NSs indicated that (1) with both *this* and *that* there is a preference for events on the right frontier as antecedents; and (2) the reliance of existing theories of textual deixis on an analogy with spatial deixis in spoken discourse may be flawed. However, NNSs were shown to employ a strategy of analogy with spatial deixis in processing textual deixis. The second group of experiments tested the antecedent preferences of *it*, *this* and *that*. In online reading, NSs did not show strong preferences, whereas NNSs performed form-function mappings. The third group of experiments tested the role of noun phrase statuses in the antecedent preferences of *this* and *it*. In contrast, NSs and NNSs had the same preferences but

used different processing strategies. The findings of NNSs could be explained with respect to the interface hypothesis and residual indeterminacy at the level of discourse, with a distinction between prescriptive and descriptive rules, and in terms of competition between implicit and explicit knowledges. Finally, a sliding scale ranging from the uninterpretable to the most interpretable features was introduced to explain differences in the processing involved in reading and writing.

Key words: Eyetracking, Discourse deixis, Anaphora, L2 learners' online processing and Shallow processing

ÖZ

THIS, THAT VE *IT* METİN İŞARETLEYİCİLERİNİN ANADİLİ İNGİLİZCE VE YABANCI DİLİ İNGİLİZCE TÜRK KATILIMCILARLA ÇEVİRİMİÇİ VE ÇEVİRİMDİŞİ İŞLEMLENMESİ

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Bu çalışmanın amacı İngilizcedeki *this*, *it* ve *that*'in çevrimiçi ortamda işlenmesini araştırmak ve İngiliz katılımcılarla (İK) Yabancı Dili İngilizce olan Türk katılımcıların (YDİTK) çevrimiçi işleme stratejilerini karşılaştırmaktır. Birbirinden bağımsız üç grup okuma deneyi ve norm belirleme deneyi yapılmıştır. Eyelink 1000-2K göz izleme cihazıyla yapılan ilk grup okuma deneylerinde ve derlem çalışmasında *this* ve *that*'in sol ve sağ sınıra ulaşmaları incelenmiştir. İK'ların (1) *this* ve *that*'in öncülü olarak sağ sınırı seçtiği; ve (2) teorilerde metin işaret adlarıyla sözlü söylemde kullanılan konumsal işaret adları arasında yapılan benzerliklerin doğru bir yaklaşım olmadığını göstermiştir. Diğer taraftan, YDİTK'larının metin işaret adlarının işlemlenmesinde konumsal işaret adlarına benzerliği strateji olarak kullandıkları gözlenmiştir. İkinci grup deneylerde *it*, *this* ve *that*'in öncül tercihleri araştırılmıştır ve okuma deneylerinde İK belirgin bir tercih göstermezken, YDİTK'ların yapı ve muhtemel fonksiyon arasında ilişki kurmaya çalıştıkları

gözenmiştir. Üçüncü grup deneylerde *this* ve *it*'in öncül seçiminde isim statüsü'nün rolü araştırılmıştır. Aksine, İK ve YDİTK'ların farklı işleme stratejilerini kullanarak aynı öncülleri tercih etmişlerdir. YDİTK'ların bulguları arayüz hipotezi, kuralcı ve betimleyici dil bilgisi farkı, ve örtük ve açık bilginin işlemede birbiriyle yarışması çerçevesinde açıklanmıştır. Sonuç olarak, yorumlanabilir ve az yorumlanabilir özellikler arasındaki farklar için bir ölçek önerilerek okuma ve üretim işlemleri arasındaki farklar sunulmuştur.

Anahtar kelimeler: Göz izleme, Metin işaret adıkları, Anaphora, Yabancı Dil Öğrencilerinin çevrimiçi işleme ve Sığ işleme

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LIST OF ABBREVIATIONS

CT	Centering Theory
FTF	Full Transfer Full Access
FFH	Failed Functional Feature Hypothesis
NP	Noun Phrase
NS	Native speakers
NNS	Non-native speakers
SDRT	Segmented Discourse Representation Theory
UG	Universal Grammar
İK	İngiliz Katılımcılar (Eng. English Participants)
YDİTK	Yabancı Dili İngilizce olan Türk katılımcılar (Eng. Turkish Foreign Speakers of English)

“Now he’s seeing it like *this*, now like *that*” would only be said of someone *capable* of making certain applications of the figure quite freely. The substratum of this experience is the mastery of a technique.

Ludwig Wittgenstein, *Philosophical Investigations*, p.208

CHAPTER 1

INTRODUCTION

This chapter is comprised of five sections. The first section presents the background to the study, showing the factors leading to the need for experiments on *this*, *that* and *it*. The second section discusses the purpose of the study. The third section demonstrates the significance of the present study. The fourth section defines some of the key terms used in the study. The fifth section presents the limitations of the study. Finally, the overarching research questions of the present study are given.

1.1 Background to the study

To date, linguistic and psycholinguistic studies of *this* and *that* have focused on their roles in spoken discourse, treating them as demonstratives pointing to an entity in a spatial and/or temporal context. It is generally assumed that these expressions redirect the interlocutor's focus to the entity that is in the utterance context, but upon which the interlocutor was not previously focusing (Bosh, Katz, and Umbach, 2007; Bonfiglioli, Finocchiaro, Gesierich, Rositani and Vescovi, 2009; Brown-Schmidt, Byron, and Tanenhaus, 2005; Cornish, 2007; Diessel, 2002, 2006; Fossard and Rigelleau, 2005; Hidmarch and Heath, 2000; Grundy, 1995; Matras, 1995; Passonneau, 1993; Strauss, 2002; Kaiser and Trueswell, 2003; Levinson, 1996; Lyons, 1977).

Few studies in linguistics draw attention to the functions of these expressions in written discourse. Those that do define *this* and *that* as discourse deixis or textual deixis (Conte, 1992; Webber, 1988), referring to some "portion" (Levinson, 1983), "aspect" (Fillmore, 1997), or "preceding and following segment" of the discourse itself (Lyons, 1977) or a proposition in a previous segment. It has been suggested that these expressions direct an addressee's attention to a specific part of a text, and guide the addressee in the building-up of coherence between text units (Çokal and Ruhi, 2006; McCarthy, 1994; Webber,

1988).¹ However, when it comes to defining more precisely which segments of a preceding text these deictic expressions refer to and how the use of them differs, or how their linguistic realizations differ in terms of the referents these expressions refer to (i.e a proposition versus an entity, or an entity in the subject position versus an entity in the object position), the existing literature is still ambiguous. To the best of the author's knowledge, there is no psycholinguistic study that investigates the online processing of *this* and *that* and their accessibility to the text segments, their referent choices and the role of noun statuses in the selection of referent in written discourse. This study is a first attempt to explore the cognitive information processes employed in tracking the antecedents of *this* and *that* in written discourse.

On the other hand, functional differences between the anaphoric pronoun *it* and deictic *this* and *that* have also attracted considerable attention from theoretical and computational linguists (Cornish 2010, 2008; Fillmore, 1997; Levinson, 1983; Linde 1979; Lyons, 1977; McCharty, 1995; Passonneau, 1989; Webber, 1988). Within a variety of theories and paradigms, some linguists have handled *it*, *this* and *that* as oppositional, saying that these expressions refer to different entities in discourse and thus function differently in written language (Linde, 1979; Lyons, 1977; McCharty, 1994; Webber, 1988). In particular, these expressions have been treated differently because of their different antecedent selections. *It* is considered anaphoric since it signals the continuation of discourse by referring to the salient entities in subject or object roles whereas *this* and *that* is regarded as discourse deixis because it signals a change of focus by referring to less salient entities. However, for Ariel (2001) the English pronoun *it* and the discourse deictic *this* are indistinguishable with respect to the role they serve for the intended referent (p.29). Close attention to the theoretical studies reveals the claim on the antecedent these expressions refer to is inconsistent. Still the distributions of these expressions with respect to the types of antecedents and noun phrase status in written discourse remain contradictory and the cognitive

¹ In line with Rhetorical Structure Theory, 'unit' is used interchangeably with 'sentence' in this study.

functions of *this*, *that* and *it* in text processing and production have not been explored with online reading methods.

In the literature on sentence processing in second language acquisition, it is seen that studies put forward different findings on processing strategies that native and non-native speakers of the target language use. Felser and Roberts (2007) who investigate processing wh-dependencies in second language, propose that at the proficiency level learners differ from native speakers of the target language in processing strategies and reading time. Marinis (2003), too, points to such difference between native and non-native speakers of the target language. On the other hand, Sorace and Filiaci (2006) deal with anaphora resolution in near-native speakers of Italian and test whether the interpretation of subject pronouns in intrasentential contexts by near-native adult speakers of Italian is different from that of native Italian speakers. In contrast to Felser and Roberts, they find out that the near-native speakers display patterns of preferences similar to the natives in both forward and backward anaphora sentences. In other words, they have acquired target-like processing strategies for anaphora resolution of null pronouns, and are sensitive to the same structural constraints as native speakers in processing backward anaphora. As seen, the findings on processing strategies that non-native speakers of the target language employ are controversial. The focus of these studies is on the processing strategies of wh-dependencies and pronouns in Italian rather than on those of deictic expressions in English. In this regard, further study is required here to fill in this gap in the literature and investigate the cognitive processes and processing strategies that native and non-native speakers of English employ in tracking the referents of *this*, *that*, and *it*. This study sheds light on the discussions over whether L2 learners employ processing forms similar to those of native speakers of the target language or transfer processing strategies from their mother tongue.

1.2 Purpose of the study

Although discourse analysts and computational linguists have repeatedly argued that the pronominal usages of *this*, *that* and *it* in English guide readers to different parts of a text and establish different foci in discourse, there is hardly any

empirical evidence for these ideas. The purpose of this thesis is to investigate the effects of these expressions in reading from an interdisciplinary perspective, by bringing theories and methods from computational linguistics, linguistics and psycholinguistics together. In particular, it aims to investigate the referential choices of these expressions by combining online (i.e. eyetracking experiments) and off-line methods (completion task and corpus analysis).

This thesis aims to explore the underlying cognitive processes and processing strategies in tracking the referents of these expressions. It will further our understanding of the referent preferences of *this*, *that* and *it* in written discourse.

This thesis will focus on the online processing of Turkish non-native speakers of English and their cognitive information processing in tracking the referents of these expressions and touch upon whether non-native speakers of English employ processing procedures similar to those of native speakers of English or discuss the role of language transfer from their mother tongue in second language processing.

1.3 Significance of the study

When the literature on anaphora processing is taken into consideration, it is seen that there are a great number of psycholinguistic studies dealing with the processing and interpretation of anaphoric expressions (i.e. personal and definite pronouns, full NPs and implicit/associative anaphora), but few of them have focused on online processing of discourse deixis (Bosh, Katz and Umbach, 2007; Fossard and Rigelleau, 2005). It is also observed that the studies focus on demonstrative expressions in French, German and Dutch, not on those in English. Therefore, this thesis is significant since it will fill in the gap in the literature by studying the online processing of English deictic and anaphoric expressions and the possible cognitive information processes employed in tracking the referents of these expressions.

This thesis aims to fulfill the need for a study that investigates the cognitive load of demonstratives by using a direct methodology (see, Fossard and

Rigelleau 2005). To do this, it will investigate the cognitive processes and load of *this*, *that* and *it* by using eye tracking.

The result of this thesis will also be significant for examining the cognitive information processing that native speakers and non-native speakers of English employ during reading anaphoric and deictic expressions. The findings of this thesis will shed light on the discussions on whether L2 learners employ processing procedures similar to those of native speakers of the target language or transfer processing strategies from their mother tongue.

1.4 Definition of key terms

Antecedent, deixis, textual deixis, anaphora, focus, cue phrase, discourse segment, and markedness/unmarkedness are all key terms in this thesis that need to be clearly defined. The following sections offer such definitions.

1.4.1 Antecedent. In this study, an antecedent is a mental representation of a segment or entity of core referencing and an evolving unit in discourse (see Garnham, 2001; Passonneau, 1993). The term ‘antecedent’ is used interchangeably with ‘referent’.

1.4.2 Deixis, textual deixis and anaphora. Traditionally, deixis is employed to refer to spatial, temporal or personal entities. However, current studies distinguish textual deixis from other uses of deixis. In general, deixis is a procedure to redirect the interlocutor’s attention to an entity that is in the utterance context, but to which the interlocutor is assumed not already to be attending. Textual deixis, on the other hand, refers to some “portion” (Levinson, 1983), “aspect” (Fillmore, 1997) or “segment” (Rauh, 1983) of the discourse itself (Lenz, 2007). This means that textual deixis refers to a proposition, a sequence of propositions, or an entity that is less focused in written discourse as referent (McCarthy, 1994; Gundel et al., 1988). Cornish (2007) defines this phenomenon of written discourse deixis as a break in the continuation of discourse in which the interlocutor is asked to ‘step out’ of the discourse context in order to identify a new referent (p. 203). Thus there may be no dependent entity, and the referent of

the new discourse entity is induced from the surrounding context (Cornish, 2007; Gundel, Hedberg & Zacharsky, 2004).

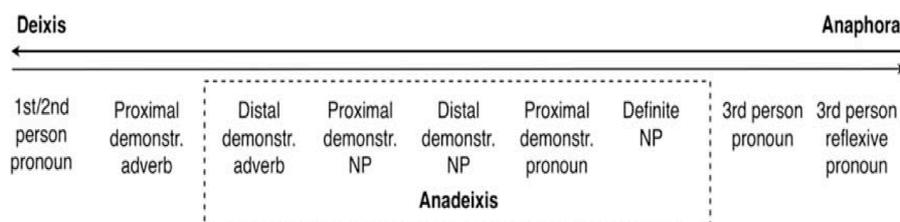
On the other hand, according to traditional textual linguistics, anaphora is used to denote any case where two nominal expressions are assigned the same referential value. In other words, it points back to a specific entity and signals the continuity of a pre-established center/reference in the text (Ariel, 1988; 1990; Givon, 1983; Fox, 1987, Huang, 1994; Halliday and Hasan, 1976). For traditional linguists, in the following example there is a referential relation between the antecedent and referent in terms of ‘syntactic congruence:’

A man entered the room. Then, he/this man looked around.

Anaphora resolution is seen as some kind of discovery procedure to find the best matching antecedent in a textual structure. Therefore, textual deixis is defined as a kind of transition between the notion of anaphora and ‘deixis’, since it points to a part of the pre-existing memory representation, but one which is not highly activated. Textual deixis orients the interlocutor’s attention to a referent, which is shaped on the basis of the previous part of the discourse and his/her personal knowledge and world experiences. So far, the distinction between anaphora and deixis has not been completely clear. Bühler’s (1990) distinction between material pointing and reflexive pointing can explain the difference between deixis and anaphora. Material pointing is a reference to a thing/an entity or to linguistic specifications (i.e phrases, entities) in the intercourse, whereas reflexive pointing refers to something other than an entity itself. Reference to something other than itself means a reference to the mental picture/mental representation of the mental phrases. Bühler’s reflexive pointing can explain the functions of his imagination-oriented deixis. Reflexive pointing not only points to a phantasy of the entity, but can also lead a hearer to enter imaginatively into the phantasy of that entity.

Cornish (2007) put indexical expressions on a scale to present their relative degrees of ‘deicticity’ and ‘anaphoricity’ (see scale below). On this scale, there is a significant range of expressions that include both deictic and anaphoric qualities or characteristics. Cornish characterizes such expressions as examples of

‘anadeixis’. Anadeictic expressions lie between or combine pure deictic and pure anaphoric functions. The best examples of anadeictic expression are demonstratives, which retrieve an already presented referent within a discourse representation, and whose referent does not have to be highly salient.



Scale 1: Cornish’s scale of anaphoricity and deicticity coded by indexical expressions (quoted from Cornish 2007, p. 149)

In this study, *this* and *that* are handled as cases of discourse deixis or Bühler (1990)’s imagination-oriented-deixis, which refer to a mental representation of an event/proposition, whereas *it* is treated in its traditional anaphoric aspect and Bühler’s material pointing, referring to highly salient linguistic entities (i.e subject or object positions). In line with Cornish (1999), we viewed anaphora and deixis as complementary discourse-referring management procedures, which the user ‘exploits in constructing, modifying, and accessing the contents of mental models of an unfolding discourse within the minds of speaker and addressee or writer and reader’ (Cornish, 2008, p.999).

1.4.3 Focus. The common assumption in the literature is that the level of saliency determines the referent of an anaphoric expression. The main question arising is ‘what is saliency to determine the selection of one referential expression instead of another one’ (see section 2.1.5). The concept of saliency is always explained in terms either of topicality or of focusing. These are in fact related concepts, but are accepted as opposed terms in traditional linguistics and in some psycholinguistic studies (see Arnold 1999| for further discussion). When we review the definitions of focus in the literature, we see that the term has been defined differently across different fields. As a result, the working definition of focus has become unclear. Indeed, Humphreys (1993) likens the terminology confusion to a ‘minefield’ (Zuo and Zuo, 2001, p.4).

Before moving to the definitions of topicality and focusing, however, the concept of ‘topic’ should be defined. Reinhart (1982) defines ‘topic’ as what the sentence is about. For Gundel (1985) ‘topic’ is a shared knowledge with which both speaker and addressee are familiar. Prince (2003) defines ‘topic’ as the backward-looking center that connects topicality with pronominalization in centering theory (see 1.4.3.4 for Centering Theory by Grosz, Joshi and Weinstein, 1997). The use of ‘topic’ in this study combines all these definitions. ‘Topic’ is used here to refer to a given information in the previous sentence, the knowledge of which is shared by the writer and reader, and which can be pronominalized. In the following, some factors that play roles in the topicality of a referent and saliency are discussed.

1.4.3.1 Topicality. Three factors play a role in the topicality of a referent and these are subjecthood, givenness and pronominalization. Subjecthood is a grammatical role in a sentence. A subject in a subject position is salient to the topic in the next sentence (see, for experimental study: Brennan, Friedman and Pollard 1987 and theory: Centering theory see in section 1.4.3.4). Givenness can be defined as old and new information. If the sentence is about the information given before, anaphora prefers to refer to the old information rather than the new information (see Strube and Hahn, 1996). The last factor is pronominalization. It is assumed that if the referent is the most salient, it will be referred to by a ‘more

minimal form’ or ‘reduced forms’ (Beaver, 2004). Kameyama (1996) points to another factor that affects pronominalization. When a non-subject entity is referred to, it starts to compete with the entity in the subject position. All these three factors affect the saliency and the topicality of a referent. In terms of topicality, the entity in the subject position is preferred over any entity in an object position. Likewise, given information is preferred over new information, since the prior entity or information is more salient than the new.

1.4.3.2 Focus in Chomsky’s generative grammar and Jackendoff’s semantic interpretation. Chomsky (1972) states that in prosodic intonation the ‘intonation centre’ creates a focus in a sentence. In other words, ‘the constituent containing intonation center’ is defined as ‘focus’. For instance, the sentence below can have three different interpretations and thus three different presuppositions, as the prosodic intonation (defined in bold, below) is put on different constituents.

*Did the Red Sox play the **Yankees**?* (quoted from Gundel 1999, p.3)

PRESUPPOSITION

FOCUS WITH INTONATION CENTER

a- The RS play someone

Yankees

b- The RS did something

played the Yankees

c- something happened

the RS played the Yankees

In sentence (a), if the intonation center is on Yankees, the topic is who the RED SOX played and the predication is the YANKEES. When the intonation is on the VP (playing the Yankees), the topic is ‘the Red Sox’ or ‘what the Red Sox did’ and the predication, they played with the YANKEES. If the intonation is on the whole sentence, then the topic is not overtly presented and the predication is ‘what happened at a certain time’.

However, if the intonation center moves from the Yankees to the RED SOX, there will be one interpretation:

Did the RED SOX play the Yankees? (quoted from Gundel 1999, p.3)

PRESUPPOSITION

Someone played the YANKEES

FOCUS

THE RED SOX

In the sentences above we see the distinction between topic and focus from the perspective of generative linguistics. The topic is the entity in the subject position: presupposition is the assumption about the utterance, whereas the focus is the constituent with intonation center. Predication and focus were accepted as different concepts by generative linguistics. Later, however, the focus and the presupposition were ‘consolidated’ by Jackendoff (1972). Jackendoff defines the focus of a sentence as ‘the information in the sentence that is assumed by the speaker not to be shared by the speaker or the hearer’, whereas ‘the presupposition of a sentence is the information that is assumed by the speaker to be shared by him and the hearer’ (p.230). Focus is an aspect of presupposition and when focus is satisfied, it leads to a ‘true’ presupposition. For Jackendoff, focus is a semantic relation in the sentence rather than a specific constituent. The focus assignment in a sentence is determined by ‘the semantic representation and the semantic material associated with surface structure nodes dominated by Focus of sentence’ (Jackendoff, 1972, p. 247). Similarly, Akmajian (1973) proposes that topic is a semantic relation rather than a single term.

To conclude, for Chomsky focus is related to prosodic prominence in the sentence and the relation between prosodic prominences and syntactic/semantic factors, whereas for Jackendoff and Akmajian, focus is not a single constituent but an unshared semantic relation among surface structure nodes.

1.4.3.3 Focus in Functional Grammar. Halliday (1967) defines focus in terms of information structure, opposing newly given information to old information. He asserts that new information creates a new focus. By “new” information Halliday intends information that has not been previously mentioned, and/or that the speaker presents as not being recoverable from the preceding discourse (p. 204). Here, the focus is determined by the speaker’s intention and exists in the previous part, but the hearer does not know that it will be in his/her focus later (see Prince 1981 for the idea of prediction in new information).

Halliday’s definition is different from those of Chomsky (1972) and of Jackendoff (1972). Halliday points to the role of the information structure and the degree of sharedness. New and unshared information that may or may not exist in the previous part of a discourse can be a focus.

1.4.3.4 Focus in computational linguistics. Linguists from computational linguistics handle focus in terms of syntactic factors or, to use their own term, ‘linguistic structures’ (see Hobbs, 1978, Grosz, Joshi and Weinstein, 1997; Mitkov, 1998; and Stuckard, 2001). Syntactic saliency procedure is used for resolving pronouns and in the processing of anaphora processing, focus is determined by the syntactic saliency of antecedents. For instance, Grosz et al. (1995) employ a grammatical rule hierarchy and present rules for managing informational and attentional change to select the local NP (center/focus) for each element of the sequence of sentences in a discourse. They present three transitional rules to indicate the possible local NP (center/focus) for each element of the sequence of sentences: these are centering continuation, centering retaining, and centering shifting (Smooth or Rough shift). In centering continuation, the entities referring to a preceding entity are pronouns in the subject position, which indicate the continuation of the same discourse entity. In centering retaining, entities pick up the entity that is not highly salient in the preceding discourse (i.e. object or object 2). In centering shift, the entity that is in focus is changed (either smoothly or roughly) and a new entity is introduced. Centering theory handles candidates for the referents of anaphoric expressions in a ranked order, as in the following:

Subject > Object > Object 2 > Others

Zero pronominal > pronoun > definite NP > indefinite NP

As seen above, in this ranked list, syntactic saliency is essential in establishing focus. The entities in the current focus space or focus structure are the most salient and easily accessible in the current consciousness of the speaker, or 'stack'.

1.4.3.5 Focus in cognition. In cognitive psychology too the term focus is related to working memory, and is handled as a sub-part of working memory in psycholinguistics (see Garrod, 1995). Musseler and Rickheit (1995) define focus as a mental representation that is limited but open to referential expressions. Gernsbacher and Hargreaves (1988) define focus as a salient individual in discourse such as the first character to be mentioned.

1.4.3.6 Focus studies in psycholinguistics. How linguistic focus is processed in written discourse has been studied by many psycholinguists (Birch and Rayner, 1997; Filik, Paterson and Sauermann, 2011; Sturt, Sanford, Stewart and Dawydiak, 2004; Ward and Sturt, 2007). Birch and Rayner (1997) manipulated focus through syntactic focusing phrases (i.e it was the street... / there was this street...). They found that readers were more likely to re-read focused words than non-focused words. The effect of focusing was seen in the later eye movement measures instead of first pass fixations. Since the main effect of focus was seen in the second reading times, they concluded that focused words were not accessed quickly but were re-read and had longer fixations than non-focused words. Sturt et al. (2004) used change detection techniques to explore whether participants recognised changes in the focused or the non-focused regions. They found that if semantic changes were made in the focused area, the participants detected them even when the semantic change was small (i.e *hat* changed to *cap*). If the changes were not semantically relevant in the unfocused area, the participants only noticed them if the semantic change was large. Ward and Sturt (2007) also ran an eye-tracking experiment in which a focused word was changed

to either a semantically related word or did not change. They found that longer fixations occurred when words changed in the focused area but there were no differences between changed and unchanged words in the focused area. They concluded that linguistic focus led to more detailed lexical semantic representations but the detailed information coding was not seen in the early eye-movement measures.

Other psycholinguistic studies also investigated the effect of focusing on processing. Almor (1999) ran self-based reading experiments and found that a noun phrase with a cleft referential expression was easier to resolve than one that co-referred with an uncleft referential expression depending on the specificity of the referring expressions. Foraker and McElree (2007) investigated the effect of focus on eye movement measures by using cleft sentences (*i.e.* (1) *It was the cheerful waitress who made the decaffeinated coffee.* (2) *What the cheerful waitress made was the decaffeinated coffee.* (a) *Reassuringly, she gossiped behind the counter of the diner.* (b) *Reassuringly, it brewed behind the counter of the diner.*). Like the studies mentioned above, they found that clefting antecedent conditions did not affect early eye measures but in second pass reading and regression path times the advantage of clefted antecedent conditions was seen. Diverging from previous studies, Filik, Paterson and Sauermann (2011) investigated the effect of focalisers such as *only* or *even* upon eye movement behaviour. Their stimuli were composed of congruent and incongruent sentences. They found that incongruent sentences with *only* were detected more quickly than those with *even*. They pointed out that readers had regressions back to the critical region with *even* if the sentences were about a set of events that were likely to happen. The participants expected *even* would signal an unlikely event. However, when *even* was used with the events likely to happen, regressive eye movements occurred. Regarding these findings, Filik et. al. concluded that ‘highly-complex semantic-pragmatic information associated with different focus-sensitive particles’ plays a role in sentence processing.

The results of all these studies showed that focus affected the processing of sentences and the effect of focus was revealed in late eye movement measures instead of early eye movement measures.

The term focus, then, as was mentioned at the beginning of this section, is defined and studied differently across different fields. In this study, we use *focus* to refer to a mental representation of a referent in the working memory to which the text directs the reader. *Focus* is unattended and just enters into the reader's working memory or attentional span. Focus is approached from the perspective of cognitive psychology and functional grammar. Therefore, in this study *topic* and *focus* are handled as separate but correlated concepts. We approach the concept of topic and topicality through computational and syntactic paradigms. *Topic* is what the sentence is about, and subjecthood is essential in order for a given entity to be the topic of a discourse and to determine the topicality of a referent.

1.4.4 Cue phrases. Cue phrases assist in the resolution of anaphora through the presence of a structural boundary or a relationship between parts of discourse, and serve to give explicit structure to a discourse (Litman and Hirschberg, 1999). They signal to a reader how to build a coherent mental representation of the text (Givon, 1995) and inform the reader how s/he can store the information presented (Echlich, 1982). According to the Jakobsonian model, all language use is structured by an “addressor > message > addressee” paradigm (Jakobson 1960, p. 353): in each sentence, through the use of linguistic markers, the addresser conveys a meaning and focus to the addressee. The discourse deictic expressions – *this* and *that* – are special components of narrative language which establish the center from which the narrative emerges (Fillmore, 1997; Jarvella and Klein, 1982; Zubin and Hewitt, 1995). With these cue phrases, the addresser leads the addressee to focus on the newly introduced center emerging from the narrative text, or to track the antecedents of discourse deictic expressions in order to bring them into focus (Çokal, 2005, Çokal and Ruhi, 2006). Fillmore, for instance, specifies the foci *that* and *this* establish, as well as the role of the degree of shared knowledge between interlocutors in the selection of one deictic expression rather than the other. *That* ‘signals shared knowledge, whereas *this* signals unshared knowledge between speaker and addressee’ (Strauss, 2002, p.132).

1.4.5 Discourse segment: Left and Right Frontiers. A discourse segment is a clause (Polanyi, 1986), a single sentence (Hobbs, 1978) or a sequence of sentences that describes a chunk of event (Nakhimovsky, 1988) or a single purpose (Grosz and Sidner, 1986). A written text is composed of hierarchical structures and discourse segments which are consistent with each other (Fox, 1987; Mann and Thompson, 1988; Marcu, 2001).

Discourse is composed of right and left frontiers. The discourse segment on the right frontier is open to be continued and is accessible by *this* and *that* (Asher, 1993; Asher and Lascarides, 2003; Polanyi, 1988; Webber, 1988). However, the segment on the left node is closed and the entity(ies) on the left node cannot be taken as antecedent(s) by either *this* or *that* (see extract 1 for *this*):

Extract 1

(a) it should be possible to identify certain functions as being unnecessary for thought by studying patients whose cognitive abilities are unaffected by locally confined damage to the brain. (b) For example, binocular stereo fusion is known to take place in a specific area of the cortex near the back of the head. (c) *Patients with damage to this area of the cortex have visual handicaps but they show no obvious impairment in their ability to think.* (d) *This* suggests that stereo fusion is not necessary for thought (Webber, 1988).

The antecedent of *this* in unit (d) is the proposition in unit (c), which is on the right node. Units (a) and (b) on the left node do not provide antecedents for *this*; therefore, *this* cannot access the entities on the left node.

1.4.6 Markedness/unmarkedness. Unmarked referential expressions signal that their referent is a continuation of the topic established previously. On the other hand, marked referential expressions direct the reader to new entities or topics that are not highly salient.

In the literature on second language acquisition, marked and unmarked features are defined differently from marked and unmarked referential expressions. Marked features are subtle, less salient and uncommon, whereas unmarked features are those widely distributed, common, natural and basic (see Eckman 1977 in section 2.4.1).

1.5 Limitations of the study

In this thesis, the online processing of the referents of pronominal usages of *this*, *that* and *it* will be analyzed. However, the online processing of pronominal usages of these expressions will not be dealt with.

Another limitation of the study is due to the restrictions of the Turkish deictic system. We discovered that the deictic distinction in referring to a proposition that exists in English between *this* and *that* has no direct equivalent in Turkish; *bu* is invariably used in both cases. The Turkish corpus analysis and the grammatical judgement survey revealed that where the English deictic system is governed by syntactic and sequential structures, the Turkish deictic system is governed by semantic relations. Therefore, the corresponding experiments in Turkish will not be run and as a result the sentence processing of non-native speakers of English in their mother tongue will not be thoroughly addressed. Only theoretical explanations will be provided for the Turkish deictic system.

A third limitation of this thesis is that the online processing of these deictic expressions in written discourse only will be studied. The findings of the study will therefore not be generalizable to spoken discourse.

The fourth limitation of this study is that it will not handle model properties of deictic expressions (i.e. how *that* is used to indicate the distance of the speaker to a statement, whereas *this* is preferred to indicate a statement that is

supported by the speaker). The fifth limitation of this study is that *it* is excluded in the experiments on the accessibility of referential expressions to the right and left frontiers. There are two reasons why the experiments in section 3 are run for *this* and *that* only. The first reason is the structure of the experimental stimuli. The stimuli were composed of long sentences where more than one possible candidate could be taken as the antecedent of *it* and the accessibility of *it* to right/left frontier would not be observed. The second reason is the assumptions in the theoretical studies. The studies only focused on the accessibility of *this* and *that* to the right and left frontiers but not the accessibility of *it* to these frontiers. Therefore, we did not include *it* in Experiment 1 and 3 in sections 3.1. and 3.3. In this thesis, we followed the theoretical assumptions in the literature regarding the anticipated referent choices of *this*, *that* and *it*.

1.6 General Research Questions

This thesis aims to give answers to the following questions:

- 1- Do the functional specifications that the literature assumes to be inherent in each type of expression guide sentence processing in different ways?
- 2- Do native speakers of English have referent choices for *it*, *this* and *that* in processing and producing a text? Do native speakers of English display asymmetrical referent preferences for these expressions?
- 3- Do these expressions signal the same procedural instructions to Native and Non-native speakers of English?
- 4- Do Turkish non-native speakers of English differ from native speakers of English in processing the referents of *this*, *that*, *it*?
- 5- Do Turkish non-native speakers of English have native-like referent preferences for *this*, *that* and *it* in producing a text?

CHAPTER 2

LITERATURE REVIEW

This chapter has five major sections. The first major section introduces theoretical, computational, cognitive linguistic and pragmatic perspectives on the types of antecedents these deictic/anaphoric expressions (*it*, *this* and *that*) refer to, the foci they establish, and their accessibility to the right and left frontiers. It also touches upon contradictory findings on their functions. The second section reviews psycholinguistic studies on anaphora and demonstrative processing from visual and self-based reading paradigms, and details the factors that affect anaphora processing. The third section explores existing psycholinguistic models of anaphora processing and sentence/discourse processing. The fourth section presents theories on second language processing and language acquisition. The fifth section points to the gaps in the literature that this study aims to fill. The sixth section gives the predictions, founded upon the existing literature, that our experiments set out to test. The final section offers an overview of the concept of the psychology of reading.

2.1 Approaches to *This*, *That* and *It* in the literature

Satisfactorily defining the deictic functions of *this*, *that* and *it* in written discourse has proved extremely problematic. To date, attempts at doing so have floundered, producing ambiguities and contradictions. In part, we argue, this reflects flaws or blind spots in the various conceptual frameworks underlying these attempts. More fundamentally, however, it also reflects a serious lack of experimental research: conclusions have too often been based upon an abstract notion of what ought to happen according to a given theory, rather than observation of actual language use and processing. However, it will be helpful to review existing attempts to define the functions of *this*, *that* and *it* in theoretical and computational linguistics.

2.1.1 Approaches to the Antecedents *This, That and It* in Theoretical and Computational Linguistics.

To date the most significant studies attempting to define the antecedent preferences of *this*, *that* and *it* have been corpus analyses. In these studies, different accounts of the antecedent preferences of *this* and *it* and their different functions have been proposed. In some studies the authors contradict their own statements and; we will point out these contradictions. Webber (1988) conducted a small-scale analysis of written corpus retrieving 177 samples from books, articles, editorials and *the Guardian*. Her results clearly show the antecedent preferences of *this* and *it*. 81 samples out of 177 referred to a noun phrase and in 79% of these samples *it* was used and in 2% of these samples *this/that* was used to co-refer to a noun phrase. 96 samples out of 177 referred to the interpretation of one or more clauses. In 15% of cases *it* was used to refer to the interpretation, while 81% of uses of *this/that* referred to a proposition. The percentage of references to an interpretation of a clause is, for *that* 19% and for *this* 62%. She concludes that *this* refers to a proposition or event in the previous clause/sentence. On the other hand, *it* can refer to discourse entities in subject or object roles but not the proposition of the text (cf. Heim, 1982; Kamps, 1984). Passonneau (1989) meanwhile conducted a contrastive analysis of *it* and *that* in spoken discourse. In contrast to Webber's corpus analysis, she found that the ratio of uses of *this* was lower than expected. The ratio difference between Webber's and Passonneau's studies might be the result of written and spoken differences: Webber collected data from written discourse, whereas Passonneau retrieved the data from spoken discourse. The distributional differences of *this* and *that* across discourses are not our main concern. Though Passonneau's main focus on *that*, rather than *this*, her findings are essential to an understanding of the possible antecedents of discourse deixis and anaphora. She compared *it* and *that* in terms of two aspects: the persistence of the grammatical subject and the persistence of the same syntactic form. With regard to the persistence of grammatical subject, she explored usages where both the antecedent and anaphoric expressions were subjects of their respective clauses, whereas in the persistence of the same form, she analyzed cases in which the antecedent was a single word phrase or multiple word phrases. Passonneau found that if both

referring expressions were subjects, then the lexical choice was far more likely to be *it* than *that*. Then, she contradicts this claim with her statement including the cases where *that* refers to the discourse entities in the subject role. It is especially interesting that when the antecedent is a non-NP non-subject any subsequent pronominal reference is most likely to take the form of demonstrative *that*, and mostly likely to be a subject. She claims that non-NP status has different conceptual status from NP status. She concludes that the use of *it* is flexible, *it* being used to refer to both propositions and noun phrases. She concludes that the distance factor had no correlation with the lexical choice of anaphoric expressions. Again, she disagrees with Webber regarding the flexibility of the anaphoric *it* in referring to both proposition and noun phrases, and regarding the accessibility of *that* to salient discourse entities.

Like Passonneau, Gundel, Hegart and Borthen (2003) claim that all three expressions, *it*, *this* and *that*, can refer to a proposition, but semantic factors govern their respective selection. Though they focus on *that* much more than *this*, their claim is essential for us to understand the role of semantic properties and the information structure in the determining of antecedents (see the examples quoted from Gundel et al. (2003) below).

Example 1

John insulted the ambassador. That/it happened at noon (p.5).

Example 2

A. For the governor to meet with us would be very helpful. It would almost certainly get things moving (p.11).

Example 3

A: We're going to do a lot more than just fire her.

B: What does that/*it mean? (p.7)

In example 1, it is claimed that an event is given in the previous sentence and thus either *it* or *that* is appropriate. If situations or facts are given in the previous sentence, the use of *it*, they argue, is not appropriate. However, they then seem to contradict their statements about *it* by stating that in some cases *it* can access a proposition with facts or situations if the structural prominence of the subject position is sufficient to bring an entity into focus regardless of its information status (see Example 2). Unlike *this/that*, *it* requires its referent to be in focus and accessible (see Example 3). They argue that both *it* and *this* can access the proposition if they are used in the appropriate information structure.

In the light of these hypotheses, we approach the antecedent types of *this*, *that* and *it* through a simplified perspective in order to explore native and non-native speakers' preferences when these expressions refer to (a) proposition vs. an entity in an object position; and (b) distant entity as a subject and recent entity as an object. Here, we do not investigate the type of proposition (i.e event, fact or situation) and its affect on the use of one anaphoric expression instead of another. Approaching anaphoric expressions in terms of different types of proposition is a topic for another study, and lies beyond the scope of this thesis.

2.1.2 Approaches to the types of foci *This*, *That* and *It* establish in cognitive linguistics, Theoretical linguistics and Pragmatics. Within a paradigm of cognitive linguistic account, Linde (1979), who conducted experiments on the functions of *it* and *that* in spoken discourse, claimed that *it* refers to the current discourse entity in a subject or object role, whereas *that* refers only to a statement across discourse node.

Approaching the subject from a broadly pragmatic perspective, McCarthy (1994) argues that *it*, *this* and *that* occupy separate domains in the way they attach to items and signal different attentional states. Therefore, though these three items seem to refer to the same entities, there is a subtle shift in meaning and foci. McCarthy defines *it* as an unmarked item referring to a topical entity in current focus within the discourse segment. He specifies the foci that *this* and *that* can establish as follows: “*This* signals a shift of entity or focus of attention, whereas *that* signals reference across entities or foci of attention, that is, to a topical entity

which is not the current, non-central, marginalizable or other attributed one” (p. 273). McCarthy’s definition of the function of *this* here seems to be at odds with the examples he gives

Extract 2

(a) Coming out from the base of the brain like a stalk is *the brain stem*.

(b) *This* is the swollen top of the spinal cord, which runs down to our ‘tail’.

(McCarthy, 1994, p.273)

Rather than a “shift of entity or focus of attention”, *this* seems to *maintain* or reassert the focus of attention, which may or may not have just been established in the previous unit (see, for example, Bosh, Kat and Umbac, 2007; Fossard and Rigelleau, 2006; Strauss, 2002; Kaiser and Trueswell, 2003; Levinson, 1983, Webber, 1988). This is clearly evident in extract 2, where in sentence (b) *This* refers to *the brain stem*, to which our attention has already been directed by the close of sentence (a). Petch-Tyson (1996), who explicitly sees herself as confirming McCarthy’s thesis, actually seems more influenced by McCarthy’s examples than her argument: her own examples too show *this* maintaining the newly established focus (see extract 3).

Extract 3

As mentioned previously, one of the main claims of the advocates of capital punishment focuses on *the idea of the death penalty acting as a deterrent. This* is a concept that does not have much evidence to support it and can therefore be easily refuted. While many believe that the death penalty is the most effective deterrent, it is not a proven fact.

(Petch-Tyson, 1996, p.48-49)

In the case of *that*, on the other hand, McCarthy's definition and his examples seem to be in agreement:

Extract 4

(a) You entered into *a tiny little hallway* and the kitchen was off *that*

(McCarthy, 1994, p.273)

Here, *that* shifts the attention back across 'the kitchen' to the previously mentioned 'tiny little hallway'. Again, though, when we turn to Petch-Tyson's supposed confirmation of McCarthy's hypothesis, things become problematic. Petch-Tyson offers the following example to illustrate the validity of McCarthy's argument regarding *that*:

Extract 5

Through media, *these dangers would be listened to and at the same time read about*. Hopefully *that* would encourage people to take action. Recycling is a very essential part of preserving the Earth....

(Petch-Tyson, 1996, p.48-49)

Petch-Tyson seems to take this as significantly different from the example cited in extract 3, but in fact *that* here refers to the current focus, the dangers that would be listened to and at the same time read about, just as *This* in extract 3 refers to the idea of the death penalty acting as a deterrent. In both cases the deictic markers refer to the nearest entities in the previous sentence, which is already the current focus of the addressee. The example of *that* in extract 5, therefore, rather than supporting McCarthy's hypothesis, actually contradicts it.

Approaching discourse deixis from a linguistic perspective, Çokal (2005) analysed the centres *this* and *that* establish in written academic discourse from within the framework of Centering Theory (CT). She claimed that *this* signals centre continuation and a shift in focus and *that* mostly signals a smooth shift, (although there are some cases in which *that* signals a rough shift). CT mainly focuses on pronominal resolutions and the establishment of noun phrases (in subject or object positions) as foci; therefore, it does not explain those cases in which the proposition in the previous sentence or sentences itself becomes the focus within a given discourse. Though the theory does not explain those cases, the concepts Çokal used to explain the foci *this* and *that* establish are more comprehensive than McCarthy's and Petch-Tyson's. She found that both *this* and *that* refer to an entity or proposition in the nearest sentence and that cases where *that* refers across units to distal entities are very rare.

Briefly, according to these foci accounts, a writer can establish a variety of foci with respect to his/her intention and his/her assumptions about the cognitive status of a reader. In the process of establishing foci, an appropriate referential expression and antecedent type are selected. If the writer signals the continuation of the same focus, s/he prefers to use *it* rather than *this/that* to refer to a highly salient entity. The highly salient entities are accepted noun phrases in a previous text, but the noun phrase in the subject position is assumed to be more salient than the one in the object position since it is the topic of the discourse (see Centering theory). The writer signals the shift of foci by the use of *this* or *that*, and brings the less salient entities, which are mostly propositions, verb phrases or noun phrases in object position, into focus (see Brown-Schmidt et al., 2005; Kaiser and Trueswell, 2008). In order to investigate foci dichotomy between *it* and *this/that*,

we designed several experiments and investigated native and non-native preferences for *it*, *this* and *that* (see Experiments in chapters 4 and 5).

2.1.3 Approaches to the frontiers that *This* and *That* can access in Computational Linguistics. The distinction between *this* and *that* is also studied in terms of their accessibility to the different parts of a text. Webber (1988) argues that only certain discourse segments can yield referents for discourse deictic expressions. Webber utilizes Polanyi's (1988) left-frontier / right-frontier terminology (1985): the right frontier refers to the clause immediately preceding the referential expression; the left frontier refers to the clause before that (so in extract 6 below, (d) contains the deictic expression, (c) is the right frontier, and units (a) and (b) constitute the left frontier). In Experiments in chapter Three, we adhere to Webber's terminology and use discourse segment to indicate right or left frontiers. For Webber, the discourse segment on the right frontier of the structure is open for continuation and is accessible by *this* and *that* (see, Asher, 1993; Asher and Lascarides, 2003; Holler and Irmen, 2007; Grosz and Sidner, 1986, Lascarides and Asher, 2008; Polanyi, 1988; Webber, 1988; 1991). Thus the antecedent of *this* in unit (d) in the following extract is the proposition in unit (c), which is on the right frontier and close to the deictic marker:

Extract 6

(a) it should be possible to identify certain functions as being unnecessary for thought by studying patients whose cognitive abilities are unaffected by locally confined damage to the brain. (b) For example, binocular stereo fusion is known to take place in a specific area of the cortex near the back of the head. (c) *Patients with damage to this area of the cortex have visual handicaps but they show no obvious impairment in their ability to think.* (d) *This* suggests that stereo fusion is not necessary for thought.

(quoted from Webber, 1988, p.6)

Units (a) and (b) on the left frontier do not provide antecedents for *this*; in other words, *this* does not access the entities in these units.

However, the segment on the left frontier is generally closed to continuation for Webber: only in a small number of cases, she argues, can *that* (not *this*) access the entity(ies) on the left frontier but she finds such cases odd (see Extract 7). She argues that because of the position of the sentence with *that*, its accessibility to the left frontier (the left frontier is the information about house A in 2, 3, 4 and 5) is odd but the rest of *that* constrains the interpretation of *that* referring to the left frontier (Webber, 1988). She points to the contradictory dilemma in accessing of *that* to the left frontier though its position is not acceptable.

Extract 7

(1) There's two houses you might be interested in:

(2) *House A is in Palo Alto. (3) It's got three bedrooms and two baths, and was built in 1950. (4) It's on a quarter acre, with a lovely garden, and (5) the owner is asking \$425K.*

(6) House B is in Portola Vally. (7) It's got three bedrooms, four baths and a kidney-shaped pool, and (8) was also built in 1950. (9) It's on 4 acres of steep wooded slope, with a view of the mountains. (10) The owner is asking \$600K. (11) I heard all *this* from a real- estate friend of mine. (12) #But *that's* all I know about House A.

(13) Is *that* enough information for you to decide which to look at?

(Webber, 1988, p. 15)

Webber's right frontier account runs parallel with Çokal's (2005) argument, but does not account for McCarthy's (1994) *that* case (extract 4). Webber does not give the underlying reason for the inability of deictic markers to access the antecedents on the left frontier of a discourse structure, and her study is purely theoretical, citing only a handful of examples which are used to support her argument again and again. If these units are taken into consideration within the

framework of Asher and Lascarides' (2003) Segmented Discourse Representation Theory (SDRT), however, one possible reason for the inability to access left frontier antecedents in Extract 6 might be the rhetorical relations between units (a), (b), (c) and (d). According to Asher and Lascarides, rhetorical relations between units determine accessibility and the left frontier is open for discourse continuation if semantic relations between units exist, irrespective of the use of *it*, *this* or *that*.

When the units in the above extract are handled in terms of SDRT, unit (b) is used to illustrate the statement in unit (a) (see Rhetorical Structure Theory - Mann and Thompson, 1988). Thus, units (b) and (a) are in an elaboration relation, since unit (b) elaborates the idea that certain functions are unnecessary and these are obviously seen by studying patients. Unit (c) is a further explanation of one of the areas of the brain discussed in unit (b). Unit (d) interprets the proposition in unit (c), but not the interpretations of units (a) and (b). Therefore, *this* does not pick out the entity/propositions in units (a) and (b) on the left frontier of the discourse structure. The entities on the left frontier of the discourse structure are rhetorically unrelated to *this*. Therefore, discourse units on the left frontier of the discourse structure do not provide entities for *this* in Extract 6. While SDRT, Webber (1988) and Polanyi (1988) are in agreement regarding the right frontier, SDRT proposes that if there are no linguistic expressions (i.e. *every*, *not* and *if*) or semantic relations between units that block discourse referents from being antecedents to anaphora, discourse deixis can refer to right and left frontiers, and to a group of sentences. In extract 8 below, *this* may refer to the claim in unit (a), which is on the left frontier of discourse; to the sum of claims in units (a), (b) and (c), since units (b) and (c) are the continuation of unit (a), elaborating the linguistically implicit topic (three plaintiffs made three claims that they were ill-treated); or only to unit (c), which is on the right frontier. According to the SDRT, this shows that the intention of the writer determines the accessibility of discourse deixis to the right or left frontiers, and that approaching the resolution of referential expressions by ignoring the semantic relations between units and intentional structures is flawed.

Extract 8

- (a) One plaintiff was passed over for promotion three times. (b) Another didn't get a raise for five years. (c) A third plaintiff was given a lower wage compared to males who were doing the same work. (d) But the jury didn't believe this.

(Lascarides and Asher, 2008, p. 97)

Like Webber and Polanyi, Grosz and Sidner (1986) point to the right frontier constraint upon referential expressions and linguistic structures. They propose a model of discourse structure with respect to intentional and attentional states, stating that discourse is composed of a set of focus space stacks and segments (units-sentences). The relation between segments creates a dominance hierarchy. They argue that the information in the lower space stack, which corresponds to the right frontier, is usually accessible from the higher space stacks, which correspond to the left frontier -- **but less accessible than the information in the higher spaces** (Grosz and Sidner 1986, p.180). However, in their study they mainly focus on utterances in which higher spaces become accessible to linguistic structures such as flashbacks and interruption. They explain accessibility to higher spaces within the framework of intentional states. The intentional structure or the purpose of discourse segments can push the current entity on the right node onto the stack and can bring the old information on the left frontier into focus. However, they apply their model to spoken discourse (ie. flashbacks, interruptions), not to written discourse. As has already been seen, the openness or closedness of the higher spaces or the left frontier for discourse deixis seems to be very ambiguous and debatable. Most authorities agree that the left frontier can be opened for topic continuation through referential expressions thanks to intentional structures or the writer's intention, but the frequency of such access, whether it applies identically to spoken and to written discourse, and whether it occurs in online reading, are all questions that remain undecided.

However, neither linguistic nor psycholinguistic studies have approached the accessibility of frontiers or distant antecedents in terms of both comprehension

and production. Accessibility can change according to the speaker/writer's intentional state and the reader's attentional state. We therefore decided to investigate the accessibility of frontiers and the interaction between frontiers and discourse deixis in two different cognitive processes: online reading, online production and writing. Experiments in chapter 3 and the corpus analysis explore how writers use *this* and *that* to refer to antecedents on the left or right frontiers. Experiments 1 and 3 in section 3 explore how readers access these frontiers.

2.1.3.1 Situational Models and Narrative Shift Model In Psycholinguistic Studies. In situational models (Anderson, Garrod and Sanford, 1983; Morrow, Greenspan and Bower, 1987) and narrative shift models (Zwaan, 1996) the common assumption is that discourse representation is updated with incoming new information. In other words, the accessibility of antecedents depends on their being in focus. Zwaan proposes that though two events are in consequence or in sequence, the processing and integration of the second event with the first event is difficult if there is a narrative time shift. An expression such as 'a moment later' indicates the end of the previous action and leads the reader to decrease the activation of the previously constructed node. To investigate this, he conducted four experiments. In Experiment 1 readers read texts with 13 lines in which a protagonist performed two subsequent but unrelated events. Time shifts between events were controlled by temporal adverbials such as a 'moment later,' 'hour,' or 'day.' The participants made recognition decisions about words. The result of his experiments was that, the first event is deactivated and made inaccessible to the readers since it is not in the current focus of the reader.

Zwan's narrative shift model corresponds to Webber's Right Frontier Constraint. In other words, the first event which is on the left node is not accessible for referents after a time shift. A new event is presented on the right node, which leads to a new discourse topic. The question arising with regard to the proposals in situational and narrative shift models and Right Frontier Constraint is whether cue phrases lead the readers to reactivate the previous event and deactivate the current event. If so, the first event on the left node can be retrieved as a centre. If we apply Zwaan's insight to *this* and *that* we might

hypothesize that events on the left frontier will be made less accessible (perhaps completely inaccessible) when a time shift is either implicitly indicated by a new event presented in the right frontier, or explicitly by adverbials within the same unit as the deictic marker. Determining when and how discourse deictic expressions lead readers to reactivate foci outlined in the left frontier will have implications for our understanding of the narrative shift model.

2.1.4 Approaches to the modal properties of *This* and *That* signal in Cognitive Linguistics. Cornish (2001) explores the modal properties of *this* and *that* from a cognitive-semantic perspective. In the case of *this*, “the speaker is establishing the referent cognitively within his/her discourse sphere, thereby tacitly associating and involving himself/herself with it” (ibid.: 312). *That*, on the other hand, signals that “the intended referent is not cognitively or subjectively within his/her discourse sphere, though this use may well indicate that s/he is aligning herself/himself with the addressee” (ibid.: 312-313, emphases added). In other words, if the addresser is in favour of the proposition or entity, *this* is used rather than *that*. However, if s/he wants to dissociate himself or herself from the proposition or entity, *that* is preferred to *this*. Cornish’s argument regarding the modal properties of deictic expressions appears correct, but there may be other modal properties that play a role in the use of these expressions. Cornish’s study is based on the analysis of a very small number of examples drawn exclusively from verbal discourse, with no corpus study to support its conclusions. In this thesis, the modal properties of these expressions were not controlled. A study controlling these modal properties would be a worthwhile one, but lies beyond the scope of this thesis.

2.1.5 Accessibility/Saliency Approaches To Distinguishing Referential Forms in Cognitive and Computational Linguistics. The role of saliency in the selection of referential forms has influenced both cognitive linguistic and computational linguistic studies. In cognitive linguistics, the leading theory is that of Givenness Hierarchy by Gundel et al. (1993): in computational linguistics, the most influential theory has been Centering Theory, established by Grosz, Sidner

and Weinstein (1995). The common point in these theories is the governing role of saliency in the use of referential expressions, but these theories use the term ‘saliency/accessibility’ in different aspects. In the following, these theories are outlined and then the differences and similarities between them are addressed.

2.1.5.1 The Givenness Hierarchy. According to cognitive linguists, different referential expressions mark different cognitive statuses of the intended referent in discourse (Ariel, 1988; 1996, Chafe, 1994, Givon, 1983 and Gundel, Hedberg and Zarchaski, 1993). That is, they signal different ways in which a sentence may or should be resolved. Gundel et al. (1993) presents six cognitive statuses in the light of Givenness hierarchy. From the most activated to the least restrictive expressions, these are:

in focus >	activated >	familiar >	uniquely identifiable >	referential >
It	That	that N	the N	Indefinite thisN
	This			
	This N			

According to Ariel’s Accessibility theory and Gundel’s Givenness hierarchy, the use of a particular referential expression is closely related to the level of accessibility/saliency or activation that the mental representation of the referent is assumed to have in the addressee’s mental model of the discourse under construction. If the referent is assumed to be highly accessible/salient for the reader or addressee, a zero or unaccented third-person pronoun is used, whereas if the referent is not in focus but activated, a demonstrative pronoun is used. Gundel et al. (1993) also make a distinction between *this* and *it* in terms of the grammatical positions of their antecedents. It is claimed that subjects and direct object of matrix sentences are highly likely to bring a referent into focus and the use of *it* in such cases is suitable. However, the use of *it* is not appropriate in cases

where the entities are even if the subject of subordinate clause. In the subordinate cases, *deixis* seems to be more appropriate than *it* since *deixis* signals a less accessible/salient referent than *it*.

Gundel's and Ariel's accessibility factors are significant for the psycholinguistic models of anaphora processing, but it can be argued that these models are proposed regarding the cognitive status of the referent for the addresser in the selection of expressions. However, Gundel and Ariel do not consider the cognitive process or status of the referent for the addressee in the processing of these expressions. There might be differences between the addresser's cognitive status of the referent in the selection of demonstrative pronouns and that of the addressee in the processing of these expressions.

2.1.5.2 Centering Theory: Similarities/Differences between Givenness Hierarchy and Centering Theory. Gundel et. al.'s hierarchy is based on Centering Theory (CT) developed by Grosz, Sidner and Weinstein. It is worth mentioning CT since the basic tenet of CT- that the saliency is key in determining referential expressions- has been much studied in psycholinguistics and in what follows we will refer to these studies in order to understand proposed processing models for anaphora. CT models the interaction between attentional state and referring expression. The theory is based on noun phrase status and the determinacy rule of anaphoric pronouns, but excludes the status of the proposition and the role of discourse deixis in the anaphora algorithm. The basic rationale behind the theory is that certain entities mentioned in an utterance are more central than others, and this imposes constraints on a speaker's use of different types of referring expressions. CT proposes that the preferred centre is the one in the subject position, and that it sounds ungrammatical if there is a shift from a grammatical subject to a grammatical object in the continuation. They also claim that coherence and attention can be changed according to intentional structure and the relation between attentional states and linguistic structures. Besides the subject role, they claim that the centre may be realized in other grammatical roles (i.e. object and others).

Both CT and Gundel et. al.'s hierarchy are based on the assumption that different forms engender different inferences on the part of the hearer or reader. In

some aspects, however, they differ from each other. While Gundel. et. al focus on the references to a proposition and the possible pronoun selection in such cases, CT only focuses on the NP statuses and their roles in the assignment of pronouns. Focusing only on NP status, and not including discourse deixis or propositional references in the algorithm, constitute significant constraints on the usefulness of CT. In this thesis, we include both NP status and the propositional references of *it*, *this* and *that* in order to have a comprehensive view of both the antecedent preferences of *it*, *this* and *that*, and any differences in cognitive processing due to the different cognitive status they signal (see Experiments in chapter 6). The last but not the least difference between CT and Givenness Hierarchy is the concept of saliency. While the Givenness Hierarchy defines saliency as ‘the level(s) of activation of the same referent in the mental representation of the addressee (i.e activated, familiar etc.), CT handles saliency in terms of the syntactic positions of the entities in a previous sentence. Here, we see two different but interrelated concepts. In this study we used aspects of the definition of saliency from both CT and the Givenness hierarchy: thus saliency here means the level of activation and/or mental representation of a previous entity/frontier, and the syntactic positions of a referent. In the experiments on *this* and *that* (see chapter 3) referring to the left and right frontiers, saliency refers to the activation levels of the right and left frontiers and the mental representation of these frontiers. In the experiments on *it*, *that*, and *this* referring to noun phrases (see chapter 6), saliency refers to the syntactic positions of the noun phrases. In the experiments on *it*, *that*, and *this* referring to a proposition and noun phrase (see chapters 4 and 5), saliency refers both to the position of the noun phrase which is explicitly stated in the discourse, and to the mental representation of the proposition/verb phrase (i.e the process of writing a book).

2.2 Psycholinguistic Studies.

The major psycholinguistic studies on anaphora, discourse deixis, anaphor processing and models of discourse processing are outlined below.

2.2.1 Distinction between deep and surface anaphora in psycholinguistic studies. In the psycholinguistic literature, as in computational and theoretical linguistics, much discussion is given over to the question of whether different referential expressions create different representational forms and processing models. Studies mainly focus on personal pronouns, ellipses forms, ‘do it’ anaphora and reflexives (see Bélanger, 2004; Carlson & Tanenhaus, 1985; Tanenhaus, Carlson & Seidenberg, 1985; Tanenhaus & Carlson, 1990; Mauener, Tanenhaus & Carlson, 1995; Murphy, 1990). The common assumption is that deep and surface anaphora are different, and that therefore there are different sentence processing and interpretation processes, but that these differences are a result of the types of antecedents to which deep and surface anaphora refer. The antecedents of surface anaphors are linguistic objects, whereas those of deep anaphors are sorts of mental representations and the interpretations of their antecedents (Sag and Hankamer, 1984). Therefore, deep anaphors are also called ‘model-interpretive anaphora’ (cf. Sag and Hankamer, 1984). Mauener, Tanenhaus and Carlson (1995) clarified the processing of surface and deep anaphora by saying that activation or suppression processes occur in the processing of surface and deep anaphora. In the surface anaphora condition, a linguistic entity is activated whereas in the deep anaphora condition a linguistic entity is suppressed. Bélanger (2004), on the other hand, claimed that though deep anaphors also used linguistic properties, the processing differences between deep and surface anaphora are clear-cut. Regarding the dichotomy between deep and surface anaphora, we argue that the deep pronouns *it*, *this* and *that* can function as surface anaphora in a suitable context, but there would still be differences between them in processing. We hypothesized that the dichotomy between *this*, *that* and *it* exists, irrespective of their being surface or deep anaphora, because their being surface and deep anaphora depends upon the different centres they bring into focus.

2.2.2 Experimental studies on Anaphora and Demonstratives. Experimental studies from a visual paradigm and from a self-paced reading paradigm are outlined below.

2.2.2.1 Experiments from a visual paradigm on Anaphora and Demonstratives.

As presented in section 2.1, it has mostly been theoretical and computational linguists who have studied *it*, *that* and *this*, and their claims have been based on algorithmic models of language processing or small-scaled corpus studies. The number of psycholinguistic studies in the literature is very few and their foci are mostly the use of demonstratives in spoken discourse (Brown-Schmidt, Byron and Tanenhaus, 2005; Kaiser and Trueswell, 2008). It is worth mentioning the findings of these psycholinguistic studies to understand the nature of psycholinguistic studies on demonstratives, their findings on the functions of these expressions and the problems that they have come across in terms of data analysis, and in particular the failure to find a clear asymmetrical pattern across different expressions.

Brown-Schmidt et al. (2005) ran three action-based visual paradigm experiments and hypothesized that *it* referred to a salient entity whereas *that* referred to a conceptual composite. In Experiment 1, eye movements were recorded when the participants heard spoken instructions such as ‘put the cup on the saucer’. In their experiments, the preferred referent was the ‘theme (cup) for *it*’ and ‘the composite for *that* (cup on the saucer)’. In Experiment 2, they controlled the stressing and presented that the number of possible interpretations can be lowered when *it* is stressed. Experiment 3 was a replication of Experiment 1, and the authors concluded that participants preferred entities without linguistic antecedents (i.e cup on the saucer) more than entities with linguistic antecedents (i.e cup). Their experiments also demonstrated that *it* and *that* clearly had different preferred referents. Participants tended to interpret *it* as the theme of the preceding utterance (i.e cup) and *that* as the composite (i.e cup on the saucer). They also claimed that if both a theme and composite were semantically related to the objects, both pronouns were interpreted as composites. They noted that if a composite was available, its availability affected the online processing of *it* and the composite could be more salient than the linguistically presented entity. Therefore, the composite could be the referent of both *that* and *it*. They pointed out that the pure saliency-based account was wrong and a clear asymmetrical

referent choices for demonstratives in online experiment was problematic, since several potential referents competed with each other.

Another psycholinguistic study investigating a referent choice of anaphora and demonstratives from a visual world paradigm is that by Kaiser and Trueswell (2008). Kaiser and Trueswell focused on the demonstratives (*tämä*) and anaphors (*hän*) in Finnish. They argued that the demonstrative *tämä* and the anaphora *hän* have asymmetrical antecedent preferences and that the referent selection would not be explained only by syntactic saliency. They hypothesized that *hän* refers to an entity in a subject position, whereas *tämä* refers to an entity in an object position. *Hän* was sensitive to syntactic position and *tämä* was sensitive to a linear word order. Relying on these differences between *hän* and *tämä*, they proposed that referent choices could not be explained only by the syntactic role, but that other factors such as linear word order also played a role. There were form-specific factors that distinguished one anaphoric expression from another, but referential expressions could show different degrees of sensitivity to different factors. Their sentence completion experiment supported their hypotheses: in 64% of cases *hän* was used to refer to a subject regardless of whether the sentences were SVO or OVS, and in 88% of cases *tämä* was used to refer to an object in SVO sentences. *Tämä* was more sensitive to a postverbal subject than to a preverbal object. In Experiment 2, they recorded participants' eye movements. The participants listened to the beginnings of a series of stories and were asked to complete the rest of the stories according to given pictures. In Experiment 2, Kaiser and Trueswell observed an asymmetrical pattern between these items. However, *tämä* in SVO did not pattern as they predicted: they did not find a strong pattern for SVO/ *tämä*, contrary to the results in their offline experiment. They assumed that *tämä* behaved as a determiner (i.e. this man), and later the participants noticed their misinterpretations but did not erase their first interpretations. Kaiser and Trueswell hypothesized that the absence of a strong pattern for *tämä* might have been a result of a 'lingering effect of garden-path' or the stronger competition between dispreferred and preferred referents. They also added that the referent choice of *tämä* was ambiguous, whereas *hän* had clear strong referent preferences. One possible reason for the asymmetrical pattern

between these expressions may have been the level of ambiguity. They concluded that these items should be handled from a multi-dimensional approach, in which the degree of the sensitivity to each factor would be changed from one expression to another one. While *tämä* was sensitive to both syntactic role and linear word order, *hän* was sensitive only to syntactic role.

These studies founded on a visual paradigm approached the demonstratives and anaphora from a saliency account, but also pointed to other factors that affected the choice of referential expressions. Unlike with the personal pronouns, they had problems in tracking the referent choice of demonstratives because of (a) the strong garden-path effect, and (b) more than one alternative referent.

2.2.2.2 *Experimental studies from self-paced reading and priming mask paradigms on Anaphora and Demonstratives.* The studies presented below used the self-paced reading measurement, priming and completion tasks to investigate the online processing of these expressions.

Similar to Kaiser and Trueswell (2008) and Brown-Schmidt et.al (2005), Fossard, Garnham and Cowles (2011) conducted two reading experiments and one sentence completion to investigate the degree of saliency in referent choices of *that NP* and the personal pronoun *s/he*. They assumed that *that NP* is an anadeictic expression and prefers to refer to a less salient entity, whereas personal pronouns refer to a highly salient entity. They investigated the influence of saliency and conceptual gender agreement on anaphora processing. The first experiment was sentence completion and involved a text composed of three sentences (see a sample stimuli from their study below). Fossard, Garnham and Cowles controlled the position of the character in the text. A primary character was introduced in the initial sentence. A pronoun ('s/he') or demonstrative (e.g. 'that man') was introduced in the second sentence, along with a subordinate character. In the completion task, 88% of third person anaphoric pronouns were taken to refer to the primary character while 17% of demonstratives were taken to refer to the primary character. It was evident that the participants used the demonstrative pronoun to refer to the subordinate character.

<i>Experiment 1 (gender cue version)</i>	<i>Experiment 2 (no gender cue version)</i>
<p><i>Sentences 1 & 2</i> At restaurants, // <i>Peter</i> _{M.char.} loves taking his time to read the menu. // The last time, // he had hesitated so much between two dishes that he // finally had to ask <i>the waitress</i> _{S.char.} to help him // choose something from the menu. //</p> <p><i>Target sentence:</i> Main character*pronoun: In fact, he // simply ordered the dish of the day // Main character*demonstrative: In fact, that man // simply ordered the dish of the day // Subordinate character*pronoun: In fact, she // simply recommended the dish of the day // Subordinate character*demonstrative: In fact, that woman // simply recommended the dish of the day //</p> <p><i>Question:</i> For "Main character" conditions: Did Peter go for a very expensive dish? For "Subordinate character" conditions: Did the waitress advise a very expensive dish?</p>	<p><i>Sentences 1 & 2</i> At restaurants, // <i>Alice</i> _{M.char.} loves taking her time to read the menu. // The last time, // she had hesitated so much between two dishes that she // finally had to ask <i>the waitress</i> _{S.char.} to help her // choose something from the menu. //</p> <p><i>Target sentence:</i> Main character*pronoun: In fact, she // simply ordered the dish of the day // Main character*demonstrative: In fact, that woman // simply ordered the dish of the day // Subordinate character*pronoun: In fact, she // simply recommended the dish of the day // Subordinate character*demonstrative: In fact, that woman // simply recommended the dish of the day //</p> <p><i>Question:</i> For "Main character" conditions: Did Alice go for a very expensive dish? For "Subordinate character" conditions: Did the waitress advise a very expensive dish?</p>

Note: The double slash (//) indicates the text presentation on the computer screen, as used in Experiments 1 and 2.

(Fossard et al. 2011, p. 6)

The next task was a self-paced reading experiment and they found that integration processes were faster when a personal pronoun referred to a main character. They also observed that the processing was slower even where the gender of the pronoun matched the subordinate character. As with the eye-tracking studies, the findings with regard to the demonstratives were less clear. The integration of the demonstrative with a subordinate character was not faster than for a pronoun. While the results for personal pronouns supported early antecedent integration with referential expression, for demonstratives, an early antecedent integration was not found. Also, though the gender of the demonstrative matched with the main character, the processing was still delayed. They concluded that early commitment to reference resolution was only possible for personal pronouns since they acted as a pointer to discourse focus. However, this is not possible in the case of demonstratives. Their findings with regard to the demonstrative contrasted with their offline task. In Experiment 2, they removed the strong garden-path on the initial character by making anaphoric sentences ambiguous, without gender cues. The results of the second experiment supported their offline results and the reading times were faster when the personal pronoun referred to a main character and a demonstrative referred to a subordinate character. Their

results supported the anaphora processing where the participants tried to disambiguate as early as they could.

Differently from the previous experimental studies, Cornish (2005) studied only the French unaccented nonsubject pronouns used anaphorically. He handled these pronouns as indirect anaphora, stating that in a text some referents of anaphoric expressions were not presented explicitly but were evoked obliquely either by an association or a stereotypical inference of some kind. He dealt with the associative or implicit anaphora and the possible constraints on their processing. For Cornish, the use and interpretation of implicit anaphora required a relevant co-text and a pragma-semantic context. He pointed out that the introducing element -antecedent trigger- always evoked a frame within which the implicit anaphora found its referent. Here, he pointed to pragma-semantic context; that is, in inferential processing lexical semantic structures, a reader's world knowledge and the sentence before the implicit anaphora played a role in tracking the referents of implicit anaphora. Cornish's study is significant since it does not approach processing only from syntactic or lexical semantic perspectives. It indicates that the parts preceding deictic expressions create frames within which the referents of deictic expressions are tracked. This indicates that in cognitive information processing, discourse deictic expressions orient readers' attention towards a referent which s/he must resolve on the basis of the representation introduced in the preceding (initial) sentence. In this information processing, inferential processing is required in order to integrate world knowledge with pragma-semantic context.

In order to test the psychological reality of the existence of two types of indirect or implicit anaphora, Cornish designed a self-paced reading experiment. He showed that reading times of the target utterances were different across experimental conditions; that is, faster reading time was observed if the implicit anaphora was in the main clause rather than the subordinate clause. He observed significant interactions between the referent type and antecedent trigger.

Similar to Cornish, Kousta (2006) pointed to the effect of preceding discourse on the processing of pronominals. She investigates top-down and

bottom-up effects on the interpretation of weak object pronoun in Greek.² She pointed to the role of top-down and bottom-up effects in the processing of pronominals. According to Kousta, pronominals were especially dependent on aspects of the preceding discourse representations for their interpretation. The preceding discourse exerted a top-down influence on resolution, in the sense that this influence was independent of the presence of a pronoun that needed to be resolved. With regard to top-down effects on anaphora resolution, the degree of salience and accessibility to an entity in the discourse representation was assumed to constitute one of the main influences on pronoun interpretation. However, pronominals did contain semantic and syntactic information (such as gender, number and case) that constrained their interpretation. This information exerted a bottom-up influence on the processing of pronominals. Kousta argued that the identification of top-down and bottom-up factors influenced the interpretation of pronouns, stating that there was comparatively little work addressing the manner in which these factors interacted in pronoun resolution. Kousta's study indicated that cognitive information processing of deictic expressions depended on the preceding discourse representation; that is, saliency and accessibility to the antecedent of deictic expressions in the preceding sentence could affect information processing. Her proposal that pronominals are encoded with semantic and syntactic information indicates that the functional specifications were assumed to be inherent in each type of expression. That is, each deictic expression is encoded with semantic, pragmatic and syntactic information, which constrains its interpretation. Thus, each deictic expression has functional specification inherent in it.

In order to investigate the interaction of top-down and bottom-up strategies in the processing of Greek weak object pronouns, a fragment-completion task was used. In the task, subjects were asked to write continuations of fragments. By using this task, Kousta investigated the interpretation of weak object pronouns in

² Modern Greek has two paradigms of personal pronouns (Holton et al., 1997), strong (emphatic) and weak (clitic), marked for case, number, and gender (masculine, feminine, neuter). Strong pronouns are stressed, are normally used for emphasis/ contrast, and can function as the subject or the direct/ indirect object of a verb or as the object of a preposition. Weak pronouns (clitics) are normally unstressed and cliticise to the left of the verb, thus preceding it. Clitics can function as the direct (case-marked accusative) or indirect (case-marked genitive) object of verbs.

the establishment of co-reference with their antecedents, and pointed to the subjecthood, implicit causality and syntactic role of anaphora in the establishment of co-reference.

Bosch, Katz and Umbach (2007) composed corpus on the use of German personal pronouns (*er, sie, es*) and demonstrative pronouns (*der, sie, das*). In their corpus study, they showed that both types of pronouns were naturally used in German to refer to both animate and inanimate referents, but they found a striking difference in use between demonstrative and personal pronouns. While demonstrative pronouns were used to refer to an object NP, the personal pronouns were used to refer to a subject NP. Then, they needed to confirm that such difference in use correlated with the processing differences. To test this, they carried out two psycholinguistic experiments. They designed a self-paced reading experiment and, similar to Kousta, used a 'priming task' (completion task) to explore the inference processing that German speakers employed in the processing of German personal pronouns and demonstrative pronouns. Similar to their findings in their corpus study, Bosch et. al showed that the demonstrative referred to the 'object of the context sentence,' whereas the personal pronoun referred to the 'subject of the context sentence' as referent. This indicated that discourse deixis differed from anaphora in the cognitive information processing when tracking the referents of these expressions.

Fossard and Rigalleau (2006) studied anaphoric pronoun and the hybrid demonstrative pronoun *Celui-Ci/ Celle-Ci*. They conducted two reading experiments using reading time measurements and tested the contrast between the two pronouns. The results of the study indicated that it was necessary to postulate a distinction between these two linguistic forms in terms of the processing instructions that they carry. For Fossard and Rigalleau, anaphoric pronouns like *she/he* signalled a highly-focused entity in discourse, and the reading time for anaphoric pronouns was shorter than for full NPs. Fossard and Rigalleau investigated whether such a trend was also seen in demonstrative pronouns in French, since they supposed that demonstrative pronouns were also pointers to discourse focus. In other words, they proposed that demonstrative pronouns could signal a change in the attention already established, that is, they would shift the

attention focus from the highly-focused entity towards a less-focused entity in order to bring the latter into the foreground. Regarding this, Fossard and Rigalleau proposed that the processing of the demonstrative pronoun *celui-ci/celle-ci* was sensitive to the focus status of discourse entities but that this sensitivity was in contrast with those of the 3rd-person anaphoric pronoun. In order to test this hypothesis, they used self-paced reading time in two experiments. The results of the study was consistent with the hypothesis proposed by Fossard and Rigalleau; that is, the referential functioning of the demonstrative pronoun *celui-ci/ celle-ci* was constrained in terms of entity focusing, but in an opposite way in comparison with that of the 3rd person pronoun *il/elle*. However, Fossard and Rigalleau emphasized that their findings should not be extended to demonstratives in general, in particular, to the most frequent unmarked demonstrative pronoun *this* in English.

According to previous research on filler-gap dependencies, parsers constructed filler-gap dependencies actively after encountering a suitable filler (Crain& Fodor, 1985; Frazier and Clifton, 1989). Also, it was stated that active search was not activated if the dependency would have meant the sentences were ungrammatical (Traxler & Pickering, 1996). The implication of this study for this thesis was that without semantically and pragmatically relating the sentence with a deictic expression to the previous or the following sentence(s), human parsers could not anticipate its referents. The anticipation of the referential expressions depended on complete processing of the sentences.

In the processing studies on anaphoric expressions that are presented above, the processing strategies used in tracking the referents of anaphoric expressions are related to the following factors:

- a) the degree of saliency and accessibility to the antecedents,
- b) the use of semantic (i.e gender and number) and world knowledge,
- c) drawing inferences regarding the semantic relations between an antecedent and its anaphora.
- d) functional specifications inherent in pronominals
- e) the role of the preceding sentence within which the anaphora finds its referent

This study aims to investigate whether these processing strategies are also used for the processing of *this*, *that* and *it* by native speakers of English, and by Turkish non-native speakers of English.

2.2.3 Psycholinguistic Studies on coherence and linguistic markers. Coherence is established by relating different information units in a text through the use of discourse markers or cue phrases (Hobbs 1978; Mann and Thompson, 1986; Sanders, Spooren and Noordman, 1992; 1993; Sanders and Nordman, 2000; Noordman and Vonk, 1997). In other words, linguistic markers and cue phrases are followed by readers in the reading process because they guide readers to infer the coherence relations and make a representation of the information between segments (Gernsbacher and Givón, 1995; Graesser, Millis, and Zwaan, 1997; Sanders and Nordman, 2000; Kamalski, Sanders and Lentz, 2008).

Most of the psycholinguistic studies explore whether linguistic markers affect language processing (Meyer, 1975; Sanders and Nordman, 2000; Britton, Glynn, Meyer, and Penland, 1982; Millis and Just, 1994; Golding, Millis, Hauselt and Sego 1995; Murray, 1995). However, the findings of these studies are contradictory. Meyer points out that connectors and lexical markers of relations do not affect language processing. On the other hand, Britton et al. (1982) and Sanders and Nordman (2000) suggest that markers help the addressee to construct a coherent text representation (Gernsbacher and Givón 1995; Graesser et al., 1997; Noordman and Vonk 1997). The common hypothesis is that “signaling helps.

Discourse deixis is very close to anaphora since discourse deixis can be used anaphorically. Another overlapping feature between anaphora and discourse deixis is that anaphora is used to track prior entities, which is close to the function of discourse deixis as establishing an overt link between propositions. Such findings lead us to explore whether *it*, *this* and *that* affect language processing and whether the dichotomy of *this-that* guides readers to construct different coherence relations between units. According to the linguistic studies mentioned in the previous, *it*, *this* and *that* give rise to different coherence representations.

2.2.4 Possible Factors that play a role in Anaphora/Deixis processing.

Psycholinguists have specified the factors that affect anaphora resolution. One of the factors is recency. Readers search backwards for the antecedents of the pronoun and prefer the closest antecedent in the previous text (Clark and Sengul, 1979). Johnson-Laird (1983) specified the possible recent entities in the participant's mind. The preceding proposition is in the short-term memory, but the capacity to make room for a second noun-phrase is quite limited. Within a recency paradigm, for example, the nearest phrase or frontier would be preferred as an antecedent regardless of whether *this*, *that* and *it* were being used. Other psycholinguists have challenged the recency strategy, showing that the initial entity of a sentence, independent of its grammatical role, is easily accessible through the memory (Hudson-D'zmura and Tanenhaus 1998; Gernsbacher and Hargraves 1988; Gordon, Grosz, & Gilliom, 1993; Jarvikivi, Gompel, Hyona and Bertram 2005). However, in two experiments Hudson-D'zmura and Tanenhaus (1998) found little evidence for the counter-argument to the recency hypothesis.

Clifton and Ferreira (1987) propose that such saliency and distance accounts are superfluous, because more than a single element in a sentence interpretation (i.e. subject or object/ NP1 and NP2) 'can be equally good for a pronoun' (p. 649). As subject -namely, a topic, for some linguists - or an object-namely a focus- can be the antecedent. Likewise, Corbett and Chang (1983), who studied proper names/personal pronouns and ellipticals, pointed out that non-antecedents and antecedents were activated in the pronoun disambiguation. The ordering of the antecedent and non-antecedent in the first clause does not effect anaphora processing. They proposed that pronouns function like a cue phrase to retrieve the potential antecedent in memory. The ambiguous resolution can be delayed till enough contextual information is reached. Kaiser (2000), who investigated cleft sentences and their preferences, proposed that the likelihood of subsequent pronominal reference is also influenced by structural focusing and pronominalization, but not as strongly as by subjecthood. Therefore, she argued one-factor models are inadequate, and pronoun resolution is determined by a delicate interplay of several factors. We do not know yet much about the online

direction of deictic *this/that* and pronominal *it* in written discourse and the role of saliency, recency or focus factors in their resolution but we predict that *this* and *it* function as cue phrases and direct the attention of readers to different parts of a sentence.

2.3 Different models of anaphora processing

Relying on the factors mentioned above, psycholinguists have proposed different models of anaphora processing. Regarding the initial context and grammatical roles, for some psycholinguists, readers deactivate possible entities as referents and thus the referents of anaphora are identified immediately (Chambers, Tanenhaus, Eberhard, Filip and Carlson, 2002; Lucas, Tanenhaus and Cralson, 1990). Thus, on encountering a pronoun, a reader should immediately attempt to integrate it into his/her discourse model. Antecedent assignment involves inhibition of the inappropriate potential antecedent rather than facilitation of the appropriate antecedent, suggesting that the mechanism for antecedent assignment involves backgrounding the inappropriate element rather than providing additional activation to the appropriate antecedent. Garrod and Sanford (1977) proposed a two-stage model, which is a sort of integration of saliency, recency and semantic factors. For Garrod and Sanford, the anaphora processing model is composed of bonding and resolution stages. In the bonding stage, readers have an initial interpretation and in the resolution stage or ‘late filter/defensible filter’, the initial interpretation is matched with the co-referential expression or semantic meaning in the later part of the sentence (for further explanation of the model, see Garrod, 1994; Garrod & Sanford, 1994; Garrod & Terras, 2000; Sturt, 2003, Sanford, Garrod, Lucas, & Henderson, 1983). Thus, the resolution-phase ‘may involve a re-alignment of previously computed coreference relations’ (Sturt 2003, p.559). In the resolution stage, ‘semantic overlap’ is the most important mechanism governing the process of identification and semantic overlap checking is only possible in recent clauses or sentences (see Garrod and Sanford, 1977). If the initial interpretation is not correct, the semantic overlapping is used to determine the antecedents of anaphoric expressions. We predicted that the

participants would use recency and information structure as factors in their initial analysis but then in the ambiguous resolution phase, they would need to use the semantic relation between the antecedent and anaphoric expressions. We also predicted that participants would sometimes underspecify the antecedents of *this*, *that* and *it*, so in the experiments we established a semantic relation between the antecedent and referent.

Offering an alternative model, Kaiser and Trueswell (2008) propose that resource to the saliency account or to the syntactic positions of referents alone is not enough to explain anaphora processing. They argue that a multi-dimensional approach where the degree of factors that affect referent selections changes from one referential item to another one. Similar to Kaiser and Trueswell, Brownschmidt et al. (2005) pointed many factors besides saliency play a role in antecedent selection.

2.3.1 Models of Discourse Comprehension. Three models of discourse comprehension dominate psycholinguistics. In the following the tenets of these models will be briefly surveyed.

2.3.2 Kintsch and Van Dijk's Models of Text Comprehension. Kintsch and Van Dijk's model (1978) is based on macro-structures and micro-structures. Micro-structures are the propositions and the meanings of a unit, whereas macro-structures are operators in discourse processing. The model is based on three steps. Firstly, propositions are organised coherently and locally. Processing is local and cyclical: only one sentence or clause is processed at a time. Secondly, the processor 'transforms the propositions into overarching macro-propositions that retain the gist of a text'. In the second stage of processing, the processor deletes irrelevant propositions/information and keeps the gist of a text. If it is necessary, the processor fills the gap in the text by bridging inferences. During the deletion process of propositions 'schemas' are retrieved from the working memory to decide which propositions are relevant. The third stage of processing is retrieving a new text when a participant is asked to recall or summarize the text.

Van Dijk and Kintsch later revised their model (1983): in the revised version, the processor does not wait until the end of the sentence or clause to establish coherence. Instead, the processor tries to establish a local coherence between units as soon as possible. Van Dijk and Kintsch put forward the idea of ‘macro-strategies’ –the inferences that the processor makes before reading the text. Then, with the influence of connectionist models, Kintsch introduced the Construction-Integration Model (1988). Contrary to the previous version of the model, in the latest version the initial processing is data-driven and bottom-up. The latest version has two steps. The first step is the construction stage, where word meanings are activated and propositions are formed irrespective of the context. In the second stage, context plays a role and the model starts to eliminate the elements that are not appropriate for the discourse context. In the elimination process, Kintsch (1990) proposes that syntactic cues direct the processor to predict what is important and ‘what to look for in a text’.

Briefly, the main idea in Van Dijk and Kintsch’s theory is that before finishing the whole text the processor makes predictions using his/her schemas and eliminates the details to get the main gist.

2.3.3 Sanford and Garrod’s Memory Focus Model. Three factors play a role in Sanford and Garrod’s discourse processing model (1981): (1) ‘the current discourse focus and the role of working memory in determination of the current focus’; (2) the linguistic properties of the anaphors (i.e plural pronouns, full noun phrase, etc; (3) pragmatic inference derived from global coherence (see Gernsbacher and Foertsch, 1999, p. 288). In this model, the discourse focus is defined as information that is highly activated and central in discourse. Discourse is also composed of activated peripheral elements but their activation is not as strong as is the discourse focus. In order to explain the activation of information in discourse, they propose two levels of memory: the explicit focus and the implicit focus. The explicit focus is the current discussion in the text, whereas the implicit focus is comprised of less active background information. Like Van Dijk and Kintsch’s model, Sanford and Garrod describe two stages of processing:

immediate processing and later processing. In the immediate processing stage, activation between anaphoric expressions and possible referents occur immediately but disambiguation happens later. In the initial stage, local coherence occurs immediately but structure integration is not conducted. The memory focus model is in favour of 'high level coherence' and thus Sanford and Garrod (1994) describe 'discourse processing as partial or incomplete processing because pragmatic aspects of interpretation dominate lower level semantic processing' (p.716).

These two models assume discourse processing occurs in two stages but that the components in the stages are different. Van Dijk and Kintsch's model is based on the representation of meaning from a text and the transformation of propositions into overarching macro-propositions in relation to schemas in the long memory. On the other hand, Sanford and Garrod's model is based on referential coherence and anaphoric resolution. Sanford and Garrod deal with the processing of specific expressions and model how the relation between a referent and referential expressions is constructed in discourse processing.

2.3.4 Gernsbacher's Structure Building Model. Like previous discourse processing models, Gernsbacher's Structure Building model (1990) aims to explore the cognitive mechanisms that enable us to comprehend a discourse by building coherent mental representations. In contrast to previous models, the first stage of processing is 'laying foundations for mental structures' and then incoming information is built on the foundation. The degree of relatedness to the first foundation leads to levels of structures (i.e main and sub-structures). The relation between the main and sub-structures is a memory node. If the incoming node is related to the main structure, memory activation is strong, but if it is weak, the activation will be less. Gernsbacher points to the advantage of First Mention in discourse. She states that it does not matter whether the first mention is in the subject or object position: it will be highly activated since, in the initial stage of processing, the processor looks for a foundation upon which to build the subsequent information. This idea of First Mention challenges the idea of the

advantage of Clause Recency: Gernsbacher argues that the processor creates a mental representation of each clause and that the representation of each clause is then connected to the first mentioned structure.

The Structure Building framework also explains why a processor forgets in the comprehension of a text. It is assumed that when a new episode or a sentence boundary is introduced, the previous part of the text will be less activated since it will not have multiple sub-structures. The level of activation depends on the strength among structures and nodes but short-term memory does not play a role in the lesser accessibility of the previous parts of a text. Two cognitive mechanisms control the activation of memory nodes: suppression and activation. When an explicit anaphor like a full name is processed, the mechanism for suppression and activation is triggered. The representation of the full name is enhanced and other related concepts are suppressed. When a less explicit anaphor is processed, the mechanism takes a longer time to suppress other referents and thus enhancement becomes less powerful (see Gernsbacher's study on anaphoric devices and the mechanism for suppression and activation 1989).

Though the models of discourse processing proposed by Van Dijk and Kintsch (1978; 1983; 1988), Sanford and Garrard (1981; 1994) and Gernsbacher (1990) deploy different concepts, the common assumption is that the processor aims to construct a coherent mental representation between the sentences in two stages. In the integration stage, the representation (for instance, between anaphora and referent) depends on different elements:

- a- For Structure Building theory suppression and enhancement play roles in the determination of the referent. The strength of the relation to the first foundation determines anaphora processing.
- b- In Van Dijk and Kintsch's model the meaning of a unit, its relation to the gist of the text and scheme affect anaphora processing. Also, the position of the referent (i.e. peripheral or main text) affects the processing.
- c- For Memory Focus, the referent and its relation to discourse focus in the working memory impact anaphora processing

In all these models, referent selection is controlled by a higher system, which can be (a) a scheme in Van Dijk and Kintsch's model; (b) pragmatic knowledge in the Memory Focus model; or (c) the first foundation of structures in the Structure Building model. In conclusion, in these models processing is always incomplete since (a) the processor gets the gist of text; (b) substructures are not strongly related to the first structure; and (c) the referent is an implicit focus. The experiments in this study seek to show which models mentioned above best explain the processing of textual deixis and anaphoric *it*.

2.4 Studies in Second Language Acquisition

In this section, major linguistic theories in Second Language Acquisition (SLA), their influence on psycholinguistic studies, and their findings regarding native and non-native speakers' language processing are summarized.

2.4.1 Linguistic Theories in Second Language Acquisition. With the contrastive analysis hypothesis (CA), Lado (1957) proposed that the first language would affect the acquisition of a second language and L2 learners' errors were possibly because of differences between L1 and L2. Lado's hypothesis made a substantial contribution to the study of second language acquisition and following Lado's study, typological studies were conducted to present the differences between languages and predict L2 learner errors (i.e Stockwell, Bowen and Martin 1965 for phonetics; Weinreich, 1963; Whitman, 1970 for phonetics). In 1959, the attack on Skinner's Verbal Behavior by Chomsky diverted the attention of linguists from pinpointing differences between languages to Universal Grammar (UG) and universal parameters/principles of language acquisition. Alternative approaches to CA were put forward such as error analysis and transfer/cross-linguistic studies from L1 and L2 (see Corder 1967) because as Swan (2007) observed, it was difficult or impossible to predict all L2 learners' errors on the basis of the differences between L1 and L2. Also, CA did not consider cases where L2 learners acquire structures that differ across L1 and L2 (see Dulay and Burt, 1973 for the same criticism). In addition, it was impossible

for teachers to practice all the differences across the languages in language classes. In the 1960s, all these reasons led to the abandonment of CA and a move towards the study of language universals and cognitive structures/mechanisms in language acquisition. L2 learners' errors were handled within cognitive science, but not only from a pedagogical perspective.

Though Kramsch (2007) especially argued that Lado's idea that L2 learners learn similar rules to their native language more easily than different ones 'can no longer be upheld', the comparison between two languages (i.e. Johanson and Oksefjell, 1998 for corpus study; Treffers-Daller, 2012 for a corpus linguistic approach to transfer; Stubbs, 1996 for translation) and the effect of similarities/differences between languages have been a focus for linguists, psycholinguists and corpus linguists. In order not to be associated with behaviorist accounts linguists have used different terms such as 'cross-linguistic influence' or 'the role of mother tongue' (i.e. Durgunoğlu and Hancin-Bhatt, 1992; Gass and Selinker, 1983; Sharwood Smith and Kellerman, 1986). In the following, the definitions of transfer, interference and marked/unmarked in linguistics are touched upon, and then recent studies in bilingualism and psycholinguistics which explore the role of the mother tongue in the acquisition of a second language are briefly explained.

Grosjean (2012) clarified the distinction between transfer and interference: transfer is a static phenomenon which reflects the permanent traces of one language on the other, whereas interference is a dynamic phenomenon in which elements of the first language(s) slip into the output of the language being spoken or written (p.11). Analyzing different situations, Weinreich drew attention to the presence of language transfer where there were 'asymmetrical effects of constituents in one language that are not parallel in the other language' (cited in Swan 2007, p. 415). Relying on the principle of markedness delineated by Trubetzkoy (1939) and Jakobson (1941), Eckman (1977) classified the asymmetries/binary oppositions in a language as marked and unmarked. Unmarked items are those widely distributed, common, natural and basic, while marked items are subtle, less salient and not common. In his Differential

Markedness Hypothesis, he specified areas of language L2 learners would have difficulties with, depending upon the degree of markedness:

- a) Those areas of the target language which differ from the native language and are more marked than the native language will be difficult.
- (b) The relative degree of difficulty of the areas of the target language which are more marked than the native language will correspond to the relative degree of markedness.
- (c) Those areas of the target language which are different from the native language, but are not more marked than the native language will not be difficult (p.5)

As can be seen, for Eckman L2 learners would have problems when the constituents between the two languages would be different and less salient or marked. On the other hand, though the two languages would have corresponding features, an unmarked item in the target language would be difficult to acquire.

Similarly, Larsen-Freeman and Long (1991) described the process of language transfer from L1 to L2: if the two languages are similar, positive transfer would be accomplished whereas if they are different, negative transfer or interference would occur. Using ERPs, Tokowicz and MacWhinney (2005) demonstrated how the similarity and differences between languages influenced the early stage of second language acquisition. Their experimental sentences were of three syntactic types:

(a) tense-marking, which is formed similarly in the first language (L1) and the L2 (i.e. in Spanish and English, progressiveness is marked by an auxiliary before the participle: *His grandmother cooking very well./ *Su abuela cocinando muy bien);

(b) determiner number agreement, which is formed differently in the L1 and the L2 (i.e. in English, the same determiner is used with both singular and plural nouns, yielding both “the boy” and “the boys. In Spanish, on the other hand, the definite article takes different forms: el niño (“the boy”) , but los niños (“the boys”);

(c) determiner gender agreement, which is unique to the L2 (i.e. English does not have grammatical use of nominal gender whereas in Spanish determiner and adjectives match the gender of the noun: *Ellos fueron a un fiesta *They went to a-MASC party-FEM “They went to a party”) (p. 174).

They predicted that L2 learners would not show less sensitivity to violations of the structures that differ in the two languages than to those that are similar in the languages. Also, they would show more sensitivity to the structures that are unique to the L2. In order to test their prediction, they gave experimental sentences to the participants and asked them to say whether the presented sentences were grammatical or not. The data were collected from 34 right-handed English learners of Spanish. They found that L2 learners were not sensitive to violations in L2 which were different from their mother tongue. They were sensitive to violations in the form of auxiliary omission - both L1 and L2 having the same rule for auxiliary use - but they were not sensitive to the determiner number agreement rule that differs between L1 and L2. The most interesting finding was that L2 learners were sensitive to violations for the items that were unique to L2. They claimed that their findings support the interactive activation model (see for the model Kroll and Tokowicz 2004). In online reading, both L1 and L2 are activated. If the structures in L2 differ from those in their L1, or suggest contrasting interpretations, L2 learners prefer the interpretation that matches their L1. In comprehension, L2 learners use their L1 to understand the structures in L2. On the other hand, in production, learners will produce an L2 that has an ‘L1 syntactic accent (for further explanation see Tokowicz and MacWhinney, 2005, p. 176).

Selinker (1972) presented three types of errors that occur in L2 learners’ interlanguage: (1) interlingual errors that were made under the influence of the mother tongue; (2) intralingual errors that were made because of the complex learning process (i.e. overgeneralizations, limited input, simplifications) but not the influence of the mother tongue; (3) errors that were made because of faulty teaching techniques and materials (Richards 1971).

Selinker's third and second error types indicate that not only mother tongue interference, but learning processes such as L2 learners' hypotheses or assumptions regarding the target language, and teaching methods or instructions play important roles in causing L2 errors. Selinker proposed five central sources of L2 learner errors: the most interesting source was 'transfer of training', which meant training- induced incorrect hypotheses regarding the target language. Richards (1971) pointed to the simplification strategy of L2 learners and noted their interlanguage was composed of simple rules. However, Corder (1967) disagreed with the idea of a simplification of rules, stating that 'a language learner can scarcely be said to be simplifying the rules of the target language in any psychological sense. What results from his learning strategies may however result in a system which is linguistically simpler' (p. 211).

A better comprehension of all these learners' errors and of the possible underlying reasons in the interlanguage is essential to a better understanding of the interlanguage system. The most essential issues here are why language transfer is important for second language acquisition, when language transfer is used as a strategy by L2 learners, and whether it is also used by advanced L2 learners. The answers to these crucial issues remain controversial among linguists and psycholinguists (see Treffers- Daller and Sakel editors' introduction, 2012). For instance, Pienemann (2005) proposed that language transfer is developmentally moderated. In other words, in order to perform language transfer, L2 learners should be competent and able to deal with the situation and thus in the initial stage it is impossible to observe it. Similar to Pienemann, Sharwood and Kellerman emphasized that in order to acquire the structures in the target language, L2 learners must be aware of differences as well as parallelisms. Therefore, L2 learners' metalinguistic awareness about languages functions prior to L1 transfer and the awareness would not influence the initial stage. On the other hand, Lefebvre, White and Jourdan (2006) argued that language transfer is seen in the early stage of L2 acquisition and is employed by L2 learners in the following stages unless there is positive input. White (1991) also pointed the importance of partial overlapping of argument structures between two languages, and the existence of difficulties if learners are not provided with negative

evidence. She collected data from English speakers of French when they were acquiring dative structures. In English, both the following structures are grammatical:

- A) John gave the book to Mary.
- B) John gave Mary the book.

However, though item A is acceptable in French (in French: Jean a donné le livre à Marie.), item B is not acceptable (in French: *Jean a donné Marie le livre), She found that English learners of French who had lived for many years in France found the French of item B grammatical and acceptable. She pointed to the role of the mother at later stages and the existence of difficulties if there were not negative evidence showing the structures that were ungrammatical in L2. Similar to Lefebvre et al., Larrañaga, Treffers-Daller, Gil Ortega, and Tidball (2012) stated that language transfer was seen in the later stages if necessary positive input was not provided to L2 learners. They collected data from 68 British learners of Spanish at three different proficiency levels who were told stories including path and motion verbs. They followed Talmy's (2000) framework and Slobin's typology (2004) to classify motion events. English and German are handled under the category of S-languages, whereas Turkish and Spanish are V-languages. In S-languages, a 'path is mapped onto satellites or prepositions which are added to the verb (i.e. go into, go in, go up etc.). On the other hand, in V-languages, the path is encoded in the verb as such (i.e. *entrar* (in English, to go in)). They stated that in S-languages, motion and path are conflated in the main verb and thus the manner of motion verbs does not allow them to be used with prepositions. They hypothesized that the acquisition of path verbs would be easier for British speakers of English since English path verbs would facilitate their learning (i.e. positive evidence). They predicted that British learners of Spanish would have difficulty in the acquisition of manner verbs since (1) those verbs are less frequent in terms of input and did not exist in their mother tongue; (2) they would not have enough evidence for the existence of the boundary crossing (i.e. the context where manner and motion verb did not conflate) and (3) there would be no negative

evidence. In order to test their hypotheses, they used a story of a bank robbery and asked the L2 learners to describe the scene in which the robbers entered the bank. Then, they grouped the verbs L2 learners used into categories such as path, deictic, manner or alternative options. They found that the learners had difficulties with manner verbs and satellites. L2 learners translated English verbs into Spanish and used prepositions to indicate boundaries between events/objects. The possible reason it took a long time to express motion in Spanish might be due to positive and negative feedback. However, it was hardly possible to measure the negative and positive feedback that they were exposed to. Their study also showed the role of L1 transfer in L2 acquisition.

Like Larrañaga et al. (2011), Rankin (2012) investigated the role of the verb-second syntactic rule in German and Dutch when German and Dutch speakers started to learn English. In German and Dutch, a topicalized constituent can be in the first place and a finite verb is used after it in the left periphery of the clause. On the other hand, in English, a verb is not necessarily used in the second place. English has some V2 usages but they are exceptional. To investigate L2 learners' V2 preferences, Rankin conducted a corpus study using the international Corpus of Learner English (ICLE). The variables in the study were the function of the fronted constituent and the type of verb. Rankin did not find significant differences between groups, but observed that V2 may exist in German learners' sentences in English. While they were good at thematic verb placement, inversion was still non-native like. They seemed to learn the *be* inversion rule in declaratives and interrogatives but they did not know of subtle restrictions on *be* inversion. Also, bare adjective inversion was used though it was not V2 syntax (i.e. *Interesting was the article) (p. 154). Such mistakes were handled as results of L1 transfer, since they resulted from the application of topicalization of the constituent in German. Rankin emphasized that L2 learners needed negative and positive input, which would provide reasons why the sentence with *interesting* above was not grammatical. Rankin's study thus presents L1 transfer and strategies of topicalization, focus and contrast in discourse-pragmatic interface, to propose that interface features like topic, focus and contrast are always unstable in L2 learners' grammar.

Ehala (2012), meanwhile, proposes that Russian learners of Estonian perform L1 transfer in the use of Estonian object case assignment and compromise forms. She argues that besides L1 transfer, they use other strategies such as ‘universal cognitive preferences and analogical extension of error patterns’ (p.159). In order to explore their preferences, 91 Russian learners of Estonian were given texts with blanks and asked to fill the blanks with direct objects. In Russian and Estonian, the direct object is used with an accusative case but if the sentence is negative in Russian, the genitive case is used. In Estonian, the object case is very complicated; many factors play a role, such as the aspectual meaning of verbs, and the partiality of the object - subject stance. The most common case marking in Estonian is the partitive with the imperfective aspect, which might be assumed to correspond to Russian accusatives. Also, language transfer would occur in the cases where aspectual meaning is expressed by verbal morphology. In the following, a sample from the production test is given in Estonian, English and Russian:

*Meie firmal on kavatsus sõlmida **leping** (nom) Microsoftiga.*

Our company has an intention to ratify **a contract** with Microsoft.

*Наша фирма решила заключить **договор** (acc) с компанией Microsoft.*

*Neljapäeval toimus koosolek. Seal otsustati, et kui tingimused on rahuldatud, siis sõlmime **lepingu** (gen) kindlasti.*

There was a meeting on Thursday. It was decided that if the conditions are met, we will ratify **the contract** certainly.

*В четверг состоялось собрание, на котором постановили, что если все условия будут соблюдены, то мы непременно заключим **договор** (acc).*

*Kui meid aga tahetakse petta, siis me ei sõlmi **lepingut** (part).*

But if one wants to trick us, we will not ratify **the contract**.

*Если же нас хотят обмануть, то мы не будем заключать **договор** (acc).*

*Ühesõnaga, me olime valmis **lepingu** (gen) sõlmima.*

In sum, we were ready to ratify **the contract**.

*Другими словами, мы были согласны заключить **договор** (acc).*

*Ka vallavanem arvas, et oleks tarvis **leping** (nom) sõlmida.*

The mayor also said that it would be good to ratify **the contract**.

*Старейшина волости также считал, что было бы необходимо заключить **договор** (acc).*

*Siis aga teatas Microsoft, et ta ei ole veel valmis **lepingut** (part) sõlmima.*

But then Microsoft announced that it is not ready to ratify **the contract**.

*Но затем Microsoft сообщил, что ещё не готов заключить **договор** (acc)*

(Ehala, 2012, p.166)

Ehala concluded that transfer was not the only explanation for L2 learners' errors, since the variation pattern in responses was diverse and there were evidently other factors in play. As predicted, in negative sentences, genitive cases were transferred from Russian. L2 learners were innovative and used hybrid constructions that exist neither in L1 nor L2. She added that the main strategy was the drawing of an analogy between L1 and L2, which led to hybrid uses. Therefore, she suggested that language transfer studies should be handled within a much broader scope, taking into consideration 'the mechanism of analogy'.

To sum up, the studies in both linguistics and psycholinguistics considered above point to the effects of similarities and differences between the target language and the mother tongue in SLA. The finding common to many of these studies is that if the items in the target language are different from those in the mother tongue, L2 learners will have difficulty in acquiring them. Here, it is worth saying that understanding the similarities and differences between the mother tongue and the target language is important for an understanding of the system of second language acquisition and hybrid constructions in learners' lexicons, but

there are other even more crucial factors than the mother tongue effect: (1) the degree of subtlety of the target item, or in Eckman's term 'the degree of markedness for items across the languages'; (2) the frequency of these differences/similarities in the positive input; (3) the amount of negative input which would lead to metalinguistic awareness; (4) the application of the right teaching input and materials, and L2 teachers' awareness of subtle differences between the items in the target language and the mother tongue (see Selinker, 1972). In terms of online reading and production, several concepts in the interactive activation model should be taken into consideration: L1 and L2 are active but L1 structures are more dominant than those of L2, the L2 being processed through the structures of L1. This might explain the reasons why different patterns are seen across online and offline experiments to some extent. Since in online experiment L2 readers access implicit knowledge, the potential use of L1 might be higher than in the production task. In the production task, they are aware of the goal of the task: to produce sentences according to the rules they know in the target language. They may therefore have more capability to suppress L1 dominance. All these assumptions on the effect of L1 are helpful for this study in its attempt to understand L2 processing and productions better, and to explain how L2 learners' performances differ from those of native speakers.

In the following section, the results of some studies handling L2 learners' demonstrative uses with traditional approaches (i.e corpus studies, free writings of L2 learners and multiple choice tests) are summarized.

2.4.2 Studies on L2 users' demonstrative uses with traditional approaches. The number of studies on L2 learners' use of English demonstratives is very limited, and most of the existing studies have only touched upon the frequency of demonstratives in L2 learners' writings and oral productions (Hinkel, 2001; Ferris, 1994; Kang, 2004). Kang (2004) collected data from Korean speakers of English, English native speakers and Korean native speakers. The data were collected using a story about a frog: the participants were given the story and asked to complete it. Though Kang's main focus was on the frequency of personal pronouns, he pointed out that L2 Korean speakers of English used the

demonstratives *this* and *that* as determiners, which was an indication of the cross-linguistic influence of Korean. Korean does not have definite and indefinite articles and for marking information, the Korean learners used demonstratives.

Similarly, Hinkel (2001) explored the frequency rates of cohesive devices in academic texts written by English, Japanese, Korean, Indonesian and Arabic students. Hinkel found that the frequency rate of demonstratives were higher in the writings of Korean, Japanese, Indonesian and Arabic students than in those of native speakers of English. While the frequency of demonstrative in native speakers' writing was 0.68%, it was 1.62% in Japanese students' writing, 2.00% in Korean speakers' writings, and 1.44% in Arabic students' writings. The possible underlying reason for the higher use of demonstratives might be that L2 users use demonstratives as a cohesive device in order to bring together unified ideas. In other words, using demonstratives was a strategy of L2 learners to establish cohesion in the text. Also, by using demonstratives, L2 users point back to the information mentioned previously. However, in their writings, demonstratives did not refer to a clause, a phrase or noun phrase. In other words, the antecedents of demonstratives were implied but not explicitly stated (*Although my opinion is like that or I have been doing that* (quoted from Hinkel 2001, p.125). However, in native speakers' writing, the antecedents of demonstratives were explicit, identifiable and specific. Especially, in L2 users' writings, demonstratives were used to refer to an entire context. Hinkel concluded that L2 instructions should include the specific functions of demonstratives in English and the textbooks should give much more attention to their functions, instead of devoting only one paragraph to this topic (see Hinkel, 2001, p. 114 for the little attention that textbooks paid to demonstratives). Though the use of demonstratives in the target language seems to be simple, it is in reality very problematic for L2 users.

Another corpus analysis of 160 English as second language students was performed by Ferris (1994). In this study, the second learners' mother tongues were Arabic, Chinese, Japanese and Spanish. He only grouped the cohesive devices in L2 users' writing. In 12.75% of cases, the intermediate students used demonstratives, whereas in 16.84% of cases, advanced level students used

demonstratives. This indicated that the advanced learners had more pragmatic sensitivity. Similarly, Jin (2001) also presented the higher use of demonstratives in advanced learners' writings than in intermediate students' writings. Jarvis, Grant, Bikowski and Ferris (2003) investigated the frequency of 21 linguistic features across different language profiles such as demonstratives, impersonal pronoun *it* etc. but in the study the use of demonstratives across different language profiles was investigated.

All these corpus studies revealed that L2 learners use demonstratives more frequently than native speakers of English. The proficiency level of learners was another factor that affected the use of demonstratives, since advanced level learners were more sensitive to pragmatics and thus used more demonstratives than students at the intermediate level. Besides presenting the frequency of demonstratives in L2 learners' productions, these studies explored the possible reasons the learners used demonstratives. The first reason was not having enough syntactic and pragmatic structures to express and unify ideas. Therefore, they used demonstratives as cohesive devices to link ideas. In such usages, the antecedent of the demonstrative was not explicit, and clear ran contrary to native speaker use. The second reason was the tendency to mark information for the reader or listener. Through the use of demonstratives, the learners tried to create definiteness in their discourse. All these findings are significant, but looking at the frequency rates of demonstratives in L2 writings and oral productions does not give information regarding the demonstrative system in L2 learners' lexicon or the functions of demonstratives in L2 learners' interlanguages.

Niimura and Hayashi (1996) conducted a detailed contrastive analysis of L1 and L2 uses of anaphoric expressions in order to understand demonstrative systems across English and Japanese, as used by English learners of Japanese and Japanese learners of English. Firstly, they carried out a contrastive analysis of demonstratives in English and Japanese. Regarding Strauss' (1993) schema focus, they stated that in English the choice of one anaphoric rather than another is governed by *focus domain* or *the degree of attention paid to the referent*. For instance, while *this* signals a highly focused entity which has just been introduced into a discourse, *it* signals a low focus entity which has already been introduced.

The corresponding items in Japanese are *ko*, *so* and *a*. As in English, they refer to an entity that is mentioned either earlier, later, or out of context. Differently from English, if the entity is in the speakers' territory or speaker's direct experience, *ko* is preferred; if it is in the hearer's territory or the speaker's non-direct experience, *so* is preferred; if it is referred to out of context, *a* is used. Niimura and Hayashi prepared three close tests using comic strips and gave them to L2 learners, native speakers in Japan, the United States and the UK. For the item where the speaker's face was close to a stain on the carpet and saying: *hmm a bad stain on the carpet*, 68% of native speakers' answers' used *that* to fill the blank, whereas 84% of the advanced non-native speakers and 74% of intermediate non-native speakers used *this*. Niimura and Hayashi concluded that English determiners were selected according to the degree of focus rather than physical proximity, and L2 learners still did not have enough knowledge regarding this. The following item depicted a girl leapfrogging over her father and then saying *I just could not resist.... Dad!* while her father replies *Well, look out! I mean to pay you back for.....* . Of the native speakers, 75% preferred to use *it* for the first utterance, while 64% used *that* for the second utterance. As with the native speakers, the majority of non-native speakers used *it* for the first item. On the other hand, instead of *that*, non-native speakers tended to use *this*, which corresponds to *ko*. The next task was a close test which depicted a conversation in Japanese between two friends in a café. It was seen that non-native speakers of Japanese had difficulty using *ko* to refer to the speaker's direct experience. They also found that L2 learners of English had difficulty with the distinction between the medium-focus use of *that* and the low-focus use of *it*. For instance, for the item reading *I will catch her yet. When she's least expecting.....*, native speakers used *it* whereas non-native speakers preferred *that*. Similarly, in the following item, *Yahoo! I've done..... at last*, native speakers used *it* while intermediate non-native speakers preferred *this*, which was taken to indicate L1 transfer since it referred to an event in the speaker's direct experience. Again, Niimura and Hayashi observed the low and medium foci effect on the use of *that* and *it* in native and non-native speakers' preferences. In the utterances, *Hiroshi: in Sendai, in Tohoku region John: Is..... near Tokyo or far away?*, native speakers preferred *that* to fill the gap, whereas

non-native speakers used *it*. For Niimura and Hayashi, *Sendai* is a new item and less shared, and therefore native speakers preferred *this*, signaling high focus. In the Japanese close test, they found that L2 learners had difficulty in the use of *so*, which indicated L2 learners did not understand that the demonstrative system in the target language is different from that in their mother tongue. They argued that the use of one item instead of the other depends upon subjective factors in the two languages, and these factors ought to be investigated further. They proposed that learning demonstratives in the second language is difficult since the textbook only gives spatial-temporal uses of the demonstratives but does not teach their discursive and psychological functions and when to use one instead of the other.

Differently from the previous studies mentioned above, Berkemeyer (1996) found that L2 learners' successful identifications of the antecedents of anaphora depended on their proficiency levels and how well they comprehend the text as a whole. She collected data from American learners of German at different levels. The participants were given one text and asked to identify the antecedent of an underlined anaphoric expression in German: for example, *Marta hat eine Bluse. Sie ist sehr groß.* All L2 learners interpreted *Sie* as referring to *Marta* instead of *Bluse*. Berkemeyer found a correlation between overall comprehension, German language proficiency test results, and coreferential comprehension. He also identified some strategies followed by his participants. The first was the selection of the closest noun phrase as an antecedent. the second was the use of background/world knowledge without reference to the content of the text. Berkemeyer 's study is essential, as it points to the role of linguistic competence in anaphora processing and supports the idea of exposing L2 learners to positive inputs through formal grammar classes.

Contrary to Niimura and Hayashi's study and Berkemeyer's study, Young (1996) pointed to the correct use of *this* and *it* in Czech and Slovak L2 learners' writing. Young (1996) investigated article usage in the spoken interlanguage of Czech and Slovak speakers of English. He focused on the function of specific/nonspecific reference, shared/unshared discourse context, and transfer from the L1. Young found that Czech and Slovak L2 speakers of English performed form and function mapping in the use of articles and demonstratives.

In other words, L2 learners in the study had a tendency to match a single form with a single function. L2 learners used *this* for referential definiteness instead of *the*. They also used *this* in the function of anaphora. For Czech and Slovak learners, the demonstratives in English were easy to learn and in the data only 3 incongruous uses of *that* were seen. Young also observed that the L2 learners did not confuse *this* with *it*. He specified the conditions that guided the use of demonstratives: 1- the discourse and the feature of NP governs the learners' choice of article 2- *this* was used in an anaphoric sense 3- demonstratives were used for referential definite NPs.

The findings of the studies by Niimura and Hayashi (1996) and Berkemeyer (1996) are crucial since the differences between demonstrative systems across languages affect L2 learners' demonstrative representations. L2 learners used strategies to compensate for their deficiencies in the use of demonstratives, such as selecting the nearest entity as an antecedent or transferring some rules from their target language, as in the case of *ko* in Niimura and Hayashi's study. Though the participants in Young's study behaved like native speakers, the most essential observation is the interchangeable use of *this* with *the*. In the corpus studies previously mentioned, L2 learners used demonstratives for definiteness, to mark information or a noun phrase. All the studies mentioned in this section study demonstratives via a traditional approach, such as the use of a close test or free composition writings. This means that L2 learners' online perceptions of demonstratives have not yet been investigated. In the next section, experimental studies on the anaphora processing of L2 learners are summarized.

2.4.3 Studies on anaphora processing of bilinguals and their theoretical implications in SLA. Before touching upon the details of the studies on the anaphora processing of L2 learners, it is worth observing that current anaphora studies focus mainly on seven areas: L2 learners' perceptions and uses of (a) overt and null pronouns in Italian, English, Spanish and Greek (Belletti, Bennati and Sorace, 2007; Sorace and Filiaci, 2006; Sorace, Serratrice, Filiaci and Baldo, 2009; Serratrice, Sorace, Filiaci and Baldo, 2011); (b) local and disjoint

constraints in the binding of personal pronouns to antecedents in Turkish, Korean and German (Roberts, Gullberg, Indefrey, 2008 or Kim, 2008 for local binding of *caki-casin* in Korean-English); (c) unergatives and unaccusatives and the position of focus (Lozano, 2006); (d) subject-verb agreement (Jiang, 2004); (e) gender-marked pronouns and gender and number-marked reflexives (Liu and Nicol, 2008); (f) the distinction between definiteness and demonstratives (Inonin, Baek, Kim, Ko and Wexler, 2012; Robertson, 2000); and (g) gender marking in French and German (Darren, 2008; Foucart and Frenck-Mestre, 2011). As is evident from this list of topics, and as many of these studies themselves observe, L2 learners' preferences with regard to anaphora and demonstratives have not been studied exclusively in relation to second language acquisition (Inonin, Baek, Kim, Ko and Wexle 2012, p. 71). Like Ionin et al., Swierzbinska (2010) points to the fact that L2 studies know very little about L2 learners' representative functions of demonstratives and demonstrative determiners.

Investigating the online pronoun resolution of Turkish and German L2 learners of Dutch, Roberts, Gullberg and Indefrey (2008) found L1 influence in the processing of Dutch pronouns. Fourteen Turkish, sixteen German and thirty native speakers of Dutch participated in online eyetracking and offline experiments. 24 experimental items, including local, disjoint and optional resolutions were constructed (see the sample below):

Resolution Types: Sample Texts

1- Local Resolution

De werknemers zitten in het kantoor. Terwijl Peter aan het werk is, eet hij een boterham. Het is een rustige dag.

“The workers are in the office. While **Peter** is working, **he** is eating a sandwich. It is a quiet day.”

2-Disjoint Resolution

De werknemers zitten in het kantoor. Terwijl Peter aan het werk is, eten zij een boterham. Het is een rustige dag.

“**The workers** are in the office. While Peter is working, **they** are eating a sandwich. It is a quiet day.”

3- Optional Resolution

Peter en Hans zitten in het kantoor. Terwijl Peter aan het werk is, eet hij een boterham. Het is een rustige dag.

“Peter and Hans are in the office. While Peter is working, **he** is eating a sandwich. It is a quiet day.”

(Roberts, Gullberg, Indefrey 2008, p. 341)

In the offline tasks, both German and Turkish learners of Dutch showed native-like preferences and found disjoint conditions unacceptable (item 2 above). Both groups preferred local resolution, but their preferences were not observed for the optional resolution because of the nature of the offline task. The authors were not sure which antecedents were preferred for optional resolution. In other words, L2 learners might have preferred a local antecedent instead of a sentence-external one. Later, they added comprehension questions after the sentences, which asked the learners to decide the referents of personal pronouns as local, disjoint or optional antecedents. In the local and disjoint conditions, they did not find differences across the groups, but in the optional reference condition, Turkish learners differed from both German and Dutch speakers. Turks preferred subject-external antecedents (i.e the subject in this condition that is not local) for pronouns in the optional resolution condition, whereas Dutch and German participants preferred local antecedents in the optional resolution condition. In the online eyetracking experiment, both German and Turkish learners of Dutch did not prefer the optional resolution condition. Their processing of the optional resolution condition was longer than that of Dutch native speakers. Also, fixations were shorter in the local condition than in the disjoint condition. On the basis of all these results, Roberts et al. concluded that L1 effect was influential in the offline judgmental task. This indicates that Turkish learners interpret unstressed Dutch pronouns as indications of topic change through the creation of contrastive

meaning, as in Turkish. Roberts et al. emphasized that referential dependencies were problematic, though L2 learners were highly proficient since interpreting pronouns requires both syntactic and discourse pragmatic information. For Roberts et al., L2 learners have problems in coping with optionalities at the interface level where both syntactic and pragmatic information need to be used.

Besides the cross-linguistic effects of L1, Sorace and Filiaci (2006) draw attention to the role of the interface between syntax and discourse in L2 learners' inaccurate pronoun selection and use. By testing the interpretation of intersentential anaphora, they proposed that in order to have native speaker-like preferences in Italian, English learners of Italian should be able to understand:

- 1- the syntactic conditions on the licensing of null subject
- 2- the discourse conditions on the distribution of pronominal forms
- 3- the processing strategies for the correct on-line production and interpretation of subject pronouns (p. 350)

In order to explore which items listed above L2 learners were able to understand, they used Picture Verification Tasks in which the participants interpreted and produced null, overt pronominal, preverbal and postverbal NP subjects. The following sample was from their experimental stimuli:

1-

Mentre lei_k//pro_i si mette il cappotto, la mamma_i dà un bacio alla figlia_k.

While she wears the coat, the mother gives a kiss to the daughter

'While she/*pro* is wearing her coat, the mother kisses her daughter.'

2-

La mamma_i dà un bacio alla figlia_k mentre lei_k//pro_i si mette il cappotto.

The mother gives a kiss to the daughter, while she wears the coat

'The mother kisses her daughter, while she/*pro* is wearing her coat.'

(p.352)

They predicted that the differences between native and non-native speakers would result in especially overt pronoun conditions instead of null pronoun conditions. The groups would differ from each other in the backward anaphora condition rather than the forward anaphora condition. The results were according to their predictions. In the interpretation of a subordinate clause with an overt pronoun condition (see item 2 above), Sorace and Filiaci found a significant difference between native speakers of Italian and near-native speakers of Italian. When the subject of the subordinate clause was an overt pronoun, the native speakers interpreted the overt pronoun as referring to an ‘extralinguistic antecedent’ not mentioned in the context, whereas near-natives did not have such preferences. The most preferred antecedent for near-native speakers was the subject of the matrix clause, which was not preferred by native speakers. When the subject of the subordinate clause was null, there were no significant differences between the two groups. In the backward anaphora conditions in which the matrix subject was preferred for null pronouns, non-native speakers had a similar preference to the native speakers and both groups preferred the subject as antecedent. This meant that near-native speakers acquired target-like processing strategies for anaphora resolution of null pronouns and were sensitive to the same structural constraints. On the other hand, native speakers preferred the object (i.e daughter) as an antecedent for the overt pronoun. In the backward conditions, native speakers preferred an extralinguistic referent as an antecedent. However, L2 learners behaved differently from the natives in the condition where extralinguistic referents were more preferred and appropriate than the subject. For Sorace, L2 learners did not have enough resources to have native-like preferences for the extralinguistic conditions. Sorace and Filiaci concluded that L2 learners had a syntax of pronominal subject and null-subject grammar and they had a Position of Antecedent Strategy-the overt pronoun prefers an antecedent in the lower positions, whereas null pronouns prefers an antecedent in Spec IP. However, they concluded that L2 learners did not use multiple recourses to integrate all this knowledge. It was also seen that native speakers were flexible in their antecedent assignment. All these findings were interpreted as the result of indeterminacy at the syntax and discourse interface in linking pronouns to antecedents.

In another study, Sorace, Serratrice, Filiaci and Baldo (2009) showed that there were multiple factors that affect anaphora processing by bilinguals and that a cross-linguistic effect was not enough to explain the inaccurate occurrences or preferences. They investigated bilingual children's acceptance of overt and null subjects, which were at the interface between syntax and discourse. The data were collected from twenty English-Italian bilingual children in the UK, thirty-nine monolingual English speakers, thirty-eight monolingual Italian-speaking children in Italy, and thirty-one Spanish speakers of Italian. The children were grouped in terms of their ages between (6 to 12); (7 to 11) and (8 to-10). In terms of overt and null pronouns, Spanish and Italian have overlapping features, whereas Italian and English have partially overlapping features. In Italian and Spanish, topic shift determines the use of overt or null pronouns. Below are sample stimuli from their study:

While John is eating, **he** (John) is talking on the phone. SAME TOPIC

While John is eating, **he** (Paul) is talking on the phone. DIFFERENT TOPIC

Mentre Gianni mangia, **æ** (Gianni) parla al telefono *While Gianni eats, talks on the phone* SAME TOPIC

Mentre Gianni mangia, **lui** (Paolo) parla al telefono *While Gianni eats, he talks on the phone* DIFFERENT TOPIC

(Serratrice and Sorace 2009, p. 204)

Sorace et al. predicted that partial overlapping and the amount of exposure to the target language would affect processing. The amount of exposure to input in particular would affect their processing: English-Italian children in the UK would have more difficulties with Italian than those in Italy. They found that Italian children were 100% correct whereas monolingual children were not. English-Italian and Spanish-Italian bilinguals preferred overt pronouns though there were no topic shifts. This indicated that such phenomena could not be boiled down to

cross-linguistic effect. The most interesting finding was that even Spanish-Italian children had difficulties when deciding on an appropriate pronoun when there was no topic shift, which indicated that having two languages and processing was cost effective regardless of partial or complete overlapping features between languages.

Similarly, Belletti, Bennati and Sorace (2007) showed that though L2 learners learned the null subject parameter of Italian, they did not have native-like performance in the interpretation of null pronominal subjects. They also differed from native speakers in the conditions in which the use of overt pronouns were deemed suitable. Similar to Sorace and Filiaci (2006), they pointed out that the use of overt and null pronouns was governed by discourse factors, and thus L2 learners would not know when to use and when not to use the overt pronoun. They collected data from eight native speakers of Italian and seventeen American and British English learners of Italian who had lived in Italy for 8.5 years. They completed several tasks such as (a) VS videos where the participants watched some videos and were asked what they had just seen; (b) story-telling where the participants were shown silent films and were asked to tell the rest of the story; (c) Picture Verification where the participants were given some sentences and were asked to match the sentences with the pictures on the screen; and (d) headlines where the participants were given some verbs and photographs and were asked to broadcast news. In all these tasks, they explored the use of the preverbal and postverbal definite and indefinite subjects of L2 learners and native speakers of Italian. Both learners and natives used a preverbal subject for the situations in focus but the number of overt pronominals was higher among learners than among native speakers. However, the two groups showed different preferences: natives preferred the use of a subject after a verb when the sentence is indefinite rather than definite. On the other hand, regardless of definiteness and indefiniteness, non-native speakers preferred the subject before the verb. Learners always interpreted the overt pronoun as referring to the subject in the matrix clause. They produced more sentences in SVO order than VSO. The effect of L1 and the active L1 discourse strategy were very obvious in their production although they were at a higher advanced level. The authors hypothesized that economy factors such as

the preference for a null pronoun instead of an overt pronoun would only affect native speakers but not non-native speakers. The final conclusion was that L2 learners would have changes to contact between languages and when they needed they would use one of these grammars, whereas monolinguals would have only one grammar. Therefore, different answer strategies were seen in L2 data of syntax and discourse interface features.

Similar to Belletti et al. (2007), Lozano (2006) showed that seventeen English and fourteen Greek learners of Spanish learned formal syntactic properties very well and showed native-like performance. However, they diverged from native speakers in discourse-related properties, which was a constant problem in their data. He investigated the acquisition of unergatives and unaccusatives and how the position of focus would affect non-natives' preferences. To test this, he used a contextualized acceptability judgment test. He handled non-native divergences from native speakers as optionality. Following Sorace's (2000) and Papp's (2000) optionality definition, he classified the cases where non-natives presented optionality as follows: (i) the cases where natives preferred *a* to *b* whereas non-natives accepted both *a* and *b* at the same time; (ii) cases where natives rejected both *a* and *b*; (iii) cases where in contrast to natives, non-natives preferred *b* rather than *a*; and (iv) cases where non-natives showed indeterminate choices and accepted both *a* and *b*. He found that his participants knew overt and null pronominals. He also added that the participants knew that overt and null pronominal could be used interchangeably, but they were not using them correctly in discourse. In other words, they knew formal syntactic rules but they failed to translate this knowledge with regard to interpretable features such as focus and topic. He concluded that L2 learners did not pay attention to information structure and he called L2 learners' misuse phase as 'Impaired Syntax Discourse Functional Features'.

In contrast to the studies above, Jiang (2004; 2007) found non-native preferences changed across different experiments. In other words, in one experiment, non-native speakers had the same preferences as native speakers, whereas in another experiment their preferences were totally different from those

of native speakers. Jiang (2007) investigated the subject-verb agreement of non-native speakers by using the following sentences in an offline task:

1- The bridges to the island were about ten miles away.

2-*The bridge to the island were about ten miles away.

The participant caught the anomalies in the second sentence, like the native speakers. On the other hand, in another online study, Jiang (2007) found that L2 learners did not catch the anomalies related to *plural s* in the following sentence: “*The visitor took several of the rare coin in the cabinet.*” Liu and Nicol interpreted Jiang’s results as the different level of attention across experiments. In the online experiment they would fail to notice plurality, whereas in the offline task they would notice since they were not time-constrained. Therefore, Liu and Nicol (2008) conducted an online experiment in which they investigated L2 learners’ processing of gender-marked pronouns and gender and number-marked reflexives. Two different contexts were written: one in which the reflexives matched with the context, and another where the reflexives interacted with pragmatic information. L2 learners were aware of the violations in the following sentence: *the new stepmother prepared himself to meet the family*. However, in the following sentence, they did not show native-like preferences: *The hungry guests helped himself to the delicious meal*. These results indicated that the learners were aware of gender agreement but information about number was still problematic.

Similar to Jiang (2004; 2007), Liu and Nicol, Lazono (2006) and Sorace and Filiaci (2006), Inonin, Baek, Kim, Ko and Wexler (2012) found that though Korean speakers of English knew the distinction between definiteness and demonstratives, they did not have strong native-like preferences. They used an analogy strategy between the demonstratives and the definiteness. It is also worth noting that they found non-native preference variations across different tasks. In other words, while advanced learners behaved like native speakers in grammatical judgment tasks, the same group differed from native speakers in the comprehension task. The authors drew attention to the different findings across

different tasks (comprehension vs. production) and concluded that some tasks do not reveal the real L2 preferences of articles and demonstratives, but mask the reality. In their study, they used elicited production in the form of grammatical judgment tasks and picture-based tasks to collect data from 21 native speakers of English and 48 L1-Korean speakers of English (24 advanced speakers of English and 24 intermediate speakers of English). They predicted that L2 learners would perform semantic transfers from their L1. Korean has a tripartite demonstrative system, consisting of *i* ('this' - a proximal form), *ce* (that over there) and *ku* (neutral form and close to both hearer and speaker). *Ku* can be used in the context if the entity is not unique in the context, but sometimes it is used when uniqueness is established. It can be used anaphorically to 'emphasise or create contrastive focus'. Therefore, for Inonin et al., *ku* corresponds to *that* instead of *the* in English if it is used in an anaphoric context, whereas if it is not used in an anaphoric context, it will behave like *the* in English. Therefore, in learning unmarked and marked features of *the* and *that*, Korean learners of English should differentiate in which context native speakers prefer to use *that* instead of *the* or vice versa. The results showed the effect of language level on native-like performance: while advanced learners had native-like preferences, intermediate level learners had different preferences from those of native speakers. The intermediate level learners did not show any preferences for *the* and *that* in the non-unique category in the elicited production task, whereas in the comprehension task, both advanced and intermediate learners were different from native speakers. Both groups showed their mother tongue preferences for *the* and *that* and mapped *ku* to *both*. The authors concluded that their participants knew the distinction between demonstratives and definiteness but did not have consistency in their performances. Therefore, they added that their participants both 'had' and 'did not have' native speaker preferences across the different tasks.

Similar to Inonin et al. (2012)'s findings, Robertson (2000) observed that L2 learners used demonstratives more often than the definite *the* although the definite article was more correct than demonstratives. The optionality in L2 learners' use of articles might have been due to their trying to perform a correct mapping of features of definiteness and referentiality onto abstract features of

determiner phrase. In Robertson's data, Chinese speakers of English sometimes omitted articles in their utterances, but also sometimes used them. Their optional use or non-use of articles varied from one sentence to another and there was no predictable rule governing their productions. Robertson also stressed that L2 learners' semantic representation of demonstratives was under the influence of their L1. He stated that though Mandarin Chinese does not have an article system corresponding to that in English, the determiners *zhei* ('this') and *nei* ('that') are used to signal definiteness and *yi* ('one') to signal indefiniteness, and cannot be used in the topic position. *Nei* ('that') and *yi* ('one') in some cases function like the definite and indefinite articles *the* and *a*. He ran an experiment with 18 Mandarin speakers of English where the participants were asked to describe 4 diagrams to each other and to draw them as instructed. As a result of the study, Robertson defined three reasons why the participants omitted the article: a) determiner drop (i.e. as in their mother tongue, if the second NP is related to the head NP, they drop the article); b) recoverability principle (i.e. if the context is sufficient to enable the recovery of definiteness/indefiniteness, they do not use an article); and (c) language transfer (i.e. demonstrative *this* and *one* is used to mark definiteness and indefiniteness, as in their mother tongue). Robertson concluded that all the optionality in the interlanguage grammar of these participants is an indication of a move from discourse-oriented language to syntax-oriented language, in which grammatical features are marked overtly.

One common finding of all these studies was that although L2 learners may be at an advanced level, their preferences regarding these specific target language features and uses often differ from those of the native speaker of the target language. There are several factors that affect L2 learners' misuse or optional non-target features. One of the main factors is the role of the mother tongue and overlapping features between the target and mother tongue. The second factor is uninterpretable features, which exist at the interface between syntax and discourse or syntax and pragmatics. In such cases, L2 learners are observed to know the rules but they cannot use them appropriately when the pragmatic factors determine whether one or the other feature should be used. The third factor is the cost effect of having two languages at the same time. When L2

learners have difficulty, they incline to use grammar rules from the other language. The fourth factor is the task effect. L2 learners' performances show variation across different experiments, such as offline vs. online experiments, or spoken and reading tasks. In the following, the studies which point to the different performances of L2 learners across different tasks or experiments are demonstrated, and the possible underlying reasons behind the variations in the studies are discussed.

2.4.3.1 Different Performances across different tasks/experiments: The role of Explicit and Implicit knowledge. In the second language acquisition studies using both traditional and experimental approaches, L2 learners demonstrated native-like preferences in one task while in another their performances were not the same as the native speakers'. Here, the main issue that needs to be answered is what causes such variation across different tasks. Before touching upon the possible reasons, it is worth listing the studies which found such variations in L2 learners' data.

Tarone and Parris (1988) investigated 10 Arabic and 10 Japanese students' use of articles when they were asked to speak and write in English. They noted that L2 learners' accuracy with respect to the use of articles changed from one task to another. Similarly, Roberts, Gullberg and Indefrey (2008) investigated the use of local, optional and disjoint pronoun use of Turkish and German speakers of Dutch and found that in the identification of antecedents of referents, an L1 affect was seen in the production of Turkish speakers, whereas the same effect was not seen in an eyetracking experiment. Contrary to Roberts et al., Clahsen and Felser (2006) pointed out that though L2 learners were native-like in the offline tasks, their offline achievement did not mean their grammar was native-like in online tasks. Therefore, they pointed to the necessity of an integration of offline and online tasks in order to investigate L2 learners' interlanguage. Jiang (2004; 2007) noticed the change of L2 learners' preferences in different experiments where the use of subject and verb agreement was tested.

What might cause these variations in L2 performances? For Tarone and Parris, the first reason might be the demands and characteristics of different

experiments/tasks. In their study, the participants' article use was native-like in the narration task since they needed to mark certain noun phrases so well that the hearer would keep track of the narration. On the other hand, in the interview task, they did not need to mark the noun phrases and thus their performances were not like those of native speakers. Tarone and Parris's reason is logical since L2 learners mainly focus on the goal of the activity and what is expected from them. In interview one, they focused on the answers and their purpose is to give answers to questions. They therefore did not pay especial attention to the need to be clearly understood by the hearer. On the other hand, in the narration task, the purpose is to be understood; otherwise, their hearer would not get what they were saying and they would be unable to accomplish the task together. Though both of them are spoken tasks, their goals are different and this might be a reason for the variations. Another reason might be the time constraints of the online experiment. In the judgment tasks, L2 learners had enough time to think and control their choices, whereas in the online tasks, they did not have enough time. Also, as Clahsen and Felser mentioned, the knowledge that online and offline tasks demand from L2 learners differs. In the offline tasks, explicit knowledge is activated or accessed, whereas in the online tasks, implicit knowledge is used or accessed. Bialystok (1982) demonstrated how different tasks led L2 learners to access explicit and implicit knowledge. She showed that writing tasks induce L2 learners to not use automatic knowledge whereas in oral communication they use uncontrolled knowledge. Ellis (1994) defined implicit knowledge as 'subconscious' knowledge, whereas explicit knowledge is conscious knowledge. Similarly, as Rebuschat specified in psychology, implicit knowledge is unconscious knowledge that a user is not aware of having. On the other hand, explicit knowledge is knowledge that the user is conscious of having, though s/he may not verbalize it. Segalowitz and Hulstijn (2005) defined explicit knowledge as effortful processing, while implicit knowledge entails automatic processing. Hulstijn (2005) showed explicit knowledge activates areas of the neocortex connected to the hippocampus, whereas implicit knowledge also activates the neocortex but the neocortex is not connected to the hippocampus. The difference in brain activation indicates that explicit and implicit forms of knowledge are processed differently.

Apart from these studies, Ellis (2005) grouped tasks and demonstrated how each form of knowledge was operationalized through each task. According to his results, oral tests (such as oral imitation tests and oral narration tests) and timed grammatical tests measure implicit knowledge, whereas untimed grammatical tests and metalinguistic awareness tests tap the explicit knowledge of the L2 users. Similar to Ellis, Hulstijn (2005) stated that in untimed reading and writing, explicit knowledge is used to monitor and control production. Erçetin and Alptekin (2012) argued that there is a correlation between explicit knowledge and working memory and advanced Turkish learners of English employed explicit knowledge in reading, as shown by the propensity for text boundedness in areas such as anaphora resolution and the resulting vocabulary-biased processing. The learners did not use implicit knowledge. Erçetin and Alptekin's findings are very important, but the manner in which they measured implicit knowledge is inadequate and the components of implicit knowledge in L2 readings were not defined comprehensively. All they state is that in their study implicit knowledge is evident in timed reading, and that in the timed reading experiment L2 learners did not present native-like preferences. Similarly, McDonald (2000) proposed that L2 learners focused on surface forms in reading, which were not even tackled by native speakers because of their difficulty level.

Sabourin and Haverkort (2003) explained that the degree of L2 learners' 'nativeness' across different tasks such as offline and online ERP studies would be related to L1 grammatical features and the strategy that L2 users employed during processing. In their study, they found that German speakers of Dutch carried out translations of Dutch sentences as a learning strategy and used their L1 processing strategies to process L2 sentences that were similar to their L1. Foucart and Frenck-Mestre (2011) proposed L2 input experience as a reason for different performances across tasks. Those who were exposed to the target language longer showed more constant native-like preferences than those who were not.

To sum up, L2 learners' preferences vary across different tasks. This might be due to (a) the purpose and demands of the tasks; (b) having different mental representation of knowledge; (c) language transfer; and (d) the degree of

exposure to the target language. The methodological implication of this is that L2 learners' variations should be interpreted cautiously in terms of the tasks and the role of accessed knowledge. While analyzing data, language transfer, and especially similarities between L1 and L2, should be taken into account. However, exposure to the target language is difficult to estimate. Rough calculations can be given but in the foreign language classroom setting, individual differences play a role in the amount of input. Therefore, this factor should not be included in the data analysis.

2.4.4 Two Hypotheses on Processing of L2 Learners: Interface Hypothesis/Representational Deficit vs. Shallow Processing/Processing Deficit. Two pioneer hypotheses on second language processing are proposed. Though the common argument in these hypotheses is that the processing of L2 learners differs from that of native speakers, these hypotheses are different from each other in terms of the underlying reasons behind the processing differences between native and non-native speakers. In the following the tenets of these hypotheses are explained briefly and the studies and arguments that have been advanced to support each of them are also provided. Later, what all these hypotheses indicate for the current study is briefly touched upon.

Sorace (2004; 2005) and Sorace and Filiaci (2006) proposed an interface hypothesis. They argued that L2 learners acquire all the syntactic properties of the target language (i.e narrow syntactic features) but that the properties at the interface level between syntax and another cognitive domain such as pragmatics, discourse or semantics are problematic even if L2 learners are at an advanced level. The properties at the interface level will not be acquired completely. The possible reasons behind the lack of native-like performances in the interface hypothesis are: (a) residual first language (L1) effects; (b) indeterminacy; and (c) optionality

Sorace (2000) defined syntactic optionality in the interface level as when two or more variants of a structure

- a- Make use of the same lexical resources
- b- Express the same meaning (p. 93)

However, one of the variants in the set was more grammatical than the other according to the 'economy principles of Minimalist Optionality Theory'. Factors such as frequency and acceptability affect grammar and optionality. Discourse/pragmatic constraints affect the distribution of optional forms and so optional forms may have different semantic representations. These semantic/pragmatic factors also affect the appropriateness of one item over the other in the set. L2 grammar has more tolerance for optionality than native grammar, since it does not have enough representation at the interface level between semantics and pragmatics.

Another possible reason for optionality at the interface level might be (a) underspecification at the level of knowledge representation effects mapping between syntactic structures with their interpretation because the parametric choices in L1 and L2 are different, or a particular feature does not exist in L1 or L2 ; (b) insufficient processing resources to integrate multiple types of information involved at the interfaces between syntax and other cognitive domains; (c) the quality and quantity of input that L2 learners were exposed to; and/or (d) the cross-linguistic influence of the L1. The use of syntactic optionality that is permanent and stabilized in L2 grammar is seen at both intermediate and advanced levels. For instance, Sorace (2005) suggests that the reason L2 learners have problems with V2 phenomena (where a verb is always used in the second place) is related to the specification of the illocutionary force of an utterance. L2 users' V2 choices depend on whether a constituent is in focus or topicalized. Therefore, in V2 cases, knowing the rule is not enough. L2 learners should be aware of the pragmatic context governing the selection of one option in focus instead of the other in topicalized entity. It was seen that advanced learners differed from natives in both production and comprehension tasks. However, they were cautious in approaching the residual differences, stating that the processing differences between the two language groups may not be attributable to L1 interference in syntactic representations (i.e Sorace 2009, Sorace and Filiaci 2006).

Papp (2000) handled optionality from a much broader perspective than Sorace. Papp predicted that L2 learners would think about the target language

rules and if L1 and L2 both had obvious and clear rules, they would acquire them and perform like native speakers. However, if the rules were ambiguous, it took some time to achieve a native-speaker like level of mastery. The source of optionality depended upon the state of learning and the degree of exposition to the target language. Papp handled optionality under two categories: stable and developmental. Stable ones refer to marked differences between L1 and L2, where the effect of L1 is seen on the use of the L2. She proposed that most of the L2 learners' optionality was generally the result of the input provided to them in the instructional settings where less target language, including more formal and complex rules, was provided. More complex, infrequent and unclear features would be learned very late. Another type of optionality is indeterminacy, where judgments remained around the mean value. Indeterminacy might be a result of a lack of knowledge and thus lead to differences from native speakers. Sorace (1993) pointed that indeterminacy was even seen at highly advanced levels. One of his interesting findings was that though the theoretical literature highlights the optionality of two items (i.e double focus constructions, focused infinitive, long and partial operator movement), native speakers did not show optionality on the close test. He argued that though categorical distinctions were predicted, these would not occur in the experimental studies. The main issue was the proportion of native speakers who preferred optionality, and this would reflect the input to which the learners were exposed. That input also provided the level of acceptability to them. On the other hand, non-native speakers' optionality was permanent and very consistent. He concluded that the items of the target language should firstly be categorized as optional, categorical or quasi-optional. When the data in the target language were ambiguous and interpretable, L2 learners would use an analogy strategy, imposing L1 settings.

There have been many studies which have supported the interface hypothesis. These studies cover various areas: (1) Production and interpretation of pronominal subjects (Hulk and Muller, 2000; Belletti, Benatti and Sorace, 2007; Serratice, Sorace, Filiaci and Baldo, 2011; Sorace and Serratci, 2009); (2) the interface between syntax and morphology (Darren, 2008); (3) the interface between syntax and lexicon (Montrul, 2000; Sorace 1993); (4) the interface

between syntax and semantics (Montrul and Slabovaka, 2003); and (5) the interface between pragmatics and syntax (Kim 2008). In the following, some of these studies are presented in detail in order to better understand how the studies have addressed and handled the interface phenomenon.

Hulk and Muller (2000) investigated an interface hypothesis from a generative grammar framework (i.e. object drop and root infinitives), assuming that cross-linguistic influence would appear when the features in the two languages overlap but differ from each other subtly. L2 learners would have more than one option, one of which would be correct in the target language. In the study, the cross-linguistic effect was handled as either ‘acceleration/facilitation’ or ‘delay/transfer’. They found that both young and adult learners had problems in pragmatic terms with overt pronominal subjects. L2 learners’ metalinguistic awareness was not like that of native speakers. They concluded that age, language contact and the linguistic intuitions of learners played a role in bilingual children’s off-line preferences, but online processing of different anaphoric expressions should be studied. They emphasized that language internals such as the information, which is at the interface pragmatics and discourse level, had a main effect on cross-linguistic influence rather than on language externals such as language dominance. Another study was conducted by Darren (2008) to investigate the knowledge of an individual L2 learner (‘Tom’) of gender and case features at morpho-syntax interface. Darren focused on uninterpretable features in German and English that were overlapping and not corresponding. He hypothesized that interpretable gender case in English would facilitate learning German, since both languages have interpretable cases. On the other hand, as uninterpretable gender in demonstratives does not exist, there would be difficulties and delays in language learning. The data were collected from Tom, who lived in Germany for six years as a journalist working for German and English publications. An informal interview was carried out with Tom. Darren showed that though Tom was accurate in verbal agreement, verbal second and verbal final (in other words good at verbal morphology), he was not successful in the use of determiners and adjectives in German (i.e. poor in DP morphology). He found that Tom learned those uninterpretable features that do not exist in his

mother tongue. However, he had difficulty in guessing inherent gender features of nouns such as abstract masculine, neuter or feminine features).

Kim (2008) studied early and late Korean-English bilinguals' local binding of the anaphoric expression *caki-casin*. In the use of *caki-casin*, the bilinguals needed to use both syntactic and pragmatic knowledge at the same time. Kim's main hypotheses were twofold. Firstly, if the L2 learners accessed the universal grammar (UG), they would not have difficulty in acquiring UG-driven features such as strict and sloppy reading of VP ellipses compared to language-specific interface properties like discourse-pragmatic constraints of local and non-local binding. Secondly, if the critical age were a factor, early bilinguals would perform like monolinguals. Data were collected from twenty-four Korean-English bilinguals in the USA, fifteen late Korean-English speakers and forty-one Korean monolinguals. 100 sentences including core and exempt binding were constructed to use in a Grammatical Judgment task with Preferential Sentence Interpretation tasks. In core and exempt binding conditions, early bilinguals' preferences were the same as those of monolinguals, whereas late bilinguals' preferences diverged from those of monolinguals. In addition, late bilinguals accepted the sentences including 'subject and c-commanding antecedents' instead of non-subject and non-c commanding antecedents as grammatical. Similar to the results in the corpus studies (see Ferris 1994; Jin 2001), Kim's results demonstrated that late bilinguals' judgments were influenced by grammatical-structural factors. UG-based features were acquired by both early and late bilinguals, but both groups had difficulties with language-specific properties in the conditions where the pronoun referred to a non-local antecedent. Kim concluded that language specific features where syntax and pragmatic interface were, like non-local binding cases, still problematic for late bilinguals. He also added that though early bilinguals performed like monolinguals they had problems with language specific properties, but their incorrect responses were fewer than those of late learners.

Differently from the studies above, Serratrice, Sorace, Filiaci and Baldo (2011) point to 'the cross-linguistic influence at the interface between morphosyntactic and discourse/pragmatic features in bilingual acquisition' (p.3). By investigating pronominal object acquisition of English-Italian and Spanish-

Italian bilingual and monolingual children, they argued that irrespective of similarities and differences between language A and B, knowing two languages and having the input of these languages affects language processing. They proposed that syntactic representations are shared by languages and thus the shared structures will affect subsequent processing and the mental representation of two languages. Therefore, the use of a structure in language A will also prime the corresponding structure in language B. If the structures in the two languages overlap syntactically but also in terms of pragmatics/semantics, then cross-linguistic influence will not be noticeable. ‘However, if the morphosyntactic structure is shared across two languages (i.e the presence of overt pronominal subjects in both English and Italian), but the syntax maps onto different discourse-pragmatic domains (i.e overt pronouns are used for both +topic shift and –topic shift in English but not –topic shift in Italian), then the routine processing of the shared structure in both contexts in language A might lead to the inappropriate extension of the syntax-discourse pragmatics mapping in language B’ (p.21). Hartsuiker, Pickering and Veltkamp (2004) claimed that in order to have shared/integrated representation of syntax across languages and even in production and comprehension, an item in the native language should syntactically prime the corresponding item in the target language. Therefore, having shared features in the two languages is crucial for priming, but those features which differ between the two languages will not prime each other. Their syntactic priming effect and cross-linguistic effects at the interface between discourse/pragmatics and syntax in non-overlapping features across two languages can also explain why in language acquisition some items are easier to learn than others from a syntactic priming aspect.

To date, the major findings of the studies on the interface hypothesis have demonstrated that non-native speakers achieve native-like performance in terms of the features on the surface level. They are good at syntactic rules but they do not have native-like preferences when the features are related to discourse, semantics or pragmatics. Unseen or infrequent rules govern the selection of one item instead of the other and non-native speakers still have problems in grasping the implicit rules. Also, mapping syntactic features onto discourse/pragmatics across

languages is confusing for L2 learners, and may lead them to wrong mental representations of the L2 structures if the discursive/pragmatic features do not correspond to the L1. Naturally, these problems with the uninterpretable features and typological differences in terms of discursive/pragmatic features are also observed in online and offline experiments. For the defenders of the interface hypothesis, the deficit of the non-native speakers in behaving in a native-like manner is because of the deficit in allocating processing resources. Sorace and Filiaci (2006) explained the deficiency as the result of not having ‘the necessary processing resources to integrate multiple sources of information’ (p.361) or – specifically – of having inefficient processing strategies when it comes to coordinating syntactic and pragmatic knowledge (see Sorace 2004; 2005).

On the other hand, Clahsen and Felser (2006a;b) argued that L2 learners’ deficit in performance is due to the lack of representation of the target language. Their Shallow Structure Hypothesis (SSH) proposed that L2 learners’ syntactic processing is shallow, or at least less deep, because L2 learners have less syntactic details of the target language (i.e. cannot compute movement traces, subadjacency or syntactic gaps but can be good at processing local entities/features), and they use lexical-semantic and plausibility cues in parsing instead of syntactic information (see Felser and Roberts, 2004; Marinis, Roberts, Felser and Clahsen, 2005; Papadopoulou & Clahsen, 2003). They do not agree with Sorace’s claim that though L2 learners have full and detailed syntactic representations, they do not have the required parsing mechanisms. Contrary to Sorace, they claim that parsing strategies are universal and do not have to be learned. Therefore, both L1 and L2 users use the same parsing strategies, such as minimal attachment, recency and active filler gap, ‘but L2 learners’ application is restricted due to the knowledge source that is the incomplete, divergent L2 grammar’ (p.117). If L2 grammar is restricted, they will not be able to make even minimal attachments. For instance, Clahsen et al. (2010) studied the morphological processing of L2 learners in inflectional and derivational word conditions. They found processing differences between native and non-native speakers, since L2 learners are less sensitive to morphological representations than native speakers. Therefore, their grammar is ‘incomplete’, ‘divergent’ and ‘unsuitable for parsing’ because of the lack of

detailed, implicit grammatical knowledge. It is difficult to see shallow processing in production tasks since L2 learners have a chance to exert conscious control. Though their participants were native-like in the offline tasks, Clahsen et al. claimed their offline achievement did not mean their grammar was native-like in online tasks.

In addition, they claimed that working memory, proficiency and extent of exposure all have little or no effect on L2 parsing performance. Contrary to Frenck- Mestre and Pynte's findings on argument structure differences between L1 and L2 and language transfer from L1, Clahsen and Felser (2006) and Papadopoulou and Clahsen (2003) claimed that there is no clear evidence or indication of language transfer in online experiments.

Witzel, Witzel and Nicol (2012) presented counter-evidence against SSH, stating that non native speakers' online processing of relative clauses, adverbials and NP and subject connectors was deeper than that of native speakers of English. While native speakers in the processing of relative clauses preferred a minimal attachment and used recency as a reading strategy, non-native speakers of English made a greater attachment for the processing of relative clauses and noun phrases. Witzel et al. proposed that shallow structure hypothesis is subject to developmental processes and therefore their L2 learners' performed deeper rather than shallower processing. L2 learners tried to encode surface forms in a deep way. Though Witzel et al.'s finding is significant, it needs further research before it can be fully supported.

The implication of the SSH hypothesis is that if implicit competence and processing abilities are essential for L2 native-like processing we should focus on form in language classes, instead of pragmatics. Clahsen and Felser (2006) stated that "processing instruction" (VanPatten 1996; 2004) or other "focus on form" techniques (e.g., Long & Robinson, 1998; Williams, 1995) will help learners to have a more native-like L2 grammar and processing (p. 121).

To summarise, both the interface hypothesis and the shallow structure hypothesis were proposed to give answers as to why L1 and L2 processing is different. Their responses to the question are different. For the interface hypothesis, L2 learners do not allocate all processing resources at the same time,

whereas for the shallow structure hypothesis, L2 learners do not have enough syntactic representation of the target language. For the interface hypothesis, L2 learners are weak in the interface between syntax and pragmatics/discourse or syntax and semantics: while they know basic syntactic rules very well they are less familiar with implicit discursive rules. For the shallow structure hypothesis, L2 learners are weak in grammatical knowledge but they use lexical/semantic rules very well. What do all these hypotheses mean for this study? Sorace assumes that if L2 learners know the syntactic rules well, they will try to do form function mapping in online and offline tasks. Both Sorace and Clahsen and Felser assume that if L2 learners do not have full representation or if they do not know implicit rules in the sense of Sorace's interface level, they will try to apply the rules they know, but differ from native speakers in their output. Their performances would be contradictory to the prediction in the literature. Whichever directions (indeterminacy or optionality) their performances would take, the underlying reason behind the difference from the native speakers in their performances would be the inadequacy of the implicit rules in the antecedent selection, such as the role of focus and topic or encoded features in the anaphoric elements and inadequate integration of pragmatic with syntactic rules to have full representation of grammatical knowledge.

2.4.5 Two hypotheses on the acquisition of uninterpretable features: Failed Functional Featured Hypothesis vs. Full Transfer Full Access. Again, in second language acquisition studies, we see two paradigms: those who claim that L2 learners cannot acquire uninterpretable features in the target language, and therefore propose the Failed Functional Featured hypothesis, and those who claim that L2 learners can have L2 representation, including uninterpretable features, and who propose Full Transfer Full Access. These two contradictory paradigms, and the major studies supporting each, are outlined in the following and their implications for the current study are discussed.

On the side of the Failed Functional Feature hypothesis, Hawkins and Chan (1997) claimed that after the critical period, the functional features become inaccessible to modification, since universal grammar becomes impossible for

language learners to set new parameters (p.189). They specified the process of L2 acquisition of functional features as the mapping of functional features of the L1 entries in the UG lexicon onto those new morphological materials in the L2. However, they argued that in this process L2 learners would not gain fully operationalized functional features of the target language (i.e C (complementizer), Agr (Agreement) and D (Determiner)) or those features different from the L2. Their interlanguage grammar is far from the representations of L1 and L2 grammars. To prove this, they collected data from 3 groups of native French and Chinese speakers of English and French, and Chinese native speakers. The participants listened to a recording and were asked to judge whether the sentences were correct or not. It was found that L1 differences are transferred to the L2 grammar in the cases where French has wh-movement and Chinese does not. Though Chinese learners improved their relative clause use, they were still less accurate than French speakers. In addition, they were good at the features that do not exist in their mother tongue, but nevertheless an L1 effect was seen. Worthy of note is that the advanced Chinese learners' accuracy was lower than the elementary Chinese learners. Hawkins and Chan explained this elementary students' achievement as L1 effect rather than their noticing the violations of the target language. They claimed that though L2 learners behave like native speakers of English on the features that are similar to their mother tongue, their interlanguage grammar is still very different from that of native speakers'. The elementary learners' achievement may also indicate that L2 advanced learners activate their pragmatic language use by using optional items of the target language or being flexible in the use of some items instead of others. However, since they do not have full competence regarding pragmatic rules or abstract rules which govern the use of one item instead of the other, their judgments were often incorrect. On the other hand, elementary learners know only surface rules and access only the basic syntactic rules in L1 and L2, and therefore their accuracy was higher than advanced learners. This, however, is not stated by Hawkins and Chan, but my own interpretation based on a close reading of the literature. Hawkins and Chan claim that though L2 learners behave like native speakers of English on the surface syntactic level and with regard to the features that are

similar to their mother tongue, their interlanguage grammar is very different from native speakers in the features that are different from their L1. Franceschina (2001) conducted an elicitation task on the acquisition of gender systems by English and Italian speakers. Supporting Hawkins and Chan's failed functional feature hypothesis, she found that L2 learners do not acquire the features in the L2 that do not exist in their L1. Sabourin and Haverlort (2003) found that though L1 and L2 have similar features in terms of gender constructions, some constructions will still be problematic. In their study on the acquisition of Dutch noun phrases, they showed that German learners of Dutch could learn only when the noun phrase is definite.

On the other hand, for the full transfer full access model (Schwartz and Sprouse 1996; White 1998; 2003), in the initial stage of learning, the grammatical representation of L2 learners is based on all the features in their L1 grammar, but then L2 learners can have 'full access to universal grammar' including even uninterpretable features of the target language. Schwartz and Sprouse (1996) collected data from a Turk named Cevdet who lived a year in Germany and had just started to produce single incomplete utterances and to understand elements of the target language, but who was still unable to respond to questions in the target language. They explored the position of the verb in Cevdet's utterances, the type of subject (ie. pronominal or nonpronominal) and the fronting of nonsubject constituent X. In the first stage, Cevdet was good at using the verb before the subject because of the frequency of the mismatching item in the target language. If the mismatching in the target language is frequent, L2 learners are learn this easily, and restructure their UG system accordingly. In the later stages, they observed that Cevdet's grammar was still different from that of native speakers of German and he had some structures that do not exist in Turkish, such as adjunction to CP. Similarly, Prevost and White (2000) found that two Moroccan speakers of French knew the surface and functional features related to tense and agreement. When they had difficulties in tense and agreement, it was because of mapping problems between surface forms and abstract features (see Lardiere, 2000 for mapping problems). In the terminal node, syntactic features are defined but specifications associated with lexical items were underspecified. When the

forms are fully specified, they also replace the specifications of underspecified forms. Therefore, the L2 learners made morphological overgeneralizations: this does not mean, however, that L2 learners have ‘impairment at an abstract level’ (p.130). In another study, White (1998) assumed that Japanese and Korean speakers of English would accept nonlocal antecedents of pronouns and reflexives. However, she found that L2 learners had a binding principle of B and L2 learners mostly accept local antecedents as referents of anaphoric expressions. She pointed to cases where Japanese and Korean speakers accepted nonlocal entities as antecedents of reflexives as it happened in their L1. She concluded that L2 learners were different from native speakers of the target language but that did not mean they could not access UG or did not have abstract notions. Meanwhile, though Snape and Kupisch’s (2010) study investigated the acquisition of articles and the role of prosody in the use of definite and indefinite articles, they found that a Turkish speaker of English did not learn ‘free clitic’ in English that does not exist in his/her mother tongue. This means that if the target item does not exist in the mother tongue, L2 learners cannot learn it since there is a UG access via L1. Those structures that do not exist in L1 will not be built or modified in the existing prosodic structures.

To sum up, the main argument between these two paradigms is why L2 learners do not perform like native speakers of a target language. The underlying reason behind the divergences from native speakers is different for the FFH and the FTF models. For FFH, L2 learners fail to construct abstract features of the target language, whereas for FTF, L2 learners are under the influence of L1 grammar and thus some features are specified and some of them underspecified. Therefore, their choices are not like those of native speakers as a result of their not having full syntactic representation. However, the main issue should have been the nature of L2 learners’ interlanguage rather than their accessing UG via L1 or not. In other words, the following issues should be measured: (a) what L2 learners can do when they read or produce sentences; and (b) to what extent their performance is divergent from that of native speakers.

To conclude, in section 2.5 the studies in second language acquisition from theoretical, empirical and experimental aspects are summarized. Though the

contrastive account hypothesis has been dead for more than 40 years, researchers have still been studying the cross-linguistic effects of L1 in second language acquisition and processing (i.e overlapping and not overlapping features in L1). For the interface hypothesis, the overlapping features between L1 and L2 are acquired but those features that do not overlap will be difficult to learn at the interface between syntax and discourse/pragmatics. Similarly, for the full access full transfer model, the features that do not overlap between the two languages stay underspecified and the use of L1 grammar is not enough to acquire them. For the functional failed hypothesis, if the overlapping and non-overlapping features are associated with abstract features, L2 learners will not acquire them. Putting UG accessibility aside, which is not within the scope of this study, all the hypotheses and models are based on the similarities and differences between L1 and L2 and how these similarities and differences affect the performances of L2 learners in online and offline tasks. In the studies, it can be seen that L2 learners' choices will differ from one task to another, and this is explained by the distinction between explicit and implicit knowledge and cognitive processing. L2 learners had more tendency to map forms onto functions or to decode surface forms than native speakers (see for further discussion McDonald 2002).

2.5 Gaps in the literature

Psycholinguistic studies have mostly focused on plural pronouns, gender assignments, determiners, full NPs and implicit/associative anaphora. The number of studies handling demonstratives is very few (Bosh, Katz, and Umbach, 2007; Brown-Schmidt, Byron, and Tanenhaus, 2005; Kaiser and Trueswell, 2003; Wilson, Keller and Sorace, 2009) and the existing studies either handle demonstratives from a visual paradigm approach (Brown-Schmidt, Byron, and Tanenhaus, 2005; Kaiser and Trueswell, 2003; Wilson, Keller and Sorace, 2009) or traditional methods such as self-based reading (Bosch, Katz and Umbach, 2007; Fossard, Garnham and Cowles, 2011; Fossard and Rigalleau, 2006). The studies adopting visual paradigm approaches and traditional methods focus on the functions of *it* and *that* in spoken discourse in English and their corresponding

expressions in Finnish, German and French. Their focus was not textual deixis, via direct methods. To fill the gap, this study runs eye-tracking experiments to explore the functions and accessibility of textual deixis and anaphoric pronoun *it*.

In the existing literature the functions of *this*, *that*, *it* are controversial. For some linguists, *it*, *this* and *that* refer to different entities and thus their functions in discourse are different (Fillmore, 1975; Levinson, 1983; Linde 1979; Lyons, 1977; McCharty, 1994; Webber, 1988). Therefore, *it* is handled as an anaphoric expression since its referent is explicit and traceable in discourse. *This* and *that* are handled as textual deixis or discourse deixis since their antecedents are mostly implicit and less salient in discourse. For Cornish (2007), *this* and *that* are anadeictic expressions, which carry out both anaphoric and deictic functions. On the other hand, for Ariel (2001), *it*, *this* and *that* function the same and are not distinguishable. Approaching these expressions either as anaphoric or as textual deixis is incorrect, because in different contexts and discourses they function differently and have different antecedent preferences contradictory to assumptions in the literature. In this study, anaphoric and deictic functions of *this*, *that* and *it* are handled through a simple approach. Their roles as anaphoric or textual deixis are explored. By providing native speakers' online and offline preferences, this study shows whether these referential items behave like anaphora, textual deixis or ana-deictic expressions. It also presents antecedent preferences of *this*, *that* and *it* in narrative discourse. In addition, with the use of eye-tracking, this study explores early and late strategies and processes to resolve ambiguity in anaphora processing. So far, the early and late processes in *this*, *that* and *it* in narrative discourse have been measured. If any early and late processes occur, these explain time-course of anaphora processing with respect to semantic and syntactic processing.

Kaiser (2000) claims that a one factor model cannot adequately explain the roles of anaphoric expressions and therefore anaphoric expressions should be handled from multiple factor aspects. Not much is yet known about the online direction of deictic *this/that* and pronominal *it* in written discourse and the role of saliency, recency or focus factors in their resolution. With online and offline

experiments, the roles of multiple factors are explored in order to model the use and processing of *this*, *that* and *it*.

Grosz and Sidner (1986) and Asher and Lascarides (2003) agree that the left frontier can be opened for topic continuation through referential expressions thanks to intentional structures or the writer's intention, but the frequency of such access, whether it applies identically to spoken and to written discourse, and whether it occurs in online reading, are all questions that remain undecided. On the other hand, as Webber (1990; 1988), Asher and Lascarides (2003) mentioned, the semantics and intentionality affect the accessibility. Accessibility can change according to the writer's intentional state and the reader's attentional state. However, previous studies have not focused on accessibility in writing and reading processes. This study fills that gap by exploring which frontiers provide antecedents for referential expressions and open for topic continuation in reading and writing processing.

Swierzbin (2010) states that L2 studies do not know the demonstrative representation of L2 learners. Similarly, Inonin, Baek, Kim, Ko and Wexler (2012) pointed out that L2 learners' antecedent preferences of anaphora and demonstratives have not been studied exclusively. The studies in second language acquisition mainly focus on the following anaphoric expressions rather than demonstratives: (a) overt and null pronouns in Italian, English, Spanish and Greek (Belletti, Bennati and Sorace 2007; Sorace and Filiaci, 2006; Sorace, Serratrice, Filiaci and Baldo, 2009; Serratrice, Sorace, Filiaci and Baldo, 2011); (b) local and disjoint constraints in binding of personal pronouns to antecedents in Turkish, Korean and German (Roberts, Gullberg, Indefrey, 2008 or Kim, 2008 for local binding of *caki-casin* in Korean-English); (c) unergatives and unaccusatives and the position of focus (Lozano, 2006); (d) the subject verb agreement (Jiang, 2004); (e) gender-marked pronouns and gender and number-marked reflexives (Liu and Nicol); (f) the distinction between definiteness and demonstratives (Inonin, Baek, Kim, Ko and Wexler 2012; Robertson, 2000); and (g) gender marking in French and German (Darren, 2008; Foucart and Frenck-Mestre, 2011). The existing L2 demonstrative studies were conducted according to traditional approaches (i.e corpus studies, free writings and multiple choice tests) to present

the frequency of demonstratives in L2 learners' writings and oral productions (Berkemeyer, 1996; Hinkel, 2001; Ferris 1994; Kang, 2004). Thus, their findings are limited to the frequency of the demonstratives in L2. Only Niimura and Hayashi (1996) pointed to the demonstrative representation of L2 learners using multiple-choice tests. They found that the non-natives demonstrative selection was different from native speakers of English. The present study investigates Turkish L2 learners' anaphora and demonstrative representation using direct online measures and helps to understand Turkish L2 advanced learners' implicit knowledge and intuitions regarding the demonstrative system of the target language.

In second language acquisition literature, the most controversial issue is L1 effect/language transfer on L2 learners' interlanguage grammar. Studies have focused on where language transfer is used as a strategy by L2 learners and whether it is used only by early L2 learners or by advanced L2 learners also. The role of the L1 effect at different language proficiency levels and its extent with regards to overlapping and non-overlapping items in L1 and L2 are still controversial among scholars (see Treffers-Daller and Sakel's editors' introduction 2012). The findings of the present study have some implications regarding the effect of L1 on online reading processing and offline writing processing by advanced L2 learners.

Whether L2 learners acquired the items in the interface between semantic/pragmatics and syntax has attracted the attention of Sorace and her colleagues. They mainly focused on the null and overt pronouns in Italian, Greek, and Spanish. However, the textual deixis and anaphoric pronoun *it* in English, whose use is determined by both syntactic and semantic factors, has not been extensively studied. By studying *this*, *that* and *it*, this study shows the applicability of interface hypothesis to the acquisition of textual deixis and anaphoric pronoun *it* and explains the divergences in L2 learners' representations from the interface point of view.

Another gap this study points to is the limited number of psycholinguistic studies investigating Turkish, and the number of studies with online measures of Turkish is very few. It is therefore not surprising that to date no psycholinguistic

studies of the processing of the nearest deictic equivalents in Turkish to *this* and *that*, *bu* and *o*, have been carried out. The original intention of this study had been to run the experiments in Turkish, too, but later it became evident that Experiments 1 and 3 in sections 3.1 and 3.4 and Experiments 2 and 3 in section 4.2 and 5.2 could not be replicated for *bu* and *o*, as in translating the experimental sentences into Turkish, both *this* and *that* turned out to invariably translate as *bu*, never as *o*. A grammatical judgment survey confirmed this initial impression. That translation problem and differences between Turkish and English demonstratives in that sense have not been explored in previous linguistic studies. In order to learn more about *bu* and *o*, a corpus analysis was therefore conducted to investigate further their different deictic functions, and to compare these with those of *this* and *that*. Though in this study the experiments were not run in Turkish, the study points to gap in Turkish studies on textual deixis and brings up some significant issues, such as the reasons why translations are problematic, the differences between the English and the Turkish demonstrative systems, why the eye-tracking experiments could not be run with the existing Turkish sentences, and the problems that encountered in running experiments with eye-tracking using sentences in Turkish. The findings of this study point towards the need for further investigation into Turkish demonstratives via the use of experimental sentences, investigations which, however, lie beyond our scope here.

2.6 Experiment Predictions

Predictions for all the experiments discussed in this thesis are given below.

2.6.1 Predictions in the Experiments on The Right/Left Frontiers. On the basis of the previous studies discussed above, I assumed that discourse deictic expressions establish foci in discourse. If the assumptions of McCarthy (1994) and other linguists regarding *that* are right, there will be no processing load when *that* picks up the earlier clause as an antecedent, since the semantic relation between the antecedent and its referent is established as Asher and Lascarides (2003) described. The fixation of *this* would be shorter, since it picks up the immediately preceding clause as an antecedent. If their assumptions are incorrect,

Webber's hypothesis gains support, and the left frontier or the earlier clauses are not accessible, even though rhetorical relations between the antecedent and its referent are established. Explanations of the functions of discourse deixis in written discourse in terms such as 'referring back', 'bringing unattainable entities into discourse', 'signalling the topic shift', 'picking up any entities in activated cognitive status' will have to be reconsidered from a cognitive perspective. To test all these assumptions and hypotheses, three online experiments and a corpus study were conducted. In Experiments 1 and 3 in section 3, the processing of *this* and *that* in narrative written discourse was observed by recording eye-movements during reading. The corpus study, meanwhile, explored the antecedents of *this* and *that* in narrative texts. Experiment 2, by using the eye-tracker together with narrative completions, explored the online productions of participants when using *this* and *that* to refer to a preceding text.

The same experiments with *this* and *that* (see Experiment 4 in section 3.4 and Experiment 6 in section 3.7) were also run with Turkish non-native speakers of English. It was predicted that while native speakers of English use descriptive grammar, non-natives will use prescriptive grammar. Thus, it would be possible to see the difference between real language use and formulaic language use.

2.6.2 Predictions in the Experiments on Antecedent Types (proposition and noun phrase). Taking into consideration the accounts in theoretical and computational studies, we started with the working hypothesis that *this/that* would refer to a proposition in the previous sentence, whereas *it* would refer to a noun phrase, even if its antecedent were in an object position. If such a trend were evident from the results of Experiments 1 and 2 (see chapters 4 and 5), the hypotheses of Webber would gain support. Also, Linde and McCarthy's accounts of the role of *this* in the attentional shift would gain legitimacy since *this* would direct the attention to an entity that is less salient. If we found that *it* referred to a proposition and *this/that* referred to a noun phrase, then Passonneau's account regarding the function of *it* would gain support.

In running the same experiments (see Experiment 4 in section 4.4, Experiment 3 in section 5.3) we predicted that Turkish non-native speakers of

English may have different antecedent preferences from native speakers of English, since their interlanguage is a composite of both L1 and L2 grammars.

2.6.3 Predictions in the Experiments on Noun Statuses. In the experiments in chapter 6 we especially hypothesized that if saliency had a role in the antecedent types of these expressions, as assumed in the literature, then, *it* would prefer the noun phrase in the subject position and *this* would prefer the noun phrase in the object position. If this pattern were true, the hypotheses regarding the dichotomy between discourse deixis and anaphora in the establishment of focus and the types of antecedents they refer to would be supported (see Ariel, 1988; Givon, 1983; Fillmore, 1997; Halliday and Hasan, 1972; McCarthy, 1994; Petch-Tyson, 1996; Levinson, 1983; Lyons, 1997).

The same experiments (see Experiment 3 in section 6.3 and Experiment 4 in section 6.4) were run with Turkish non-native speakers of English and we hypothesized that although noun phrase saliency is not thought to L2 language users. The non-native speakers might show a native-like proficiency in these experiments since the exposure to the use of referential expressions with noun phrases in written discourse is more frequent than that to other implicit rules (i.e. left vs. right frontiers or proposition vs. noun statuses).

2.7 Psychology of Reading

In this section, the very broad concept of ‘the psychology of reading’ is overviewed in the light of fundamental issues related to eye movement studies, to processing hypotheses/models for word, sentence and discourse, and to reading models for comprehension (i.e top-down and bottom-up models). The purpose of this section is not to give details of all the studies on eye movements or on word, sentence and discourse processing in psycholinguistics, but to offer an overview in order to understand the psychology of reading and related issues.

Garrod and Daneman (2003) define psychology of reading as the investigation of how readers extract visual information from a written text and

make sense of it. There have been many studies to investigate how readers extract information. We can group eye-movement studies in terms of:

(a) the understanding of eye movements - these were first initiated over four hundred years ago by William Potterfield (1696-1771), developed by Charles Well (1757-1817), and Raymond Dodge (1871-1942). More recent important studies in this area include McConkie and Rayner (1975), Rayner (1998), and Findlay and Walker (1999) (for further reading see Wade, 2007, pp. 61-67; Van Gompel, Fisher, Murray and Hill 2007, pp. 4-16);

(b) the understanding of reading - these were first conducted by Cattell (1886), Erdmann and Dodge (1898), Buswell (1922) and Tinker (1939) (for further reading see Pollatsek and Rayner ,1989, pp. 3-59) and have been followed more recently by Reichle, Pollatsek, Fisher and Rayner (1998);

(c) the modelling of eye movements, which were revived in the late 1990s (Reichle, Rayner and Pollatsek's E-Z reader model, Engbert, Nuthman and Kliegl's SWIFT model, and others - for further detailed readings see Part 4 in Van Gompel, Fisher, Murray and Hill 2007, pp. 213-293).

2.7.1 Eye-Movements in Reading Words and Sentences. The purpose of eye movement is to bring words close to fovea, the region in the center of vision that is best for processing fine detail. The period that the eye rests upon its focus is referred to as fixation, whereas the moments in which the eyes move rapidly between fixations are called saccades. A reader's average fixation duration is 225 msec, but fixations can range from under 100msec to over 500 msec. Eyes can scan from 7 to 9 characters when people read and move back 10 to 15 percent of time. The typical duration of saccades is between 20 and 35 msec. The decision as to when to move the eyes is made around 140 msec before the beginning of the saccade. A target word is brought to the fovea by a saccade. In a single second, readers make four or five saccades, and every two seconds regressions occur. These regressions are very short and only go two to four characters back. The average fixation duration is between 66 and 416 msec. It is assumed that no visual information is deduced from saccades but information is derived from fixations

(Balota, Pollatsek, and Rayner, 1985; Pollatsek, Rayner, and Balota 1986; Wolverton and Zola, 1983).

There are large movements such as microsaccades and drifts, the latter of which might be the result of weak control of the oculomotor system by the nervous system. These saccades and drifts are not included in the experiments. Rayner and McConkie (1976) found that eye movements are not random, and the words with 4 to 7 characters are fixated better than shorter words (e.g. *the, a, but*). In addition, the landing positions of the eyes are not random, either. The preferred viewing location in words is between the beginning and middle letters of the word and there are generally no fixations on the spaces or blank regions between words.

Through use of a moving window technique (where the information in the fovea are shown normally but the information in the peripheral vision is changed by either removing information or putting chains of XXXs), McConkie and Rayner (1975) defined the perceptual span of reading, which is the average number of words that subjects are able to read at normal speed in a single fixation and comprehend. The perceptual span is 31 characters, or 15 character positions to each side of fixation. The finding that the perceptual span extends to something like 15 character positions either side of the fixation point has subsequently been replicated by a number of studies. It was also seen that perception is asymmetrical, meaning the information to the right of fixation is used more. McConkie and Rayner (1975) showed that processing was faster when the perception span is 4 characters to the left and 14 characters to the right than when the perception was 4 characters to the right and 14 characters to the left.

The studies to date have also explored low-level information (i.e the initial morphemes or letters) and high-level information (i.e frequency of words, syntactic and semantic ambiguities) that affect eye movements and fixations. Rayner (1982) demonstrated that readers used some of the information parafoveally where pre-processing that took place. There were no differences in results between the condition where the readers saw three characters of a word and the condition where they saw the whole word. Rayner and Pollatsek (1989) claimed that initial foveal processing was accomplished first, and then parafoveal

reading started to be useful. Slowiaczek and Rayner (1982) found that letters were processed rapidly when they were read parafoveally Pollatsek and Rayner (1982) added that only 9 characters from the fixations were used but that might not be the case for highly predictable words. The stimuli in the parafovea are available for 200 msec, until the eye moves. The information gathered from visual stimuli is integrated in a temporary visual buffer. Later, the information in the buffer is integrated with the parafoveal region when the eye is fixated. The integrative visual buffer is like the iconic memory and is useful to study semantic preprocessing in reading (i.e processing was faster in the preview when in place of a real word, 'door', a nonword, 'sorp', that was visually similar was used, but no effect of semantically related and unrelated words in the preview was seen).). Rayner, McConkie and Zola (1980) found that if the initial two or three letters of words were constant across fixations (i.e "chest"- "chart"), processing was facilitated. All these findings showed that initial letters were important for parafoveal reading but morphemes were not extracted from the parafovea (see Lima and Pollatsek, 1983). However. Inhoff (1988) ran the experiment using compound nouns and showed that the first letters or the first morpheme was a significant unit in integration across saccades. Henderson and Ferreira (1993) pointed out that the frequency of the words affected the duration of first fixations but the frequency effect was only possible for the currently fixated word but not for parafoveal reading.

Another low-level information factor was retinal image size and character size. Morrison (1984) hypothesized that when the retinal image size increased, the processing of the stimuli would be easier. Or, if the stimulus is in the periphery, then acuity would be low. If the given stimulus is in the retinal periphery, acuity is poorer. Tinker (1963) found that fixations were longer when the characters were smaller, as readers spent more time discriminating the characters. A number of studies have determined the high-level information that plays a role in the duration of fixations and subsequent saccades. Word frequency affected duration of fixation. If the words were from an infrequent word category, longer fixations occurred (Pollatsek and Rayner 1989; Inhoff and Rayner 1986; Just and Carpenter 1980; Rayner and Duffy 1986). Another factor was the function of a word. That

is, if a word was a verb, it was fixated for longer than a noun or functional words. Syntactic ambiguity in a sentence affected fixation duration (Frazier and Rayner, 1982). Predictability was another factor governing fixation duration (Ehrlich and Rayner 1981; Balota, Pollatsek, and Rayner 1985). Durations were shorter when the words were predictable from the previous context (Ehrlich and Rayner 1981; Balota, Pollatsek, and Rayner 1985). Homonyms (words spelt the same but with two or more meanings) were fixated for longer than other words. Also, if the distance between an anaphora and its antecedents was increased, fixations became longer (Ehrlich and Rayner 1983; Duffy and Rayner 1988).

It is impossible in a study of this length and focus to fully detail the vast literature on the psychology of reading. However, having looked at the key implications of some of the major studies relating to eye-movements and the factors governing fixations and saccades, we will now, in the next section, examine existing models of eye movement more closely.

2.7.2 Models of Eye Movement. Different models (i.e Minimal-Control, EMMA, SWIFT, Mr. Chips or Glenmore) have been proposed to estimate the factors that govern eye movements/saccades. These models can be grouped under two main categories: those focusing on the oculomotor system (i.e saccade accuracy) and those that focus on the cognitive system (see Reichle, Rayner and Pollatsek 2003). Here, only those models of each type that focus on the role in language processing and attention are handled.

According to the eye-mind lag model, after the information is processed, many computations are done regarding the correctness of the orthography of the words, pronunciation, meaning and the relation between the words and the syntax of the phrase. All these computations lead to eye-mind lag/latency, and then trigger eye-movement system. When the decision is made, saccades are made. The eyes then fixated on the next word. Inhoff and Rayner (1986) timed the duration of eye-mind lag to around 180 msec, with the duration of decision and eye movement programming measured separately at 50 to 75 msec for short words. McConkie (1979) proposed that an 'attention spotlight' moves around the text and when difficulty is encountered, a signal to the eye-movement system is

sent, moving focus to the point of difficulty. Before the eye movement is programmed, the difficulty is computed and attempts are made at its resolution. According to the model, saccades are controlled when some of the features have been processed. McConkie (1979) also specified two factors governing eye movements: temporal decision and spatial decision. The temporal decision determines the duration of the fixation, and the spatial decision determines the length of the saccade and the location of the next fixation. Morrison's (1984) model preserved McConkie's concept of the attentive spotlight. The eyes were assumed to detect difficult parts instead of simple parts. If the word detection was successful, the eyes moved to the next word. Here, 'a covert attention system governed eye movements', which were programmed on prior fixations. They moved serially from one word to the next. However, these two models focused on difficulties and eye movements when the difficulty spots were identified. On the other hand, the E-Z reader model, which is a processing model and an extension of McConkie's and Morrison's models, pointed to successful processing where words were skipped and the eyes moved two words ahead. It also explained re-fixations in processing, whereas for Morrison's model, processing was completed and the eye moved to the next word. The E-Z reader model put forward that both the oculomotor system and the attention system had a role in moment-to moment processing. Briefly, in early visual processing in the E-Z model, a visual image is transmitted from the retina to the brain in 90ms, but the visual processing is not yet completed at this stage. Through the oculomotor system, saccades to upcoming words are programmed. Then, word identification is performed in two stages: the early stage, where an orthographical analysis/familiarity check is performed; and the late stage, where semantics and syntactic analyses are used. Reichle et al. (1998) also pointed to the familiarity check upon the saccadic movements and signal given to the motor system. It is assumed that parafoveal reading for the coming word is started when the second stage of lexical processing is computed on the fixated word. If the fixated word is one of a high frequency, parafoveal processing increased. Otherwise, foveal reading increased and parafoveal reading decreased.

Having briefly examined the literature regarding the mechanism that controls eye-movements/saccades in terms of the oculomotor system, the attentional mechanism, and the integration of language processing, we can now proceed to the literature exploring the mechanism that guides eye-movements for word processing.

2.7.3 Word Processing. The processing of words is assumed to be automatic in many priming studies. Pollatsek and Rayner (1989) proposed that automatic processing is done unconsciously with only a small amount of mental effort. Cattell (1986) proposed that word processing is serial letter by letter. However, tachistoscopic experiments found evidence against the serial word processing hypothesis and showed that if serial processing were to be done, an attentive mechanism would be required, which would result in a longer processing time. However, the identification of a word was achieved in around 50 msec.

In an interactive activation framework, word processing is an interaction between higher-level/top-down and lower-level/bottom-up features. Low-level features include a visual feature level, a letter level, an auditory feature level, a phoneme level, the level of the word, a syntactic level and a word sense level, whereas high-level features include scenario and semantic levels. Activation happens bi-directionally between these levels. The pattern on one level can activate the compatible pattern in another level. However, this activation does not inhibit the incompatible ones. According to the interactive activation model, multiple information sources affect the representation at the same time and at each level. It is assumed that context helps readers to perform selective processing but the effect of context and semantics on selective processing is not active at the initial processing level, since phoneme and letter levels are activated at an initial level when the reader cannot have detected the whole word. Therefore, the context and semantics are not helpful in the initial stage.

Another model for word processing is parallel processing by McClelland and Rumelhart (1981). When a reader was given a word 'cat', the reader activated features for 'C' such as edges and corners. Then, 'letter' detectors were activated but all the letters in *cat* did not need to be activated serially. All the features,

sound neighbors to *cat* like *catch*, *cattle* and visual representation were activated. Balota (1990) argued that word processing models, which did not include the role of meaning in word recognition, would not account for the magic moment when the word was recognized. He proposed that in the parallel processing model, featured level processing was included as a higher-level representation for meaning.

On the other hand, Tanenhaus, Leiman, and Seidenberg (1979) proposed an ‘autonomous lexical access mechanism’ in word processing. They proposed that even where words had two meanings, readers accessed the correct meanings without having any difficulties with respect to the local context in which the words were used. They argued that word recognition was composed of two stages that were rapid and automatic. They observed that reading was rapid when the words were used in an appropriate context but there were no differences between inappropriate and appropriate context uses. Therefore, they claimed that in word processing appropriate meaning is activated immediately and the decay of semantically inappropriate meaning was very slow. The readers were quick to activate appropriate meanings. Similarly, Frisson and Pickering (1999, 2007) observed that readers accessed both meanings of *convent* in metonymic and literal conditions. That indicated that parsers could rapidly access both meanings including underspecified meanings.

The immediacy hypothesis formulated by Just and Carpenter (1980) claimed that before moving the eyes to a forthcoming word, the current fixated word was processed immediately with regard the context and meaning. Just and Carpenter’s account was not only for word access but also the word’s integration with a text or sentence. In eye-tracking studies and the eye-mind hypothesis, the summed duration of consecutive fixations on one word before the move to the next word reflects the processing of that first word. However, the frequency of the fixated word can lead to spill-over in the next word region (Henderson and Ferreira 1993; Rayner and Duffy 1986). Also, a sentence-wrap up effect would be seen in the processing of words; that is, a contextually appropriate word was retrieved but semantic analysis was left until the end of the sentence. Frisson and Pickering (2007) found some results supporting the immediacy hypothesis but

others that did not. They showed that in the experiments on metonymy and coercion, while parsers showed difficulty immediately upon reading ‘answered the stadium’, they also demonstrated processing difficulty after reading ‘during Finland’ or ‘started the book’. This late effect in the experiments lead them to argue that ‘some aspects of lexical, syntactic, and semantic processing do (largely) respect the immediacy and eye-mind assumptions (with some important caveats)’, but that many aspects of sentence interpretation are somewhat delayed (p. 47). They also claimed that all deep semantic effects would not be observed at once in the initial processing and thus second pass reading times localized late processing well.

After an examination of word processing hypotheses and models, one thing that strikes the attention is that word processing appears to be rapid and automatic, using several recourses. Specified and underspecified meanings are active but one thing that is not clear among psycholinguists is whether meaning is accessible at an initial stage of processing. In the next section, controversies and unclear issues regarding sentence processing are briefly considered.

2.7.4 Sentence Processing. In the literature on sentence processing, several controversies have emerged among psycholinguists. In the following, the most significant and relevant of these controversies are briefly outlined.

According to the garden path model, the initial analysis of a sentence depends upon structural information. Two strategies are followed in order to perform an initial analysis. The first is the late closure: if a new node is grammatically suitable, it is attached to the phrase or constituent that is currently available or that has just been processed. The other processing strategy is minimal attachment, which favors the attachment of an entity to a lower phrase structure of the tree rather than a higher one. In processing long distance dependencies, it was claimed that parsers used a filler gap identification strategy or recent filler strategy. In the filler gap strategy, parsers had certain expectations about a gap, but when that expectation was not met, they had difficulty in processing. Since parsers tried to fill the gap as soon as possible, they tended to fill the gap with the recent entity (see Crain and Fodor 1985; Fraizer, Clifton and Randall 1983).

Fraizer (cited in Mitchell, Cuetos and Zagar, 1990) argued that minimal attachment and late closure are universal processing strategies. However, in Mitchell, Cuetos and Zagar's study, Spanish participants attached a relative clause not to the recent noun phrase but to the early noun phrase. On the other hand, English subjects preferred recent noun phrase attachments. Mitchell, Cuetos and Zagar claimed that though their data were not enough to make generalizations regarding universals of language processing, the hypothesis of a universal parsing mechanism would not work for all languages.

There are three hypotheses regarding the parsing of sentences: (1) a single structure is decided upon; (2) two possible structures are decided upon and then one is eliminated when enough information is accessed; (3) the parser does not resolve the ambiguity till enough information has been obtained. Fraizer and Rayner (1987) pointed out that readers did not fixate longer on the ambiguous words if there was no prior context. They preferred to read further in order to disambiguate. Their finding ruled out the hypothesis that readers formed multiple syntactic constructions when they came across ambiguity. Some studies found that at an early stage of processing, pragmatic and contextual effects are not seen (Ferreira and Clifton 1986; Rayner, Carlson and Fraizer 1983). Rayner, Carlson and Fraizer (1983) concluded that readers performed one constructional analysis even though their construction was not preferred semantically. Later, semantic computation might be used in order to recover misparsing. On the other hand, contrary to Rayner, Carlson and Fraizer (1983) and Ferreira and Clifton (1986), Crain and Steedman (1985) argued that initial analysis involved semantic and contextual parsing. They proposed that (a) readers preferred the most plausible interpretation with respect to their world knowledge and the universe of discourse, and (b) 'a principle of parsimony' where readers had simple presuppositions consistent with the previous part of the text. They claimed that all these stages were gone through by readers immediately for each encountered word. Holmes (1987) also drew attention to the structural biases in relation to verbs in sentence processing. He found that the garden-path sometimes did not occur, since inappropriate analysis was not performed because of the predictive strategy used

by the participants and the structural biases of verbs. He assumed that parsers used the structural biases of verbs in the initial stage rather than in the later stages.

Several studies have shown the role of lexical preferences in sentence processing but for Fraizer (1987) there might be two ways to use lexical information: lexical proposition, that may be used in the initial stage of processing, and lexical filtering, that might be used in the later stages of processing. For Fraizer, in Mitchell's (1987) study the use of lexical proposition at an early stage is ruled out since readers did not start with the correct intransitive analysis in the following sentence: *After the audience had applauded the actors sat down for a well-deserved drink*. The readers did not solve the ambiguity until shown the second sentence, *After the audience had departed the actors sat down for a well-deserved drink* (quoted from Fraizer 1987, p. 567). On the other hand, Tananheaus, Stowe and Carlson (1985) pointed to the effect of plausibility in sentence processing in the following examples:

- (1) *The sheriff wondered which horse the cowboy raced down the hill.*
- (2) *The sheriff wondered which rock the cowboy raced desperately past.*

The use of plausibility was accepted as evidence for the lexical proposition but for Tanenhaus it also might have been interpreted as evidence for the lexical filter. For Fraizer, local lexical preference was used as a filter. Contrary to the idea of local lexical preference at an initial processing, Ferreira and Clifton (1986) showed that readers did misanalyse even in the sentences with non-minimal attachments, such as *The editor played the tape and agreed the story was big* and *Sam loaded the box on the cart before his coffee break*.

So far, three controversies have been addressed: (a) whether parsers use syntactic or semantic information first; (b) whether minimal and late closure strategies are universal; and (c) whether lexical propositions are used as a filter at an initial or a later stage in processing. Another problematic area regards the sentence processing mechanism. For Rayner et al. (1983) and for Clifton and Fraizer (1985), syntactic processing involves subsystems; that is, a syntactic subsystem is structure building and a subsystem of identification and evaluation is

employed to identify the thematic relations between phrases. On the other hand, for Crain and Fodor (1985) there is only one syntactic processing system, which accomplishes all syntactic analyses. These arguments regard the use of syntactic analysis and mechanisms for syntactic processing, but Flores d'Arcais (1990) showed that readers did not detect syntactic violations compared to pragmatic violations. Therefore, she argued that there is an automatic syntactic analysis that is not used fully in sentence comprehension. When the semantic and pragmatic information is not enough to decode inconsistencies and incoherences in the text, readers 'fall back' on the syntactic analysis. Otherwise, they do not need to perform syntactic analyses to comprehend the text. Similarly, Perfetti (1990) claimed that there is an autonomous syntactic processing, but that this is only active when the thematic and pragmatic information is not enough to disambiguate the text. Readers always have basic syntactic frames at the local-level nodes but to parse the sentences they use their semantic knowledge and perform the interpretation via non-minimal attachment instead of minimal attachment. Their resolution can be performed at the end of the sentence.

In the multiple-constraint view, Taraban and McClelland (1990) claimed that sentence processing is performed with respect to readers' expectations and thematic roles. Instead of an autonomous syntactic processing mechanism independent of semantics, they argued that semantic and higher-order levels determine readers' expectations and processing. Therefore, syntactic decisions are made under the impact of thematic roles and semantics. If the readers' expectations are fulfilled, the processing is more rapid. They also added that all the alternative analyses were active during the processing because of the parallel processing of the sentences.

The next controversy regards the effect of skilled reading on sentence processing and the garden path. Holmes (1996) pointed to the role of skilled reading in sentence processing and claimed that good readers might have performed syntactic analysis where poor readers relied on semantic information. Like Holmes (1996), Flores d'Arcais (1990) pointed to the different processing strategies between good and poor readers. Contrary to Holmes's hypothesis regarding good readers being good at syntactic analysis, she found that good

readers did not notice violations in the sentences if the text was semantically coherent. Their reporting of violations improved when the sentences were pragmatically incoherent. They were less sensitive to syntactic violations than poor readers. Good readers could use rapid and fast multiple information sources from the text and relied on higher-level sources.

It is worth mentioning the differences between lexical and sentence processing. The two sentence processing strategies- minimal and late closure- indicate that sentence processing is different from lexical processing in that in lexical processing all the possible meanings of a word are activated and multiple resources such as orthography, phonology, semantics and syntax are used, whereas in sentence processing only one syntactic structure is constructed and the system waits until the ambiguity is resolved. If the first structure is not right, a new structure is computed later. Contrary to lexical processing, multiple resources are not active and do not ‘proliferate’.

As Tanenhaus (2004) outlines, online sentence processing studies have explored the link between (a) ambiguity resolution and sentence processing; (b) syntactic and semantic mechanisms for disambiguation; (c) processing modularity and linguistic representation; (d) limits of the working memory and garden-path ; and (e) skilled readings and being good at sentence processing. The purpose of the studies on the linking hypotheses has been to give answers the questions ‘why’ and ‘when’. In the following, in order to understand the psychology of reading, the studies on discourse processing are briefly summarized.

2.7.5 Discourse Processing.

Understanding discourse means the creation of appropriate mental representations with respect to the schemata and scripts in the long memory (see Johnson 1983 for mental models; Schank and Abelson 1977 for the schemata and scripts). For Van Dijk and Kintch (1983) text comprehension is the integration of macro- and micro-structures. Macro-structures are scripts, schemas and events in the long-term memory, while microstructures are the sequences of propositions and the coherence among them. Readers remember macro-structures in the story

easier than the detailed microstructures. For Clark and Haviland (1977), understanding discourse is a building of a framework where new information is linked to information already given. In coherent text inference processing, connections and links between texts are made with respect to parallelism of form, gender and number assignments or implicit causality between verbs. Clark and Haviland proposed that the propositions which were important for the communication, emphasized in the discourse and related to the macrostructures were held in the short-term memory and recalled later. Similar to Van Dijk and Kintch, they argued that minor details and ideas in the discourse did not remain in the memory (Keenan, MacWhinney, Mayhew 1977; Kintsch 1974). This may have been as a result of 'the limitations of short term memory' (see Van Dijk 1995, p. 393).

Trabasso and Sperry (1985) pointed to the role of causal relations in understanding a text and the construction of a representation of a story in the memory. Myers (1990) claimed that causal relations between sentences and clauses influenced retrieval times and the type of retrievals affected the duration and accessibility. For instance, if a participant was asked to 'recall', then the shortest path dominated. On the other hand, if a re-statement was required, then the search for an antecedent was conducted until the relevant proposition was found.

In terms of the role of memory in understanding a text, Kintch and Van Dijk (1978) claimed that the recent statement related to the antecedent is held in a buffer. In Fletcher and Bloom's (1988) model, the first statement is held in a buffer to make a link between the current and the following statements. If the statements are causally related, propositional recall was done. For Fletcher and Bloom (1988), Myers (1990) and Van den Broek (1990), if the concept in the long-term memory is related to the goal of a statement, then it will be more causally dominant and prominent in the chain.

Van Den Broek (1990) claimed that conceptual knowledge about one event would help parsers to predict the next event. Necessity, temporal priority and sufficiency strengthen the causal dependency. Vonk and Noordman (1990) proposed that readers performed shallow processing and did not make inferences

unless these aligned with their reading purpose and were necessary. Costs and benefits in a reading determine inferences: if more mental processing is required due to more limited knowledge of the topic, an absence of inferences is seen.

Garrod and Sanford (1990) and Sanford (1990) showed that in anaphora processing elaborative inferences are needed in order to understand a text. They also pointed to the role of previous context and scenario in the ease of anaphora processing and the role of focus in elaborative inference. The focus can be an object or verb phrase but the degree of the focus influences the inferential processing. Some structures require the necessary/elaborative inferences and some do not. In the connectionist model, Sharkey (1990) defines discourse processing as the connections among the lexical net, micro-unit, macro units, goal/plan net and sequence net. Sharkey's definition of discourse processing matches with that of Garrod and Sanford, where the operations of mappings are top-down through the focus system. For Sanford (1990), reference resolution is the 'checking of an indeterminate number of input signals against norms for each signal type, where the norms might be determined by the text or globally more general-knowledge' (p. 502). This indicates that discourse processing is a kind of monitoring of the input, making connections between local and global units/information, and norm matching between given information and schemata. Weaver, Bryant and Burns (1995) claimed that the participants' monitoring of input depended on the difficulty level of a text and their reading abilities. If the text was easy, then the readers would monitor their comprehension. Otherwise, there would be no monitoring, which would happen in most of the comprehension experiments where different reading and monitoring preferences are seen across different tasks.

There sheer number of studies on discourse processing means that it has been impossible to analyse or even mention them all. However, from those outlined above we can conclude that understanding a text in discourse is the result of a combination of mental models from the text and from general knowledge (*i.e scripts, schemas and conceptual knowledge*) with local textual units such as *lexical units, grammatical knowledge (i.e parallelism of forms, gender, number assignment and the link between referential expression and anaphora), causality of verbs and sentences and the establishment of focus*

structures in the text. In this linking process, the motive for reading and predictions with respect to the context and given verbs play major roles in governing discourse processing. They determine where to read, when to perform inferential processing, and when to skip the text. In addition to the goal of reading and predictability, short and long term memories also influence discourse processing. Because of the limitations in the short-term memory, major details related to the given events are held in a buffer while others are not. The scripts in the long-term memory determine which are the major events in the piece of text currently being read.

All these findings on eye-movements, word processing, sentence and discourse processing lead us to the various proposed models of reading. The next section briefly gives the key tenets of each model.

2.7.6 Models of Reading. Three types of model have been put forward to explain the features of reading: top-down models, bottom-up models and interactive models. Top-down models mainly claim that when readers have problems in reading, they use their world-knowledge to resolve the problem. Also, it is believed that world-knowledge and scripts in the long-term memory help readers to predict the next event or proposition. The primary top-down models were proposed by Goodman (1970) and Fletcher, Robert and Skeate (1990; 1995). Goodman claimed that if the reader is successful in the identification of a word, it is held in the medium-term memory. If the reader has a problem, s/he goes back to the earlier text and makes a decision based on his/her interpretation. If the interpretation is right, it is held in the long-term memory. In contrast to Goodman, Fletcher and Bloom (1989) argued that the role of the long-term memory is very limited and searching in the long-term memory is minimized. Instead, readers used a ‘current-stage strategy’ where they looked at the causal path in a text. Only when a new proposition is introduced and a ‘retrieval failure’ occurs, is a long-term search activated.

On the other hand for bottom-up models (Massoro 1975), visual information is used rapidly and when the fixation is on the visual information, it is kept in the iconic memory. Serial processing from left to right is performed in

order to identify the letters in a word. The features of the words are matched with the phonemic representation in the short-term memory. The comprehension device is used to understand the syntax and semantics of the sentence. However, since this model assumes that word processing is serial and does not include eye movements comprehensively in the reading processing, it is not a particularly sophisticated way of understanding reading, even though it may be more detailed than top-down models.

The next type of model is the interactive model, where both bottom-up and top-down information is used to accomplish reading. The most frequently cited interactive model has been developed by McClelland, Rumelhart and the PDP research group (1986). It offers an alternative model to serial language processing and does not include eye movements to explain the reading process. Van Dijk and Kintch (1983), meanwhile, integrate macrostructures, which are top-down features, with microstructures, which are bottom-up features. Their model has been very influential but like the other models mentioned above, theirs is not concerned with online processes, including eye-movements.

Rayner and Pollatsek (1989) proposed a reading model involving online processes and eye-movements. Their model is much closer to bottom-up models but accepts the contributions of top-down features in reading. However, it is claimed that the contributions of top-down features, and exactly when they are involved in reading, are difficult to prove. Essentially, when this model is compared with the other models, its strength (and its relevance to the current study) is its involvement of eye-movements in the reading process. They claim that the 'working memory has three components: 1- model that holds inner speech 2- a syntactic parser 3- a thematic processing. The long-term memory is also divided into three parts: 1- the lexicon 2- real-world knowledge 3- text representation' (quoted from Rayner and Pollatsek 1989, p. 472). The start of the reading is the decoding of the words by fixations and three processes are followed in this decoding process: foveal, parafoveal and parallel processing. The lexical is accessed through fixations. The meaning of the word is derived from the lexicon by direct (i.e meaning from the printed words) and indirect (i.e. analogies to create auditory codes) routes (p. 472). Through the activation of the lexicon, acoustic

representation that characterizes inner speech is triggered, too. This acoustic representation in the working memory is a kind of holding of information for a short time of period. Parallel saccade programming is used: that is, a sequence of events are in the fovea where parafoveal processing is performed at the same time and then the lexical level is accessed. Later, the attention is shifted to the next word and the saccade to the next word starts. The meaning of the word is also integrated with the text representation. If the meaning of the word is not established, fixations become longer. The inner speech is part of the working memory and keeps what is read in order. When readers have difficulty, they may either repeat their inner speech or look back again. A parsing mechanism with minimal and late closure strategies is also activated. Readers construct one syntactic representation and if that interpretation is wrong, they wait till the ambiguity is resolved. After syntactic assignments, thematic processing involving world-knowledge is conducted. If the syntactic analysis is not accurate while performing thematic processing, a signal is sent to the eye control system and fixations become longer. In such situations, readers might look back in a text, but sometimes they can use the working memory without moving their eyes back in order to conduct a re-analysis. In such cases, the readers probably know what kind of mistakes they made and do not need to go back to that point again. The meaning might be derived rapidly or a little later. However, the concept of meaning is not defined comprehensively. It might be a proposition or might be linked causal propositions that fit with the mental models. One thing that they are sure is that inferences and co-referential links between anaphora and antecedents have to be made either immediately or at some time within the phrase. Syntactic processing is performed prior to semantic analysis and semantic analysis may lag behind the eyes.

So far, the models that describe reading processes have been explained briefly. The most important point to emerge from an analysis of these models is that approaching reading processes in terms only of top-down features, or only of bottom-up features, is inadequate. Even the integration of these features does not give a comprehensive picture of the reading process. The essential question is when and how word knowledge is used. If it is used at the beginning of the

reading, why do readers continue to read if they guess the next event? Also, the interactive model which takes into consideration bottom-up and top-down features and eye movements presents a much deeper reading processing model than the others, but there remain some unclear issues, such as the activation of subcomponents of the long-term memory, their functioning time and their interaction with subcomponents of the short-term memory in order to create a textual representation. Another issue is how a big picture is derived from a text in a short time and to what extent that picture is right. All these issues and their answers will help us understand the psychology of reading. The psychology of reading is not only decoding the letters that constitute words, but the activation of the eye movement control system and of several levels, such as the lexicon, acoustic speech, syntactic roles and then thematic/semantic roles. Having information from all these levels at the same time helps readers to perform analyses and interpretations which are later checked against the following or previous parts of the text and the world-knowledge in the long-term memory. Then, mental representation of the text is accomplished.

CHAPTER 3

EXPERIMENTS ON RIGHT/LEFT FRONTIERS

This chapter consists of six sections. These present the methodology and results of online experiments with native speakers of English and with Turkish non-native speakers of English. These experiments explored how *this* and *that* refer to the right and the left frontiers. The first section details the procedure and results of the experiment on *this* and *that* referring to the right/left frontiers with native speakers of English. The second section summarizes the results of a corpus analysis of the British National Corpus in order to determine the referents of *this* and *that*. The third section discusses the details and results of an online completion experiment in which the participants were asked to complete sentences starting with *this* and *that*. The fourth section shows the procedure and results of an experiment with native speakers of English in which the event structures of the right and the left frontiers were varied. The fifth section presents the general results of these experiments with native speakers of English. The sixth section gives the results of experiments with Turkish non-native speakers of English. The corpus analysis on the Turkish deictic *bu* and *o* and the differences between the Turkish and the English deictic systems, with particular reference to the right and left frontiers is also discussed in this sixth and final section.

3.1 Experiment 1 with Native Speakers of English: The accessibility of *This* and *That* to the right and left frontiers

In the first experiment we hypothesized that *this* and *that* bring discourse segments into focus. We therefore tested two hypotheses:

1. The left frontier of a discourse structure is more accessible to *that* than to *this*

2. The right frontier of a discourse structure is more accessible to *this* than to *that*

In order to compare *this* and *that*, we designed a 2×2 (variable 1 \times variable 2) within subject experiment. We had two levels for discourse deictic expressions (*this* and *that*) and for discourse segments (right and left frontiers). We manipulated the duration of the events on the right and the left frontiers that would be serving as antecedents for *this* and *that*. Two kinds of event were used: one of a relatively long duration, and one of a relatively short duration. In the experimental stimuli, *this* and *that* referred to long events on the left frontier and short events on the right frontier, as below:

Condition 1: *this* referring to a long event on the left frontier of discourse
e.g. “*John drove from Edinburgh to Birmingham, listening to his favourite jazz CDs. When he arrived in Birmingham, he filled up the car with petrol. This took him 5 hours, and afterwards he was happy to have enough time to go to his hotel to have a rest.*”

Condition 2: *that* referring to a long event on the left frontier of discourse
e.g. “*John drove from Edinburgh to Birmingham, listening to his favourite jazz CDs. When he arrived in Birmingham, he filled up the car with petrol. That took him 5 hours, and afterwards he was happy to have enough time to go to his hotel to have a rest.*”

Condition 3: *this* referring to a short event on the right frontier of discourse
e.g. “*John drove from Edinburgh to Birmingham, listening to his favourite jazz CDs. When he arrived in Birmingham, he filled up the car with petrol. This took him 5 minutes, and afterwards he was happy to have enough time for coffee.*”

Condition 4: *that* referring to a short event on the right frontier of discourse

e.g. “John drove from Edinburgh to Birmingham, listening to his favourite jazz CDs. When he arrived in Birmingham, he *filled up the car with petrol*. *That* took him 5 minutes, and afterwards he was happy to have enough time for coffee.”

We predicted that the processing of *this* and *that* would require different lengths of time depending on the antecedents to which they referred. We also assumed that the centres that *this* and *that* establish might be different: *that* would refer to the long event on the left frontier, because for McCarthy (1995) *that* can refer to a non-central and unattainable entity, whereas *this* would refer to the short event on the right frontier, because *this* would refer to an entity in focus.

3.1.1 Method. The methodology used in Experiment 1 is summarised below.

3.1.1.1 Participants. Fifty-two paid native English-speaking volunteers aged 21-24 from the University of Edinburgh participated, and all were unaware of the purpose of the study.

3.1.1.2 Stimuli and Design. After *this* and *that*, in order to present the time duration that long and short events take, the same structure “... took him/her + time duration” was used throughout the stimuli. After the time duration, the second clause started with ‘and’ and was followed by adverbials with 7 or more characters (i.e. “and afterwards”, “and eventually”) in case participants would see the word parafoveally during the fixation on the previous region. Preferences of *this* and *that* were measured by referring to matching or mismatching time-spans for the events (e.g. *this/that took him five hours/minutes* referring to either *John drove from Edinburgh to Birmingham* or *he filled up his car with petrol*).

Some of the long events used included moving to a new flat, preparing roast turkey and potatoes for a dinner party, and planting roses. The time duration of few long events ranged from 1 hour to 2 months, whereas that of the short

events ranged from 5 to 45 minutes. The short events were events related to the long events. The durations of the long and short events were also checked by 2 research assistants in the lab and 2 PhD students at the University of Edinburgh. Taking their feedback into account, the time duration for a few of the events was changed.

The clause with the long event was given with a modifier. In order to prevent the modifier being taken as an antecedent of *this* and *that*, special attention was paid so as not to introduce a new event or use psychological verbs (i.e. *planning* or *thinking*) which took time in the modifier. In order to indicate the end of the long event and the start of a new event, adverbial clauses with *after*, *once* or *when* were provided before the clauses with short events to signal that two different events were mentioned in the text (i.e. “When he arrived in Birmingham”). The long event was always on the left frontier (earlier clause in the first sentence) and the short event was on the right frontier (immediately preceding clause in the second sentence (see Figure 1):

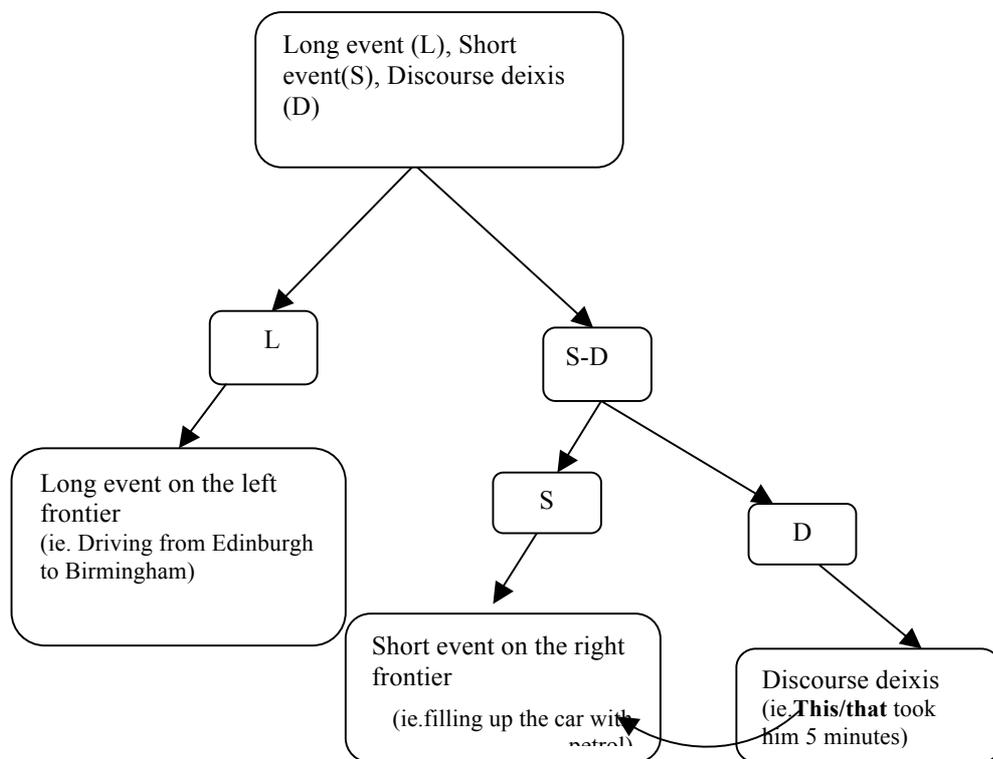


Figure 1. Discourse tree for the left and right frontiers of the sample stimulus.

There were 40 experimental sentences, each with *this* and *that*. Four files were constructed: in each file an item appeared in only one condition and each condition appeared an equal number of times. There were 60 filler items which were similar in length to the control sentences. In the filler items, consequent events that a character experienced were given. The texts were presented as three or four written lines. The number of characters in each line was between 66 and 76. *This* and *that* in the second sentence always appeared towards the middle of the line. Each participant saw all fillers.

3.1.1.3 Procedure. One hundred and ten texts were given in a fixed random order. Thirteen participants were assigned to each list. The experiment began with eight fillers to familiarize the participants with the experimental

procedure. We used an Eyelink 1000 eye-tracker in a table-mounted mode and a chin rest was used to stabilize the participant's head. We tracked only the right eye. Items appeared on a monitor approximately 60 cm from the participants' eyes. To see each item, the participant looked at the blank square and in this way, before each item, the calibration of the eyes was checked by the experimenter. After reading each item, the participant pressed the X-button on the controller to see the question and then pressed the left button for the left answer and the right button for the answer on the right.

3.1.1.4 Data Analysis. Fixations of less than 80 ms and more than 1200 ms were excluded from the analysis. Texts were divided into 9 regions (see Table 1):

Table 1. Regions (R) in Experiment 1

R1 Long event region	R2 Modifier and adverbial clause region	R3 Short event region	R4 Discourse deixis region	R5 Time duration region	R6 Connector and adverbial region
Diana packed her belongings	with the help of her best friend. Once she had wrapped everything,	she put the packages in her small car with great care.	This took her	8 minutes	and subsequently
R7 Pronoun and copula verb region	R8 An adjective region	R9 Region after the adjective			
she was	pleased to	have fitted them all into her car			

3.1.2 Results and Discussion. The condition-by-region means are reported in Figures 2a, 2b, 3a, 3b, 4a and 4b. The means for each region were analyzed using Analyses of Variance treating discourse deixis (*this-that*) and types of frontiers (left-right frontiers) as within-participants and within-item factors. Analyses were performed on the means of each participant, collapsing over items (F1), and for each item, collapsing over participants (F2). In the following, the fixation data for each region will be given within three different eye movement measurements: the first-pass reading times, regression-path time and the second pass reading time. These measurements give different information about the time-course of processing. The First-Pass Reading time is the total of all the fixations in a region between the time when the participant's eye-gaze first enters the region from the left and the time when the region is first exited to either the right or left. It gives information about early and later processes according to a region. Second-Pass Reading Time is the sum of fixations made on a region after that region has already been exited (either to right or left) for the first time. This measure excludes time spent during the initial reading of a region and gives information about any delay in relation to the first encounter of the critical region. In the analysis, we removed zeros in the first-pass reading time because there was no fixation in these regions. On the other hand, for the second-pass reading time we did not remove zeros since trials where a region was not re-fixated contributed a value of 0ms to the cell mean. Regression-Path Time is the sum of fixations from the time when the reader's gaze first enters the region from the left to the time when the region is first exited to the right. It reflects slightly later processes possibly including processes that accompany the integration of the critical word with the preceding context.

We first report the results of First-Pass Reading Time measures and the data of this measure will be given in ms across regions in Figures 2a and 2b.

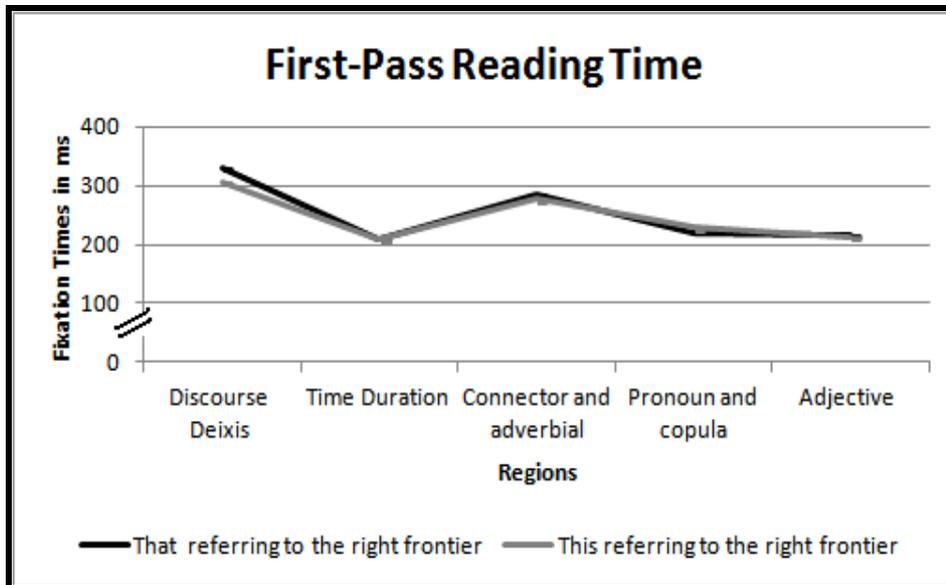


Figure 2a. First-pass reading times (in ms) across regions: right frontier

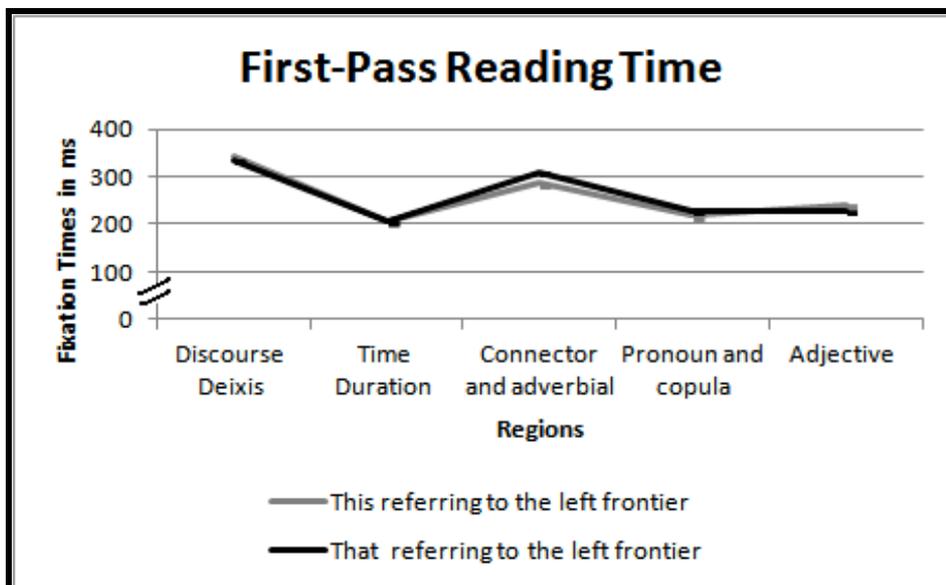


Figure 2b. First-pass reading times (in ms) across regions: left frontier

In the connector and adverbial region (i.e. *and afterwards*), a significant main effect of discourse deixis was seen, $F1(1,51) = 5.22$, $MSE = 2160.58$, $p < .05$; $F2(1,39) = 7.69$, $MSE = 1383.21$, $p < .05$. *That* was fixated significantly longer than *this*, *That* = 297 ms, $SE = 14.032$; *This* = 282ms, $SE = 11.489$. In First-

Pass Reading, *that* was read for longer than *this* in nearly all regions, but there were no significant effects of discourse deixis in other regions. In the connector and adverbial region, there was also a significant difference between the fixation duration time for left and right frontiers, $F1(1,51)= 9.59$, $MSE= 1365.20$, $p < .05$; $F2(1,39)= 4.08$, $MSE= 2031.169$, $p < .05$. Reference to the left frontier of the discourse (long events) led to longer fixations than reference to the right frontier of the discourse (short events), *Left frontier* = 297ms, $SE=12.937$; *Right frontier* = 281ms, $SE=12.406$. The same significant effect of the discourse segment (left or right frontier) was seen in discourse deixis and the adjective regions. In the discourse deixis region (i.e. *this* or *that*), $F1(1,51)=5.91$, $MSE=3701.377$, $p < .05$; $F2(1,39)= 4.32$, $MSE = 5052.16$, $p < .05$; *Left frontier*= 338ms, $SE=14.767$; *Right frontier*= 218ms, $SE=12.322$. In the adjective region (i.e. *happy to*), $F1(1,51)= 15.38$, $MSE= 1358.895$, $p < .05$; $F2(1,39)= 11.48$, $p < .05$, $MSE= 1085.259$; *Left frontier*= 234ms, $SE=9.393$; *Right frontier*= 214ms, $SE=8.260$. In the region after the adjective (i.e. *have enough time...*), the left frontier was fixated longer than the right frontier in subject-by-subject analysis, but not in item-by-item analysis, $F1(1,51)= 6.34$, $MSE= 10910.524$, $p < .05$; $F2(1,39)= 2.52$, $MSE= 232670.80$, $p > .05$; *Left frontier*= 863ms, $SE=39.064$; *Right frontier*= 826ms, $SE=39.154$. We did not see a significant interaction between discourse deixis and discourse segments (left and right frontiers of the discourse) in any regions. The next analysis was of second-pass reading time, and its results in fixation times across regions are given in Figures 3a and 3b (see below).

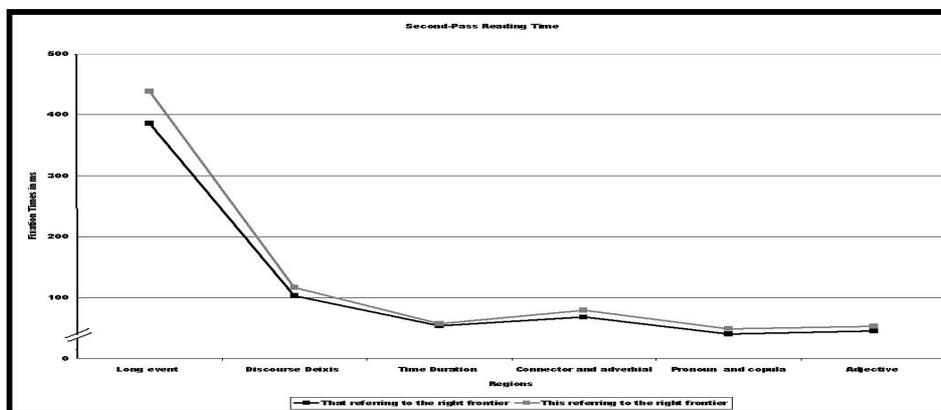


Figure 3a. Second-pass reading times (in ms) across regions: right frontier

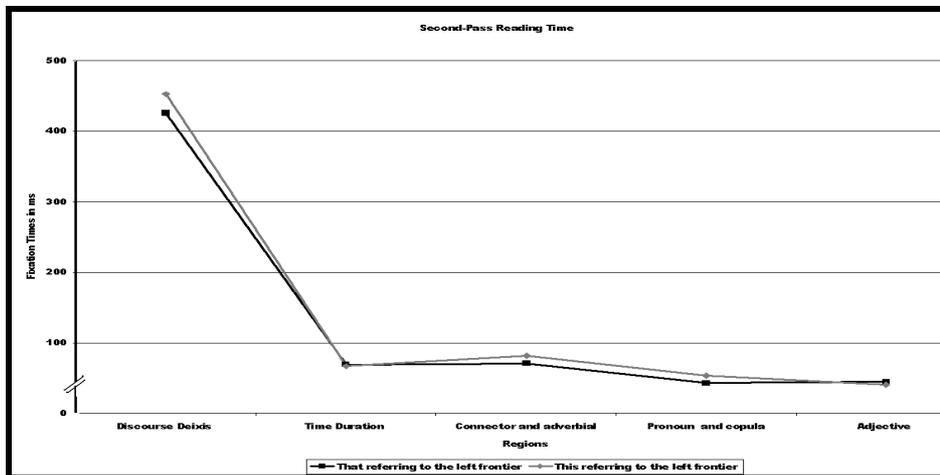


Figure 3b. Second-pass reading times (in ms) across regions: left frontier

In second-pass reading time, significant effects of discourse deixis and segment were seen in some regions. In the region with the discourse deixis, *this* and *that* produced no significant effect, $F(1,51)=.989$, $MSE= 4202.859$, $p>.05$; $F(1,39)=.841$, $MSE= 3526.955$, $p>.05$. However, in the same region, discourse segment was found to have a significant effect, $F(1,51)= 8.59$, $MSE= 5691.857$, $p < .05$; $F(1,39) = 8.56$, $MSE= 4613.733$, $p < .05$. When the deixis referred to the left frontier (long event), fixations were longer than for the right frontier (short event), *Left frontier* = 148ms, $SE=17.692$; *Right frontier* = 118ms, $SE=13.965$. In the region with the connector and adverbial (i.e. *and afterwards*), neither duration alone nor the interaction between discourse deixis and segment had any significant effect, $F(1,51)= 2.09$, $MSE= 2691.086$, $p > .05$; $F(1,39)= 3.25$, $MSE= 1504.728$, $p > .05$; $F(1,51) = .251$, $MSE= 2636.147$, $p > .05$; $F(1,39)= .091$, $MSE= 2806.284$, $p > .05$. In the pronoun and copula region, a significant main effect of deixis was seen in subject-by-subject analysis, but a marginal effect of deixis was found in item-by-item analysis, $F(1,51)= 3.74$, $MSE = 1663.990$, $p > .05$; $F(1,39)= 9.08$, $MSE = 704.887$, $p < .05$. *This* was read longer than *that*, *This* = 54 ms, $SE=7.919$; *That* = 42 ms, $SE=6.132$. In the same region, neither discourse segments alone nor the interaction between discourse deixis and

segments was found to have any significant effect, $F1(1,51) = .007$, $MSE = 17.889$, $p > .05$; $F2(1,39) = .050$, $MSE = 55.225$, $p > .05$; $F1(1,51) = .002$, $MSE = 1922.033$, $p > .05$; $F2(1,39) = .008$, $MSE = 614.374$, $p > .05$.

The next analysis was of regression path time, and its results in fixation times in ms across regions are given in Figures 4a and 4b (see below).

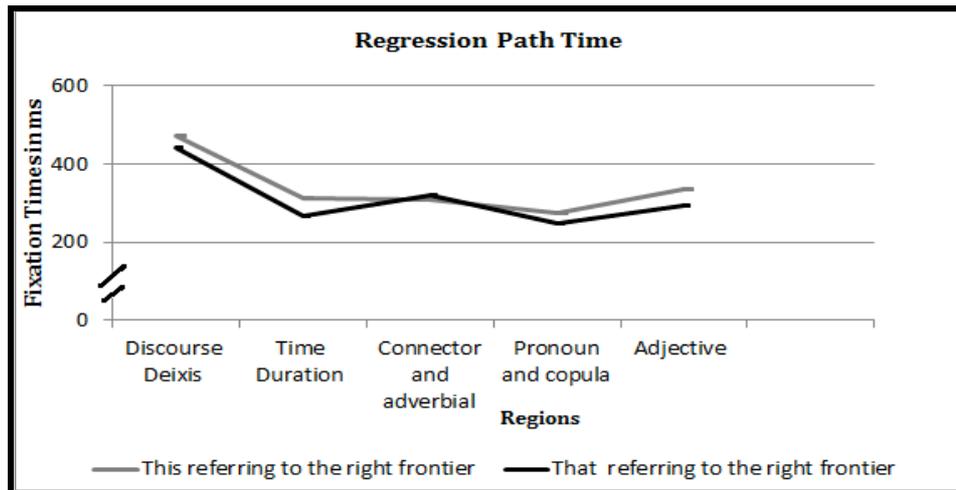


Figure 4a. Regression-Path Times (in ms) (in ms) across regions: right frontier

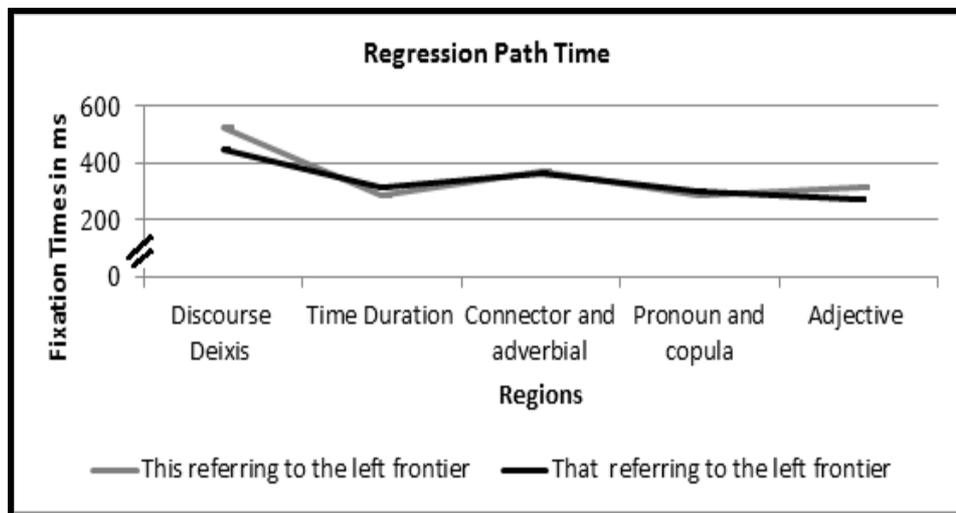


Figure 4b. Regression-Path Times (in ms) across region: left frontier

In the regression-path time measures, in the discourse deixis region, the significant effect of discourse deixis was seen, $F1(1,51) = 6.82$, $MSE = 22711.641$, $p < .05$; $F2(1,39) = 5.02$, $MSE = 19115.455$, $p < .05$; $This = 498ms$, $SE = 37.325$,

That= 443ms, *SE*=28.769. A similar discourse deixis effect was also seen in the adjective region, $F1(1,51)=7.44$, $MSE= 13117.09$, $p < .05$; $F2(1,39) = 6.01$, $MSE=7092.184$, $p < .05$; *This*= 328ms, *SE*=23.058; *That*= 285ms, *SE*=15.180. ANOVA analysis of native speakers in the time duration region revealed a trend of two-way interaction between discourse deixis and frontiers in the subject analysis but not in item analysis, *Discourse deixis X Frontiers*: $F1(51)= 4.207$, $p = .045$; $F2(39)= 1.023$ $p=.31$. The interaction pattern indicates that references to the long event on the left frontier with *this* led to shorter fixations than references with *that*, *This referring to the long event on the left frontier*= 284ms, *SE*= 16.500; *That referring to the long event on the left frontier*= 318ms, *SE*= 28.605; but the difference between *this* referring to the long event on the left frontier and *that* referring to the short event on the right frontier was not significant in t1 (51)= -1.304, $p = .306$. Also, fixations with *that* referring to the short event on the right frontier were longer than for *this* doing so, *That referring to the short event on the right frontier*=267 ms, *SE*= 13.749; *This referring to the short event on the right frontier*= 311ms, *SE*= 26.713 and t1 analysis only showed a trend for such a distinction between *this* and *that*, t1 (51)= 1.710, $p=.093$. The findings here indicate that for native speakers, the right and left frontiers were more open to *this* than to *that*. Processing of the *that* conditions were longer than for the *this* conditions. In the connector and adverbial region, the main effect of discourse segment was seen, $F1(1,51)=11.64$, $MSE= 11401.225$, $p < .05$; $F2(1,39) = 8.63$, $MSE= 11058.926$, $p < .05$; *Left frontier* = 365ms, *SE*= 18.146; *Right frontier* = 315ms, *SE*=15.554.

To summarize the results of Experiment 1: We predicted that *this* would be taken to refer to events on the right frontier and *that* to events on the left frontier. However, we did not see a significant interaction between discourse segment and deixis. This finding does not support one of our predictions about the centres established by *this* and *that*. It is also not in line with McCarthy's (1994) and other linguists' assumptions regarding the attentional functions of *this* and *that*. This finding is surprising, as we created semantically matching and mismatching time spans between discourse deixis and their antecedents, these expressions did not behave as predicted by Asher and Lascarides (2003, 2008).

Regardless of whether *this* or *that* were used, reading times were faster when the time-span matched the right frontier of discourse (the immediately preceding event), rather than the left frontier (the earlier event). The processing of events on the left frontier was difficult for the participants. Therefore, in contrast to our hypothesis, we found that the left frontier of the discourse structure is more difficult for readers to process. This finding supports Webber's (1988) argument regarding the openness of the right frontier for discourse continuation.

On the other hand, in the experiment we observed an effect of discourse deixis on reading times. In discourse and adjective regions, *this* was fixated longer than *that* in regression- and second-pass time measures in adjective region. One possible reason might be that *this* establishes coherence between long and short events. When participants read *this*, they might think that *this* can refer to both long and short events.

In first-pass reading time, however, *that* was fixated longer than *this*. One reason for this might be that the participants would immediately attach *that* to the immediately previous clause rather than the earlier clause. The results of Experiment 1 contradict what linguists have been saying about the access of *that* to the earlier clause. Even though a semantic relation was established between *that* and the left frontier, the left frontier was nevertheless fixated for longer.

The results from Experiment 1 failed to support any of the approaches to deixis outlined in the Introduction. We therefore decided to conduct a corpus analysis to assess how *this* and *that* are used in discourse. The results of the analysis would allow us to reexamine the antecedents of *this* and *that* and the text spans they access in narrative discourse.

3.2 Corpus Analysis

3.2.1 Corpus collection. The data for corpus analysis were retrieved from BYU-BNC, The British National Corpus. 200 extracts for *this* and *that* were taken randomly from fiction writing: 100 for *this* and 100 for *that*. While choosing the types of genre in the corpus, we made sure to select texts from the narrative genre

in order to mirror the text genre in Experiment 1. The average number of words per text was between 670 and 770. Only pronominal usages of *this* and *that* were selected (see samples from the corpus). As seen in Extract 8, *that* is used without a noun phrase to refer to the previous sentence itself. Similarly, in Extract 9, *this* refers to the main clause in the previous sentence and it is without a noun phrase such as 'this behaviour'.

Extract 8

I sat on the gallery floor and watched through the balusters. When those silly women went to the downstairs powder room, I saw them go. I know what they do in there. They can't fool me with that "powdering my nose" act. Even that spasm Kezia has to have a wee. I thought about it and it made me feel a bit better. I thought *about writing a letter to The Times and telling them about an important man who beat up his children. That* made me feel good too. Magnus would have to take notice. His mother might take me away to live with her. She's a lot nicer than my mother because she doesn't have any stupid daughters to distract her. Magnus's mother understands me.

(A classic English crime by Heald, T. London: Pavilion Books Ltd, 1990, pp. 96-216. 2996 s-units)

Extract 9

Marie's legs had permanent bruises from its sharp comers. She was wearing a plaid dressing-gown that her Dad had left behind: it smelled like an old dog and was as scratchy and heavy as wearing a carpet. In summer, even in a damp house like this, there was no need to wear a dressing-gown as thick and bulky as this one and Marie only put it on when her mother wasn't around. This morning, before she left for work at eight o'clock, *her mother had been friendly, quite chatty in fact. This* was not unusual. of ten, overnight, especially after a major row with her daughter, Marie's mother, stricken with guilt, would

swear to herself that she would make it up to Marie tomorrow:
tomorrow, they would make a fresh start.

(*The lock*, by Gates, S. Oxford: OUP, 1990, pp. ??, 3691 s-units)³

3.2.2 Method. The reliability of the codings was assessed by two annotators. One annotator was one of the authors of the present article and the other was a paid native-speaker, a teacher of English with a background in language sciences. The annotators were asked to define the antecedents of *this* and *that* in the given extracts from the corpus. The annotation of the antecedents of *this* and *that* was done independently. After the annotation, divergences were discussed.

3.2.3 Results and Discussion. An interrater reliability analysis using the Kappa statistic was performed to determine consistency among annotators in determination of antecedents of *this* and *that*. The interrater reliability for *this* was found to be $Kappa = 0.80$, ($p < 0.001$) and for *that* was $Kappa = 0.78$, ($p < 0.001$).

From the corpus analysis, it was found that the antecedents of *this* and *that* could be the nearest sentence or clause itself (i.e. the right frontier), a sentence that is not adjacent to the sentence with discourse deixis (i.e. the left frontier), or a group of sentences that always includes the sentence adjacent to that with the discourse deixis (i.e. is situated on the right frontier). The percentages of the antecedents to which *this* and *that* referred are given in Figure 5.

³ The extracts are cited as they are given in the BNC. Page numbers for some quotations are not specified, '??' appearing in their place.

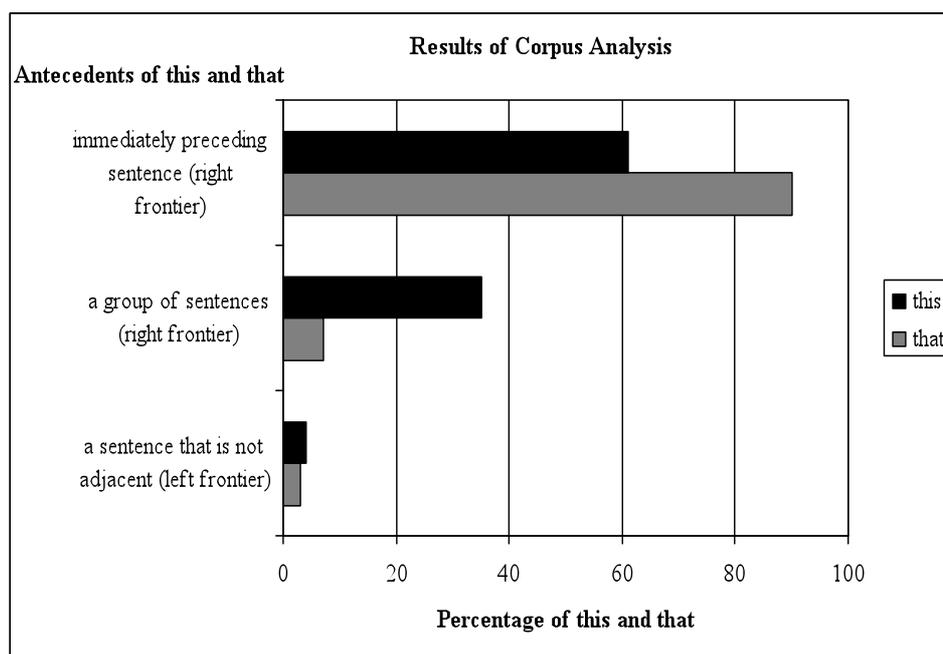


Figure 5. Percentages of the antecedents to which *this* and *that* referred

In 90 % of the extracts featuring *that*, the deictic marker refers to the immediately preceding sentence, whereas in only 61% of the extracts featuring *this*, the deictic marker refers to the immediately preceding sentence (see the extracts 10 and 11 below). The immediately preceding sentence in the corpus analysis corresponds to Webber's right frontier concept. In Extract 10, *that* does not refer to the units (1), (2), (3), (4) and (5) which explain the chat between the writer and Clarie. It picks out the proposition in the immediately preceding sentence as antecedent; that is, *that* means Magnus's making rude jokes and Claire's feeling about his jokes. In unit (6) and units (1), (2), (3), (4) and (5), the writer talks about two related incidents. In units from 1 to 6, the units present the talk between Claire and the writer about a belly dancer. In unit 6, discourse topic is changed to the writer's ideas about Magnus's jokes and how he got Claire's attention. Though the writer talks about making jokes to attract Claire's attention, different characters and incidents are presented in the text. *That* picks out the writer's imagining of Magnus's jokes getting Claire going (on the right frontier of the discourse structure) as antecedent, rather than the talk between Claire and the writer, on the left frontier.

Extract 10

(1) It's just that I could never remember it afterwards, and anyway everyone seemed to pronounce it differently. (2) At the time I was not even listening properly. (3) "Ooh, a belly dancer," I said to annoy Claire. (4) "Everyone says she's exquisite," Claire said dreamily. She wasn't listening either. (5) "Spasmo," I said. (6) *Magnus could have made one of his rude jokes which would really have got Claire going.* (7) *That* might have been fun. But Magnus had boring chicken-pox and Claire ignored me.

(*A classic English crime* by Heald, T. London: Pavilion Books Ltd, 1990, pp. 96-216. 2996 s-units)

Extract 11

(1) Mark paused again to take a very long drink. (2) "Fortunately Britain can win if we learn from past mistakes, and I would now like to conclude by outlining certain strategic proposals for your consideration, which would put Britain firmly on the upward path to meet the Prime Minister's long-term objectives." (3) Mark then described a ten point plan and summarised its resultant effect. (4) *The UK vehicle and component industry sectors alone would progressively benefit to the value of eight billion pounds sterling by year five.* (5) *This* would correct the Motor industry trade imbalance without the need to export one additional unit. Unemployment in the sector would be reduced by two hundred thousand, and existing manufacturing capacity, previously made idle by imports, would once more be fully utilised, thus improving operating profit and return on investment.

(*Man at the sharp end* by Kilby, M. Lewes, East Sussex: The Book Guild Ltd, 1991, pp. ???. 2565 s-units)

Similarly, in Extract 11, while the axiologically positive words and phrases in units 2 and 3 and the positive evaluation of the plan in unit 4 mean that *this* in unit 5 might to some extent be taken as encapsulating all that has gone before

regarding the whole proposal, it nevertheless seems to refer most immediately to the preceding sentence, the eight billion pounds sterling over five years that will correct the motor trade industry imbalance. At the least, we can argue that *this* focalizes the right frontier much more sharply than the left frontier.

Another category of antecedent that *this* and *that* can refer to is a group of sentences. In 35 % of the extracts *this* picks out a group of sentences as referent, whereas in only 7% *that* refers to a group of sentences. In extract 12, *this* refers to the right frontier; to all the features of the ideal man of whom Maggie dream. Here, *this* does not refer to the left frontier of the discourse structure: neither to unit 1, which tells of Maggie's symptoms of panic, nor to unit 2, which asks the question why she feels panic when she talks about her ideal man to her friends.

Extract 12

(1) Maggie felt symptoms of panic: prickling facial heat, intermittent interference with her hearing. (2) Why on earth had she been so precise in depicting her supposed ideal man to Caroline and Roger? (3) She heard that his flat, to which she foresaw she would soon be invited, was a mixture of Victorian (the furniture) and deco (the mirrors, the glass). (4) *He hated all soaps, especially Neighbours.* (5) *He did a great deal of walking.* (6) *He played tennis.* (7) *He didn't jog.* (8) *He rarely ate red meat.* (9) *This* was terrible; he was exactly as she had envisaged. What could she do? Caroline returned, "Everything all right?" and offered them both more wine. Maggie looked desperately around the room. She was small and cold.

(*Nudists may be encountered* by Scott, M. London: Serpent's Tail, 1991, pp. 7-115. 3092 s-units)

The other type of antecedent that *this* and *that* can refer to is a sentence that is not adjacent. The antecedent of 4% of the cases using *this* and 3% using *that* is a sentence that is not adjacent, as in extract 13.

Extract 13

(1) The widow's suit looked brand-new and Wexford couldn't help wondering if she had actually been out the previous afternoon to buy it. (2) She wore a white blouse with an ostentatious frilly jabot and a big paste spray on one lapel. (3) Her stockings were dark and her shoes, though also apparently new, the outdated stiletto-heeled pointed kind of gleaming black patent. (4) *She looked as if she were about to set off for a provincial cocktail party, an office party of female executives.* (5) At first Wexford felt a curious distaste and then he thought about the dead man and what he knew of him. (6) *This* was the way Charlie Hatton would have liked his widow to look, brave, defiant, bedizened. (7) The last thing a cocky little man like Hatton would want was a kind of spiritual suttee.

(*The best man to die* by Rendell, R. London: Arrow Books Ltd, 1981, pp. ?? 3335 s-units.)

In unit 6, *this* picks out as antecedent unit 4, in which the woman is described as looking as though she were about to go to the party or cocktail; the antecedent is not unit 5 (the adjacent sentence), which presents Wexford's curiosity about Charlie Hatton's thought. This category of usage of *this* is not explored by McCarthy (1994), Webber (1988) or Çokal (2005). For McCarthy, only *that* can be used in such a way, since for him only *that* can refer back across entities and pick out a non-central entity as discourse focus. Within the framework of Webber's account, the descriptions of the widow's dress are on the left frontier and the main character's thought is on the right frontier, since they are rhetorically and eventually different structures. The left frontier of the discourse structure is accessible to *this*.

Therefore, contrary to both the accessibility hypothesis of Webber and the narrative shift model, the proposition or the sentence itself on the left frontier is very rarely accessible to both *this* and *that* from a writer's perspective. This finding is consistent with the hypothesis of SDRT (Asher and Lascarides, 2003)

and shows that, where rhetorical and semantic relations are established between *this* or *that* and the left frontier, the latter becomes accessible. In other words, if the writer establishes intentional or rhetorical structures between the units with discourse deixis and the left frontier, then discourse deixis can access the left frontier even when it is not in the current focus. It is noteworthy that in cases where reference to the left frontier is made, the text intervening between left and right frontiers is not further explanation, interpretation or elaboration of the left frontier. In other words, the entity in the focus in this clause has not been mentioned in the preceding text but is still related to the general topic. Such usage has not been touched upon by Asher and Lascarides (2003). According to Asher and Lascarides, the unit between the left and right frontiers is further narration or explanation of the entity in the left frontier.

However, both *this* and *that* are used far more frequently to access the right frontier than the left. In the corpus study, 97% of uses of *this* and 96% of uses of *that* access the right frontier of the structure, referring to the sentence immediately preceding or to a group of contiguous units that includes that sentence. Only 4% of uses of *this* and 3% of uses of *that* from our corpus sample access the left frontier. This finding suggests that both *this* and *that* favour right attachment over left attachment in written discourse. On the basis of the results of our corpus study, therefore, we limit ourselves to arguing that in a significant majority of cases both *this* and *that* access the right frontier of the discourse structure, but that both can also sometimes be used to access the left when the writer intends to make semantic connections between the units.

In light of the surprises thrown up by the corpus study and Experiment 1, we wanted to assess in an experiment how naive participants would use *this* and *that*. In Experiment 2, therefore, we decided to ask participants to complete written narrations in order to focus on language production in relation to deictic processing.

3.3 Experiment 2: Online Completion of Sentences with *This* and *That*

In Experiment 2, we observed the online production of participants in the reading and use of *this* and *that*. The purposes of this experiment were to explore:

1. Which parts of the texts were reread or fixated for longer when the participant read *this* and *that*.
2. Which parts of the text the participant referred to when s/he completed a sentence beginning with *this* or *that*.

In order to test our hypotheses, participants were given the same controlled sentences used in Experiment 1, but, unlike in Experiment 1, the rest of the sentence after *this* or *that* was left blank (See sample stimuli below). The participant was asked to complete the rest of the sentence in a manner consistent with the previous part of the text.

Sample Stimuli

1- Davy reorganised the seating plan, / considering the PhD students' seating preferences. After he arranged the new seating plans in the offices, / he went to his office on the first floor to have a strong coffee with whipped cream. / This. /

2- Harry flew back from Turkey to Edinburgh, / travelling with his wife. When he arrived at Heathrow, / he went to the Duty Free Shop to buy whisky for his father-in law. / That. /

3.3.1 Method.

3.3.3.1 Participants. Thirty paid native English-speaking volunteers aged 21-24 from the University of Edinburgh participated, without being informed of the purpose of the study. They had not participated in the first experiment.

3.3.3.2 Materials and design. There were 40 experimental and 60 filler sentences. Two versions of each sentence and two files were constructed. In each file, each condition appeared in only one condition, and each condition appeared in only one condition.

3.3.3.3 Procedure. Sentences were given on the computer in a fixed random order. Eyelink 1000K was used with a remote desktop camera. The participant was seated about 60 cm away from the monitor. A small target sticker was placed on the participant’s forehead, which allowed the head position to be tracked. A chin rest was not used. The eye-tracker was used in the remote control mode to help the participant speak easily in a comfortable setting. At the beginning of each trial, the participant looked at a blank square on the monitor to get a new stimulus. Before reading each trial, s/he heard a 30 ms beep sound, which was followed by a 2-minute voice recording. When the participant finished reading, s/he was asked to complete the sentences in a clear voice. Sound recordings were made using Eye-tracker software developed at University of Massachusetts Amherst (UMASS).

3.3.3.4 Data Analysis. Continuations were categorized in accordance with the regions defined in the first experiment and types of antecedents according to the findings of corpus analysis (see Table 2). In this experiment, there were 5 regions:

Table 2. Regions in Experiment 2

R1 Long event region	R2 Modifier and adverbial clause region	R3 Short event region	R4 Discourse deixis region	R5 Blank Space Region
Diana packed her belongings	with the help of her best friend. Once she had wrapped everything,	she put the packages in her small car with great care.	This/that....

We predicted that *this* and *that* would direct the participants’ foci to specific parts of the texts. Relying on the first experiment and the corpus analysis,

we predicted that *that* and *this* would both most frequently pick out entities on the right frontier of the discourse structure. The antecedents of *this* and *that* would be short event structures in the immediately preceding sentence. Therefore, the long event structures on the left frontier would not be selected as antecedents of *this* and *that* by the participants. It is worth mentioning again that our main aim was to explore the usage of pronominal *this* and *that* and whether they pick out the right or left frontiers as antecedents; but, while coding their antecedents, we also coded pronominal *this* and *that* (*this* or *that* + NP) and other antecedent types. All the codings for pronominal and pronominal *this* and *that* are given in appendix A.

3.3.2 Results and Discussion. Firstly, a logistic mixed effect analysis was done to model the relative proportion of references to the left frontier (long event structure) and the right frontier (short event structure). In repeated measures designs, typical random effect factors are subject and item. Traditionally, these are analysed separately, by subject and by item analyses. The logistic mixed-effects model makes it possible to fit one overall model to the data, including both subject and item as independent (crossed) random effect factors. We made use of the statistical computing environment R (version 2.4.1) and the lme4 package (Brysbart, 2007). The following figure demonstrates which discourse segments were selected as antecedents of *this* and *that* by the participants in the experiment. 12% of *this* and *that* was used pronominally or their antecedents were unclear. We handled such cases under the other categories and excluded this category in the analysis and in Figure 6.

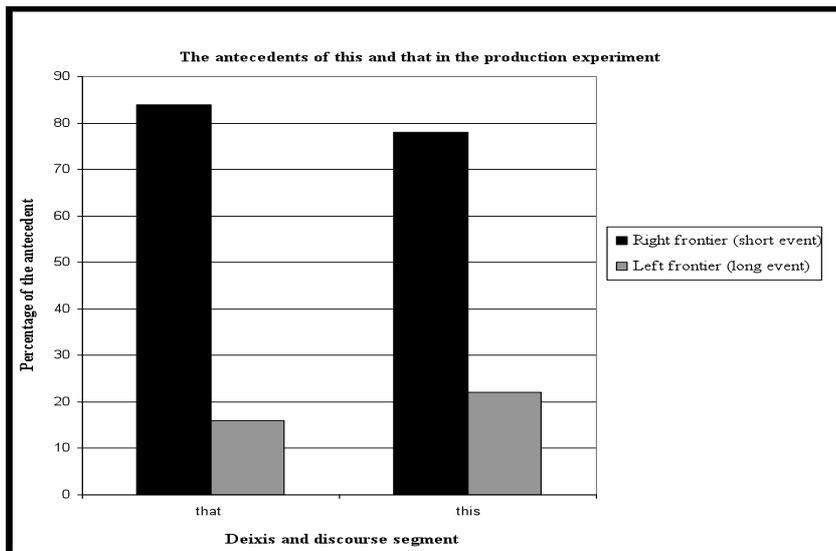


Figure 6. The antecedents of *this* and *that* in a logistic mixed effect analysis

The overall pattern of the results of a logistic mixed effect analysis seems to confirm the findings of Experiment 1 and the corpus analysis, showing that both *that* and *this* most frequently access the right frontier (the short event, in this Experiment), while also both being sometimes able to access the left frontier (long event). The analysis does show that there were more references to the right frontier for *that* than *this*, $Z = 2.746$, $p < .05$; *That* = 84%, *This* = 78%, while the cases of *this* referring to the left frontier were higher than those of *that*, *That* = 16%; *This* = 22%. While the distinction is slight, this seems to indicate that, contrary to several arguments in the linguistic literature, *this*, not *that*, is perhaps most likely to access the left frontier, reinforcing the findings in Experiment 1 and corpus study. Secondly, the linear-mixed effect model was used to analyze eye movement data. In the following section, the results of the linear-mixed effect model will be presented in terms of measures of first-time reading times, regression-path times and second-pass reading.

3.2.2.1 Eye movements and Results. In the logistic-mixed effect model, conditions and responses were included as factors. The significance of fixed-effects predictors was evaluated by means of the usual t-test for the coefficients.

We first report the results of First-Pass Reading Time measures and the data of this measure will be given in ms across regions in Figures 7a and 7b.

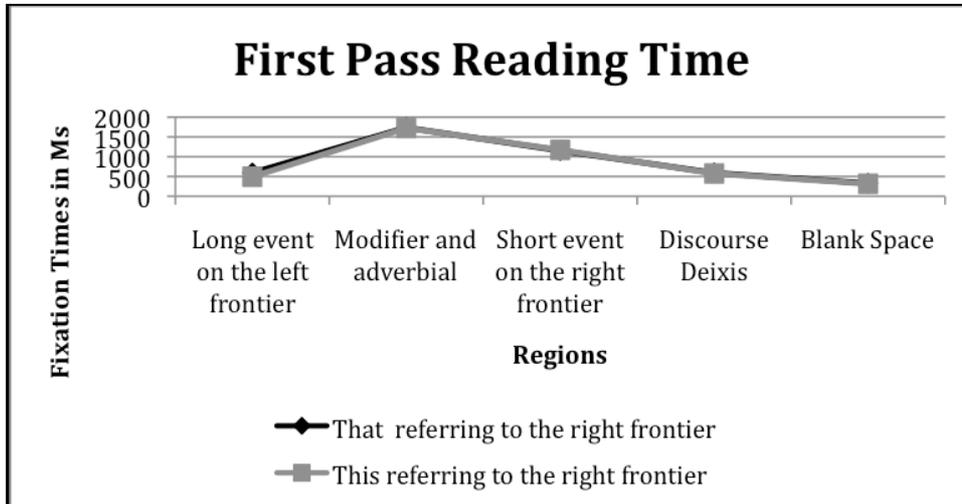


Figure 7a. First-pass reading times (in ms) across regions: right frontier

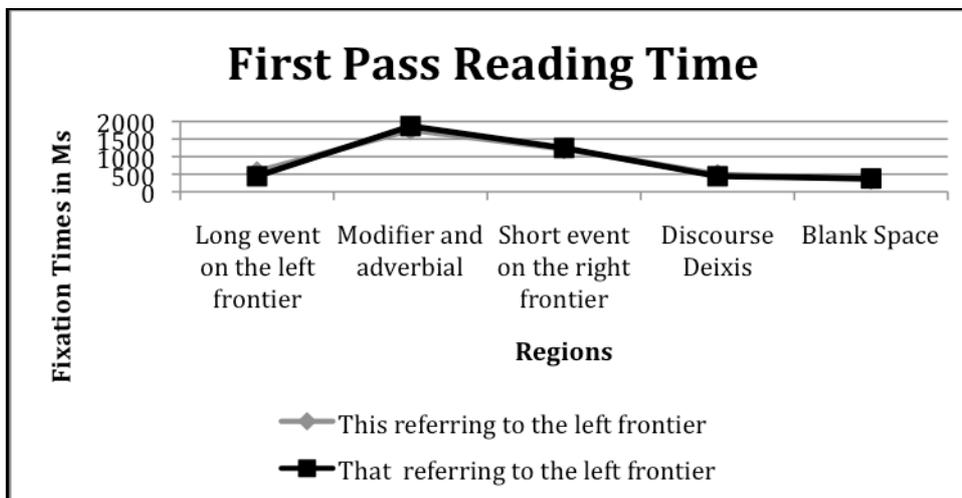


Figure 7b. First-pass reading times (in ms) across regions: left frontier

Measures of first-pass reading time in Experiment 2 showed that the effect of response was seen in the discourse deixis region, $t=2.000$, $p<.05$. *This* was read longer than *that* when the participants referred to the left frontier, *This*= 494ms; *That*= 442ms. The fixation of *that* was longer when the participants referred to the right frontier short event, *This*= 575ms; *That*= 590ms. Interaction between

discourse deixis and segment was not observed in any of the regions. The next analysis was of regression path time, and its results in fixation times across regions are given in Figures 8a and 8b (see below).

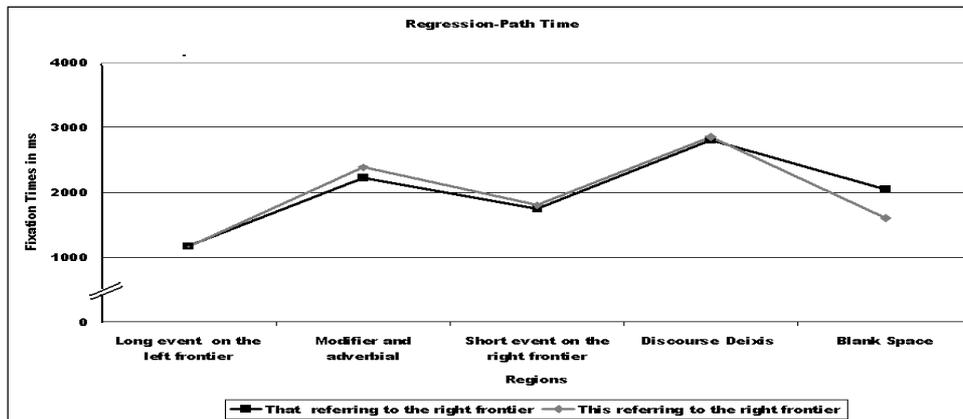


Figure 8a. Regression-Path Times (in ms) across regions: right frontier

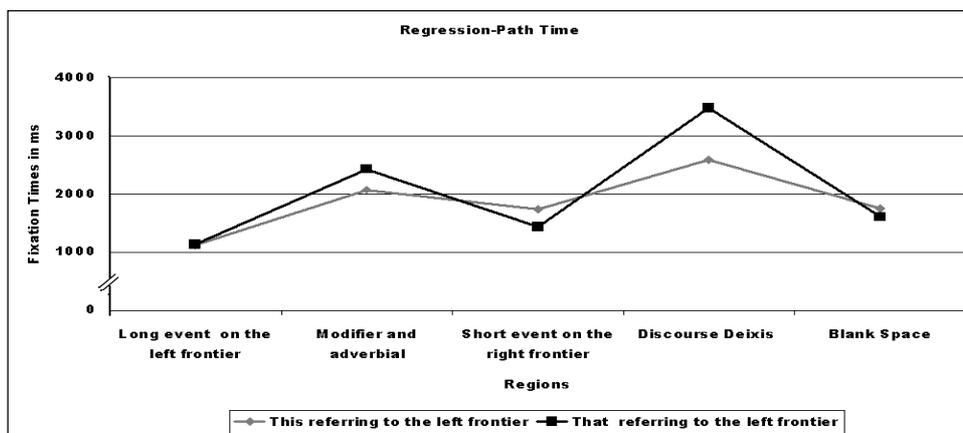


Figure 8b. Regression-Path Times (in ms) across regions: left frontier

Measures of regression-path times show the interaction between discourse deixis and the response in a modifier and adverbial clause region, $t=2.975$, $p<.05$.² The modifier and adverbial clause region (i.e. *listening to... when...*) was read longer in the *that* condition than the *this* condition where the participant referred to the left frontier (long event), *That* = 2424ms, *SE*=; *This* = 2070ms.

In the blank space region, we see the main effect of discourse deixis, $t=2.207$, $p<.05$, and a marginally significant interaction between discourse deixis

and responses, $t=1.914$, $p<.05$. The blank space was fixated longer in the *this* condition than the *that* condition when it referred to the long event on the left frontier, *This* = 1755ms; *That* = 1617ms. *That* was read longer than *this* where it referred to the short event on the right frontier, *That* = 2043ms; *This* = 1610ms. This indicates that the participants looked at the blank space while they were thinking how to complete the rest of the sentence with *this* or *that*. Also, when the fixation times of *that* in both left and right frontier conditions were compared, it was clear that extra planning time was spent when *that* referred to the short event on the right frontier. In other regions a significant interaction between discourse deixis and response was not observed.

The last analysis is of second-pass reading time and fixation times in ms across regions are given in Figures 9a and 9b.

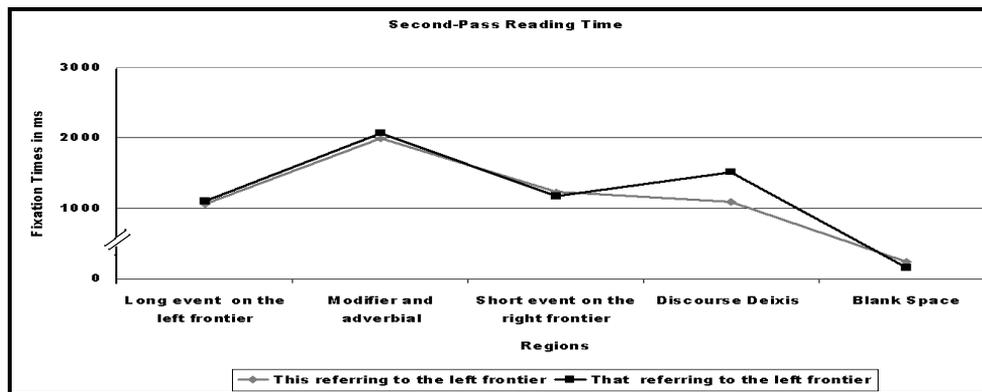


Figure 9a. Second-pass reading times (in ms) across regions: left frontier

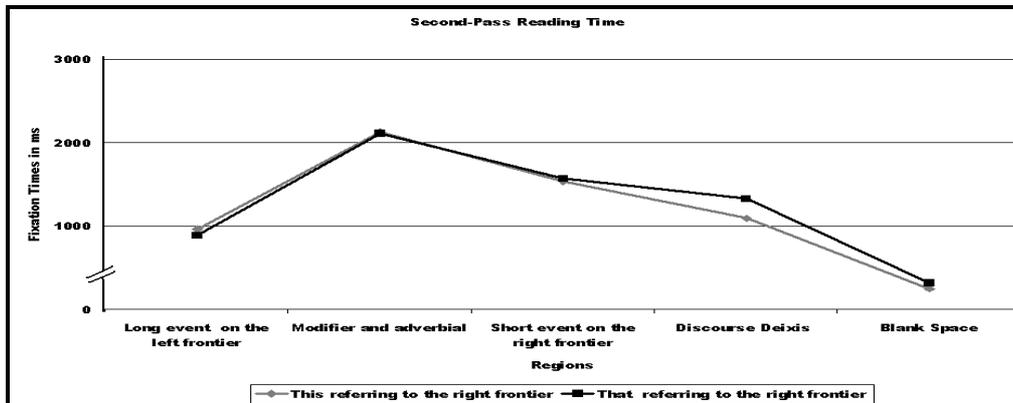


Figure 9b. Second-pass reading times (in ms) across regions: right frontier

In the second-pass reading time analysis, in the long event region, a marginally significant effect of response was seen, $t=1.950$, $p<.05$. In this region, fixations in the left frontier condition for *this* and *that* were longer than for the right frontier condition. The fixation time of *that* in the left frontier was 1100ms, and the fixation time of *this* in the same condition was 1067ms. The fixation time of *that* in the right frontier condition was 888ms and that of *this* in the right frontier condition 967ms. In the short event region (i.e. *filling up petrol*), a significant effect of response was seen, $t=2.224$, $p<.05$. The fixation time for *that* in the long event on the left frontier condition was 1170 ms, and 1128ms for *this*. The fixation time in the short event in the right frontier condition was 1570ms for *that* and 1537 ms for *this*. The important point in this region was that reading times were longer when the reader referred to the right frontier. The fixation times in the long event region cross over with those in the short event region: that is, in the long event region the left frontier was fixated longer than the right frontier condition, whereas in the short event region, the right frontier was fixated longer than the left frontier. On the basis of these findings, we can say that participants looked longer at the clause they wanted to refer to. In other words, to establish the foci of *this* and *that*, the participants look back to those parts of the text span they wanted to bring into focus.

In the discourse deixis region, there was a significant effect of condition, $t = -3.226$, $p < .05$, and a marginally significant interaction between condition and response, $t = -1.830$, $p > .05$. In both right and left frontier conditions, *that* was read longer than *this*, *That* = 1115ms; *That* = 1325 ms; *This* = 1096ms; *This* = 1094ms. Therefore, we can say that *that* was difficult to process when compared to *this*. In the blank space region, a significant effect of response was seen, $t = 2.370$, $p < .05$. *This* was read longer than *that* in the long event on the left frontier condition, *This* = 210ms; *That* = 155ms. In the short event on the right frontier condition, *that* was read longer than *this*, *This* = 253ms; *That* = 323ms, which demonstrates that the reading times of the regions became longer if the participants wanted to refer to them.

3.2.2.2 Other categories in Experiment 2. In the production experiment, the participants used prenominal *this* or *that*. It is worth mentioning that prenominal usages suggest an overall view about the usage of *this* and *that*. The following figure gives the percentages of other categories in the production experiment.

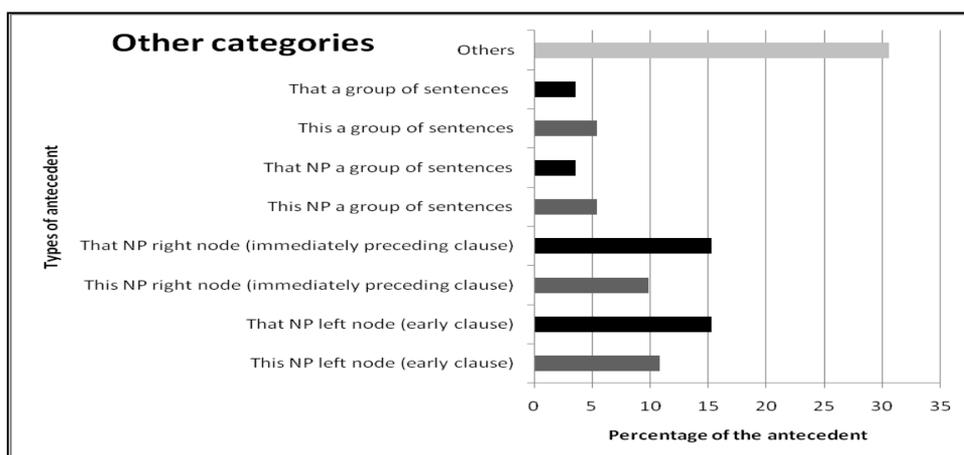


Figure 10. Percentages of other categories

10.8 % of prenominal uses of *this* referred to the left frontier, whereas 15.3% of the prenominal uses of *that* picked up the left frontier as an antecedent. Only 9.9 % of the prenominal uses of *this* pointed to the right frontier, while 15.3 % of

pronominal uses of *that* referred to the right frontier. Cases in which a pronominal *that* might be used to refer either to the left or the right frontier were more frequent than those with *this*. 5.4 % of pronominal uses of *this* picked up a group of sentences as antecedent, while 3.6% of the pronominal uses of *that* referred to a group of sentences. The same pattern was seen in the occurrences of pronominal *this* and *that* when they referred to a group of sentences. In 30% of the sentences, the antecedents of *this* or *that* were unclear, time expressions were used with *this* and *that*, or the completed sentences were not consistent with the previous parts of the texts.

To summarize the findings of Experiment 2: the processing times of *this* and *that* changed according to the text spans the participants looked at. If the participant wanted to refer to the short event on the right frontier with *that*, the processing of *that* took longer than when they were completing a sentence beginning with *this*. Or, if the participants wanted to pick out the long event on the left frontier as the antecedent of *this*, the processing of *this* in the long event on the left frontier condition took longer than that of *that*. One of the most important findings of this experiment is that both *this* and *that* are mostly used to refer to the nearest clause on the right frontier of the discourse structure. This matched our prediction. When semantics prefers right frontier attachment, *that* is better than *this*. This finding is counter-intuitive, and contradicts what linguists have tended to say about the preferences of *this* and *that* in the selection of antecedents. The literature on *that* is shown to be mistaken by these experiments, which demonstrate that *that* likes right frontier (close) attachment.

Again, contrary to linguists' expectations and theories, *this* is slightly more reliable than *that* in picking out the entity on the left frontier of the discourse structure when semantics prefers left frontier attachment. Another significant finding in the eye movement data is that people look back at the clause they are going to refer to. This may indicate that *this* and *that* establish centres in discourse and lead the participants to refer back to the antecedents. In Experiment 3 we investigated whether we would get the same patterns of discourse deixis and their accessibility to discourse segments if we changed the order of long and short events. In the third Experiment, contrary to the first Experiment, the short event

was given on the left frontier instead of the right frontier and the long event was given to the participants on the right frontier instead of the left frontier.

3.4 Experiment 3: The change of the positions of right/left frontiers

Zwaan (1996) proposed a narrative shift model. According to the iconicity assumption that Zwaan adopts in his study, if events are consecutive, the first event remains active for readers even as further events are added. In other words, if an adverbial phrase such as ‘a moment later’ is used to indicate the end of the first event and the start of the second event, the readers keep the first event active. On the other hand, if an adverbial phrase like ‘an hour later’ is used between two events, introducing an interruption to the temporal sequence, the first event is deactivated.

In Experiment 3 we hypothesized that the order of events and a short time break after the first event would have no effect on the processing of discourse deixis and discourse segments, and that therefore the left frontier would be inaccessible for discourse deixis in online reading.

In order to test the hypothesis, we kept the same design in Experiment 1, changing only the order of events. In this experiment, the short event was moved to the left frontier (the earlier clause in the first sentence) and the long event was moved to the right frontier (the immediately preceding clause in the second sentence). In the controlled stimuli, *this* and *that* referred to long events on the right frontier and short events on the left frontier. This was to ensure that the results of experiment 1 were due to the preference for reference to the right frontier, rather than a preference for short events *per-se*. We set up four conditions:

Condition 1: *this* referring to a long event on the right frontier of discourse

e.g. “John filled up the car with petrol, being careful not to spill any over his white wedding trousers. Then *he drove from Edinburgh to Birmingham*. *This* took him 5 hours, and afterwards he was happy not to have had to stop on his way.”

Condition 2: *that* referring to a long event on the right frontier of discourse

e.g. “John filled up the car with petrol, being careful not to spill any over his white wedding trousers. Then *he drove from Edinburgh to Birmingham*. *That* took him 5 hours, and afterwards he was happy not to have had to stop on his way.”

Condition 3: *this* referring to a short event on the left frontier of discourse
e.g. “*John filled up the car with petrol*, being careful not to spill any over his white wedding trousers. Then he drove from Edinburgh to Birmingham. *This* took him 5 minutes, and afterwards he was happy not to have stained his trousers.”

Condition 4: *that* referring to a short event on the left frontier of discourse
e.g. “*John filled up the car with petrol*, being careful not to spill any over his white wedding trousers. Then he drove from Edinburgh to Birmingham. *That* took him 5 minutes, and afterwards he was happy not to have stained his trousers.”

3.4.1 Method.

3.4.1.1 Participants. Forty paid native English-speaking volunteers aged 21-24 from the University of Edinburgh participated, and were unaware of the purpose of the study.

3.4.1.2 Stimuli and design. As in Experiment 1, the preferences of *this* and *that* were measured by referring to matching or mismatching time-spans (e.g. *this/that took him five hours/minutes* referring to either *John drove from Edinburgh to Birmingham* or *he filled up his car with petrol*). The clause with the

short event was given with a modifier (i.e being careful not to spill any over his white wedding trousers). In order to indicate the end of the short event and the start of a long event, adverbials such as *then*, *afterwards* were used, instead of the adverbial clause with ‘when’ or ‘after’ used in Experiment 1.

There were 40 experimental sentences, each with the four conditions. Four files were constructed: in each file an item appeared in only one condition and each condition appeared an equal number of times. There were 60 filler items which were similar in length to the control sentences. In the filler items, consequent events that a character experienced were given. The texts were presented as three or four written lines. The number of characters in each line was between 66 and 76. *This* and *that* in the second sentence always appeared towards the middle of the line. Each participant also saw all the fillers.

3.4.1.3 Procedure. As in Experiment 1, One hundred and ten texts were given in a fixed random order. Ten participants were assigned to each list. The experiment began with eight fillers, in order to familiarize the participants with the experimental procedure. We used an Eyelink 1000 eye-tracker in a table-mounted mode and a chin rest was used to stabilize the participant’s head.

3.4.1.4 Data Analysis. Eye-movement data were prepared for analysis as in Experiment 1. Because of spelling mistakes in the script, 2 experimental sentences were taken out from the data of thirty-two participants. The rest of the participants’ data analysis was done for 40 experimental sentences. The same number of regions as in Experiment 1 were used in this experiment (see table below)

Table 3. Regions (R) in Experiment 3

R1(Short Event on the left frontier)	Diana phoned to book a taxi to the airport for 7 pm
R2 (Modifier and Discourse Marker Region)	becoming stressed by the busy operator. Afterwards,
R3 (Long event on the right frontier)	She packed her suitcases with all her holiday clothes
R4(Discourse deixis)	This/that took her
R5 (Time duration)	1 hour
R6 (Connector and adverbial)	and afterwards
R7 (Pronoun and copula)	she was
R8 (Adjective)	sad to
R9 (After the adjective)	be leaving the country

3.4.2 Results and Discussion. As in Experiment 1, the means for each region were analyzed using repeated measures ANOVA treating discourse deixis (this-that) and types of frontiers (left-right frontiers). Figures 11a and 11b show the first-pass reading times across regions.

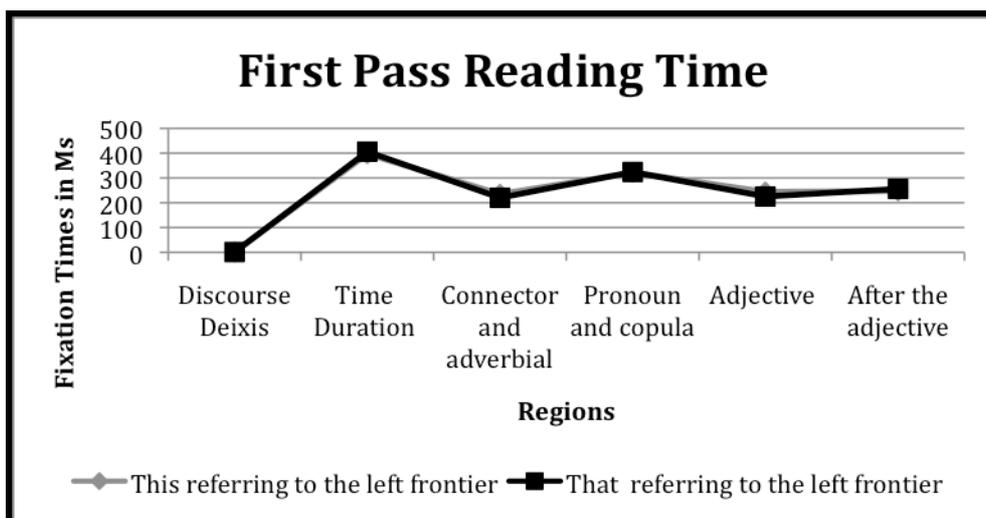


Figure 11a. First-pass reading times (in ms) across regions: left frontier

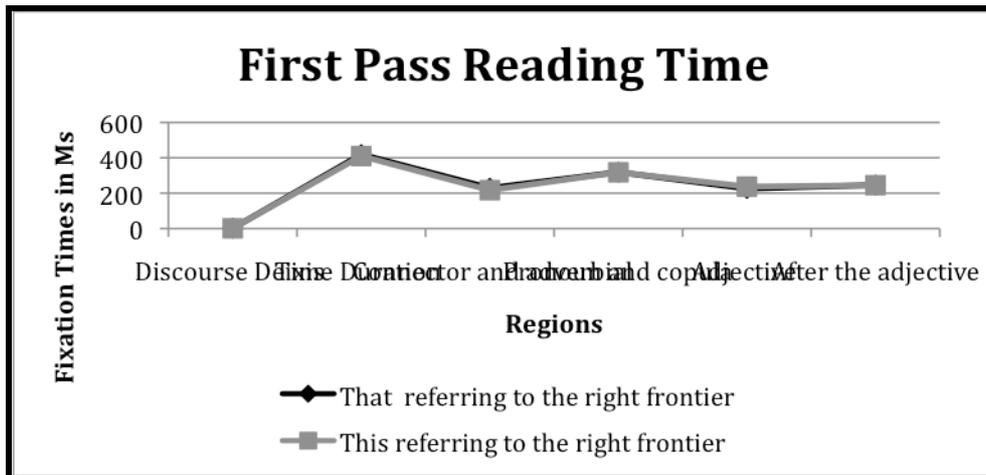


Figure 11b. First-pass reading times (in ms) across regions: right frontier

Measures of first-pass reading time in Experiment 3 showed that in the pronoun and copula verb region, a significant main effect of discourse deixis was seen in the subject-by-subject analysis, but the same significant effect was not seen in the item-by-item analysis, $F(1,39) = 4.66$, $MSE = 1355.898$, $p < .05$, $F(1,39) = 1.28$, $MSE = 5224.792$, $p > .05$; *This* = 243ms, $SE = 10.826$; *That* = 230ms, $SE = 7.785$.

Figure 12 shows the fixation times across regions in regression-path time measures in the adjective region.

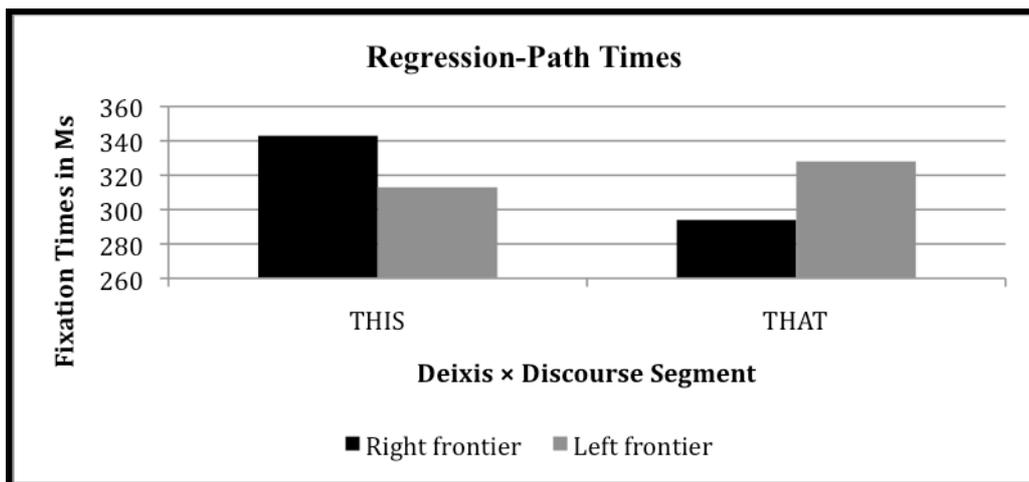


Figure 12. Regression-Path Times (in ms) in the adjective region

Regression-path time analysis reveals a marginal interaction between discourse deixis and discourse segment in subject-by-subject analysis, but not in item-by-

item analysis in the adjective region (i.e. *be leaving the country*), $F1(1,39) = 3.17$, $MSE = 13053.816$, $p < .05$; $F2(1,39) = .073$, $MSE = 18571.768$, $p > .05$. Fixation for the *this* condition was longer than for *that* when it referred to the long event in the right frontier, *This* = 343ms, $SD = 168.646$; *That* = 294ms, $SD = 141.202$. On the other hand, the condition *that* was read longer than the *this* condition when it referred to the short event on the left frontier condition, *This* = 313ms, $SD = 139.522$; *That* = 328ms, $SD = 154.106$. This indicates that the participants did not have a heavy processing load when *this* referred to the short event on the left frontier and *that* referred to the long event on the right frontier. This marginal interaction supports the findings in the corpus analysis and production experiment; that is, that participants marginally prefer to use *that* over *this* when referring to the right frontier, and vice versa when referring to the left frontier.

In the measures of second-pass reading time (see Figures 13a and 13b), the main effect of discourse deixis was seen, $F1(1,39) = 5.12$, $MSE = 40273.311$, $p < .05$; $F2(1,39) = 8.54$, $MSE = 88173.551$, $p < .05$, in the modifier and adverbial region (i.e. *becoming stressed... Afterwards*). As in Experiment 1, fixations were longer when the participants read *this* than when they read *that*, *This* = 664ms, $SE = 70.730$; *That* = 541ms, $SE = 54.192$. In the discourse deixis region, the discourse segment had a marginal effect in subject-by-subject analysis but a significant effect in item-by-item analysis, $F1(1,39) = 3.98$, $MSE = 10172.109$, $p > .05$; $F2(1,39) = 4.15$, $MSE = 47854.761$, $p < .05$. This region was fixated longer in the left frontier condition than the right frontier condition, *Left frontier (short event)* = 212ms, $SE = 17.363$; *Right frontier (Long event)* = 180ms, $SE = 180.02$. In the time duration region (i.e. *1 hour*), the same significant effect of discourse segment was seen, $F1(1,39) = 19.20$, $MSE = 1744.903$, $p < .05$; $F2(1,39) = 5.078$, $MSE = 6397.564$, $p < .05$; *Left frontier* = 98.092ms, $SE = 12.669$; *Right frontier* = 69.151ms, $SE = 10.073$. In the connector and adverbial region, the same discourse segment effect was observed in the subject-by-subject analysis but a marginal effect was seen in the item by item analysis, $F1(1,39) = 14.92$, $MSE = 2291.400$, $p < .05$; $F2(1,39) = 4.03$, $MSE = 10008.434$, $p > .05$; *Left frontier* = 88ms, $SE = 9.434$; *Right frontier* = 59ms, $SE = 10.301$. In the pronoun and copula verb region (i.e. *he was*), the same significant effect of discourse segment in the

subject-by-subject analysis and its marginal effect in the item-by-item analysis were seen, $F1(1,39) = 7.13$, $MSE = 1184.305$, $p < .05$; $F2(1,39) = 3.30$, $MSE = 2376.083$, $p > .05$; *Left frontier* = 56ms, $SE = 6.760$; *Right frontier* = 42ms, $SE = 5.648$.³

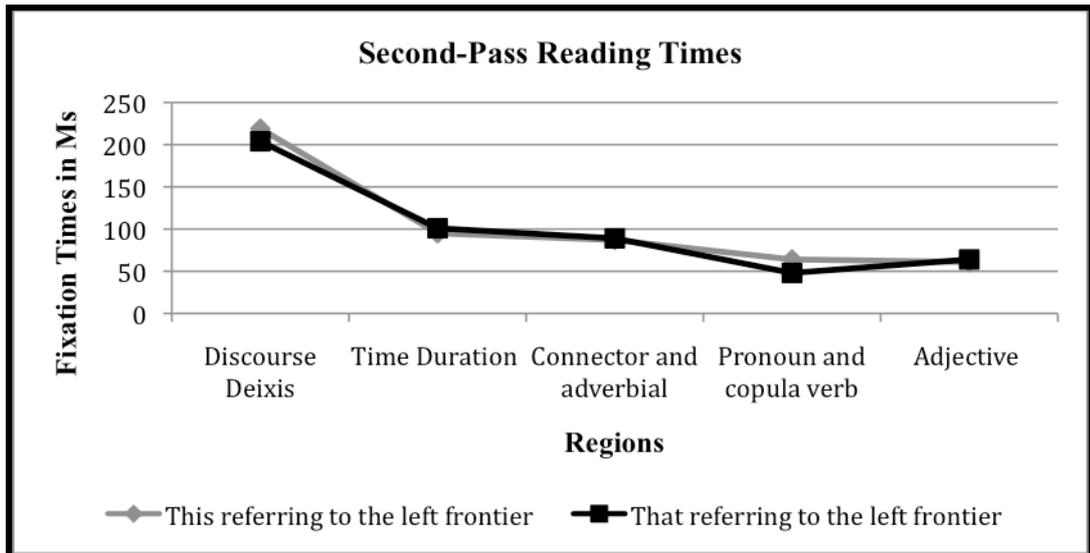


Figure 13a. Second-Pass Reading Times in (ms) across regions: left frontier

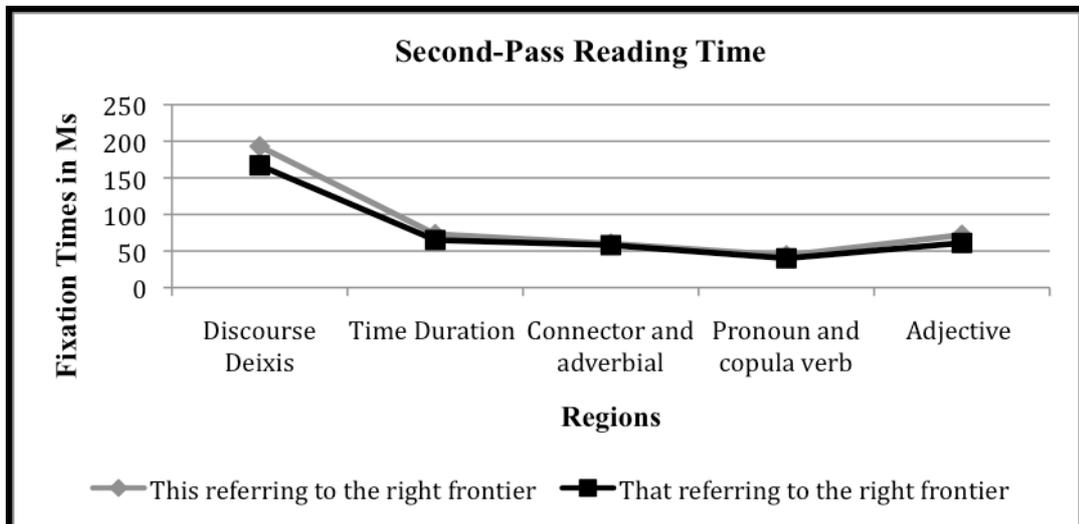


Figure 13b. Second-Pass Reading Times in (ms) across regions: right frontier

All the findings in the second-pass reading time show that regardless of whether *this* or *that* was present, the participants had a heavy processing load

when they read the referential expressions in the left frontier condition. In Experiments 1 and 3, no matter whether a long event or short event was given on the left frontier, the fixations became longer in the left frontier condition. This indicates that the left frontier is less accessible for readers, irrespective of whether *this* or *that* is deployed. This supports our hypothesis that the order of events does not affect the processing of discourse deixis or the accessibility of discourse segments. This finding also leads us to question Zwaan's (1996) narrative shift model. The findings in Experiments 1 and 3 showed that even when the events followed immediately one upon another in sequential order, the first event on the left frontier was consistently deactivated for readers, irrespective of whether the intervening events were of a long or a short duration. The reason the left frontier is deactivated for readers can be explained through Garrord and Sanford's (1977) model of resolution constraints within a focus memory framework; such an explanation would also fit within Grosz and Sidner's (1986) attentional model. For Anderson, Garrod and Sanford (1983), readers construct situational representations in chunks. The first chunk is the scenario of the narration and becomes less accessible when the second chunk is introduced. The first chunk is defined as the *Implicit Focus* and the second event as the *Explicit Focus*. The left frontier, including any non-focused antecedent, becomes the implicit focus when a second event is given. According to Grosz and Sidner's theory of attentional states, the lower space stack (equivalent to the left frontier) is less active in the attentional model. This does not mean that the lower space stack is not in the working memory: however, it has weak mappings with the referential expressions and therefore its retrieval from the implicit focus is more difficult. This would also explain why there is no comparable pragmatic inference effort for *this* and *that*. It also explains why we did not see regressive eye movements when the participants read *this* and *that*. In reading processing, contrary to linguists' assumptions, discourse deixis did not lead the participants to look back to an antecedent, since the antecedents were implicitly or explicitly present in the working memory.

3.4.3 Discussion on Native Speakers' Processign of Right/Left Frontiers. Our first aim in this study was to investigate whether the right and left frontiers of a discourse structure are differentially accessible to *this* and *that*. On the basis of arguments in the linguistics literature to date we predicted that *that* would tend to pick out the antecedent left frontier of a given discourse structure, while *this* would tend to pick out the right frontier. Surprisingly, however, the corpus analysis and online production and reading experiments showed that the deictic functioning of *this* and *that* in written discourse is far more complex than has hitherto been acknowledged, and does not, contrary to common assumptions, simply mirror the use of distal and proximal deictic markers in spoken discourse. *This* and *that* do not unproblematically “point backwards”; nor does *this* simply refer to an activated or proximal entity in a given discourse and *that* to a noncurrent or distal entity, as many linguists have argued (Levinson, 1983; Lyons, 1977; Cornish, 1999; McCarthy 1996). In both the corpus analysis and production experiment, *both* expressions referred far more frequently to the right frontier than the left frontier. Furthermore, in the online reading experiments fixations became longer in the left frontier condition, irrespective of whether *this* or *that* was deployed. This result was consistent with Webber’s (1998) account of discourse deixis as generally pointing to the nearest sentence or entity on the right frontier as antecedent. In Experiment 3, even when the semantic content made a deictic connection to the right frontier unfeasible while pointing to a connection with the left, a deictic connection to the left frontier still seemed difficult for readers to make. This problematizes Asher and Lascarides’ (2003) assumption that the left frontier can be accessed when semantic or rhetorical relations are established between the unit with discourse deixis and its antecedent.

However, this finding is merely the beginning of the story. The production experiment did reveal a slight statistical difference in the relative frequencies with which *this* and *that* access the left frontier. Yet in all these cases, *this* accessed the left frontier more frequently and easily than *that*, again contradicting not only the predictions but the assumptions of Çokal (2005), Cornish (2001), McCarthy (1995), and Webber (1988).

The shortcomings of the existing literature are perhaps due in part to their failure to take into account both writers' and readers' perspectives when examining discourse deixis (Asher and Ariel 1996; Çokal, 2005; Diessel, 2002; Gundet et al, 1996; Fillmore, 1982; Webber, 1988; McCarthy, 1995). These studies ignore how discourse deixis is actually processed by writers and readers in real time, and the simultaneous roles of the working memory and of intentional/attentional states in language use and processing. We here propose a model for discourse deixis processing in writing and reading. This model incorporates the role of the working memory, and is based on Garrod and Sanford's Focus Memory Framework (1977) and Grosz and Sidner's distinction between intentional and attentional states (1986).

During reading, two memory partitions are active: the *explicit focus* and the *implicit focus*. The explicit focus corresponds to the entities currently in focus, whereas the implicit focus contains currently active background information such as text scenario or first event chunk. These two partitions are in fact crucially related through the mappings between discourse entity tokens in the explicit focus and the various role slots afforded by the implicit focus. For readers in the online experiments, *this* and *that* in the right frontier condition were easier to process than in the left frontier condition, probably because the right frontier is the explicit focus in the working memory. We assume that the left frontier is still active as the implicit focus but its mapping with the explicit focus and the deictic marker is generally too weak to be easily retrieved, and so shallow processing occurs when *this* and *that* refer to the left frontier. Despite the semantic relation between the deictic expression and the clause on the left frontier, attention is not diverted from the right frontier to the left frontier through strong pragmatic processing, as is implied by Asher and Lascarides. What all these processes show is that *this* and *that* are focus-marked in reading but not intention-marked or prominence-marked. They only signal the current entity in focus, not a change in an entity's importance. This also demonstrates that during the processing of discourse deixis in reading not only co-textual processing occurs, as linguists have hitherto assumed, but also focus-marked mental representation.

In writing, on the other hand, *this* can be both focus-marked and intention-marked, whereas *that* can only be focus-marked. Deep processing occurred in writing: therefore, the participants looked back to the segment of the text to which they were about to refer. The saliency level is not the whole story when it comes to the question of what segment of a preceding text discourse deixis can refer to. In terms of the construction of text, we can say that *this* and *that* are usually deployed to refer to the immediately preceding entity or clause, currently in the explicit focus. A connection with the implicit focus in the working memory is much more rarely made, and makes greater demands upon the reader's processing. *This* is used slightly more often than *that* in such cases. Ariel (1996) suggests that a speaker chooses a referring expression to match the cognitive accessibility of the intended referent within the addressee's mental model of the discourse under construction. The reading experiments demonstrated that readers' and writers' mental representations for the processing of *this* and *that* may not match.

To summarise: the extrapolation from the spoken use of deictic expressions to argue that in written discourse *this* refers to proximal (right frontier) entities while *that* refers to distal (left frontier) entities is conclusively shown by our study to be unsustainable. If anything, *this* more commonly and easily accesses the left frontier than *that*, pointing to the importance of intentional states in those cases where the left frontier does become accessible. Perhaps most of all, this study points to the need for further work on discourse deixis in written discourse, highlighting the complexities involved: future studies, however, will almost certainly have to pay special attention to the role of the working memory in anaphoric and cataphoric resolution.

3.5 Experiment 4 with Non-Natives: This and That Referring to right or left frontiers.

In Experiment 4, I explored Turkish advanced speakers' preferences for the accessibility of *this* and *that* to discourse segments (i.e the long event on the left frontier versus the short event on the right frontier). There are two main reasons for the exploration of the intuitions of Turkish non-native speakers of English. Firstly, the accessibilities of *this* and *that* are not given in English as a foreign

language textbooks or in Advanced grammar books. Since such information is not mentioned in the textbooks and their accessibility is governed by discourse and intentional structures, it is worth investigating Turkish non-native speakers' mental representations of *this* and *that* in terms of accessibility to discourse segments. Secondly, from a small-scaled corpus study and personal discussion with Turkish linguists, it appeared that the Turkish deictic system is different from English in terms of the accessibility to the frontiers. Turkish *bu* and *o* can only access the nearest entities – that is, entities on the right frontier. Also, *this* and *that* in Experiment 4 can only be translated as *bu*, but never as *o* and *şu*. In addition, *bu* but not *o* refers to a proposition (i.e a long and short event in the stimuli) (see section 3.7 for the detailed corpus analysis and discussion on Turkish *bu* and *o*). The first prediction regarding Experiment 1 was based on 4 factors: (1) *this* and *that* correspond only to Turkish *bu* in the stimuli; (2) *bu* accesses only the right frontier; (3) deictic accessibility is not mentioned in the textbooks and their accessibility is governed by intentional structures; and (4) there is not enough evidence for these intentional structures and for the existence of the accessibility in the input, The first prediction regarding Experiment 1 was thus that Turkish non-native speakers of English would regard the entities on the left-frontier as not being open to access by either *this* and *that*. Alternatively, if the entities on the left frontier were open for Turkish non-native speakers of English, then they would be open to *that* instead of *this*, since they might overgeneralize the rule governing spoken language into written language.

In order to test these predictions, the stimuli in Experiment 1 in section 3.1 were adopted to a Turkish context by changing the names of cities, places and characters in the narrations. The following stimuli were then given to the Turkish non-native speakers of English:

Condition 1: Berk drove from Istanbul to Zonguldak, listening to his favourite jazz CDs. When he arrived in Zonguldak, he filled up the car with petrol. This took him 5 hours, and afterwards he was happy to have enough time to go to his hotel to have a rest.

Condition 2: Berk drove from Istanbul to Zonguldak, listening to his favourite jazz CDs. When he arrived in Zonguldak, he filled up the car with

petrol. That took him 5 hours, and afterwards he was happy to have enough time to go to his hotel to have a rest.

Condition 3: Berk drove from Istanbul to Zonguldak, listening to his favourite jazz CDs. When he arrived in Zonguldak, he filled up the car with petrol. This took him 5 minutes, and afterwards he was happy to have enough time to go to his hotel to have a rest.

Condition 4: Berk drove from Istanbul to Zonguldak, listening to his favourite jazz CDs. When he arrived in Zonguldak, he filled up the car with petrol. This took him 5 minutes, and afterwards he was happy to have enough time to go to his hotel to have a rest.

3.5.1 Method. The methodology used in Experiment 4 is given below.

3.5.1.1 Participants. Fifty-two paid Turkish non-native English-speaking volunteers aged 21-24 from Middle East Technical University participated, and all were unaware of the purpose of the study. All were either third- or fourth-year students in the Foreign Language Teaching Department at Middle East Technical University. A few of them knew either German or French but they defined themselves as low-intermediate in these languages. They also added that the dominant second language in their life is English since they use English in classes and to chat on the internet. They mostly listen to music in English and watch television series in English rather than German or French. They had been learning English since secondary school, from approximately 12 years old. On the other hand, they had started to learn German or French at university, at 18 or 19. Therefore, we included these participants' data. Besides the participants' self-evaluations of their languages, the stimuli used in this Experiment were sent to German and French psycholinguists, and their translations were requested. Though the following is not a word-for-word translation, the essential point is *this/that* is translated in German with one corresponding item, *Dies*, as in Turkish:

German translations:

Als John von Edinburgh nach Birmingham fuhr, hoerte er sich seine Lieblings-Jazz-CDs an. Als er in Birmingham ankam, tankte er. Dies dauerte 5 Stunden and er war froh, dass er noch genug Zeit hatte um zum Hotel zu gehen und sich auszuruhen.

Als John von Edinburgh nach Birmingham fuhr, hoerte er sich seine Lieblings-Jazz-CDs an. Als er in Birmingham ankam, tankte er. Dies dauerte 5 Minuten and er war froh, dass er noch genug Zeit hatte um einen Kaffee zu trinken.

In French *this* is *ceci* ('ce' + 'ici' = 'this' + 'here') and *that* is *cela* ('ce' + 'là' = 'this' + 'there'). However, in spoken French *ceci* is very rarely used (mainly when one wants to make a distinction: 'I want this, not that') and both *this* and *that* are rather *cela*. So, in both the conditions above *cela* is used (i.e. *cela lui a pris 5 heures*). In informal French *ça* would be suitable in both conditions (i.e. *ça lui a pris 5 heures*). We therefore concluded that these participants' knowledge of German and French would not be a problem for us.

3.5.1.2 Stimuli and Design. The stimuli and design used in this experiment were identical to those used in Experiment 1 in section 3.1.1.2. As has already been mentioned, small adaptations were made to the Turkish context, such as using Turkish city name like Zonguldak, Istanbul, and Gaziantep, or other Turkish examples, such as the Galata Tower in Istanbul. The characters' name were also changed (e.g. from John to Berke). However, in the selection of Turkish names, where possible approximately the same number of characters per name as in the original stimuli in Experiment 1 were used, in order not to alter the regions or the number of characters in the original region files in Experiment 1. In addition, the place of long and short events, the number of the characters in each line, and the number of experimental items were also kept the same as in the earlier experiment.

3.5.1.3 Procedure. The same procedure and Eye-link 1000 as in section 3.1.1.3 were employed.

3.5.1.4 Data Analysis. The same nine regions as in section 3.5.1.4 were used, as in the following:

R1 (Long event region):	Berra packed her belongings
R2 (Modifier and adverbial clause region):	with the help of her best friend. Once she had wrapped everything,
R3 (Short event region):	she put the packages in her small car with great care.
R4 (Discourse deixis region):	This/that took her
R5 (Time duration):	8 minutes/3 hours
R6 (Connector and adverbial region):	and subsequently
R7 (Pronoun and copula verb region):	she was
R8 (An adjective region):	pleased to
R9 (Region after the adjective):	have fitted them all into her car/ have finished everything on time

3.5.2 Results and Discussion. The condition by region means are given in Figures 14a, 14b, 16a, 16b, 18a and 18b. The means for each region were analyzed using Analyses of Variance treating discourse deixis (*this-that*) and types of discourse segments (a left frontier vs. a right frontier) as within-participants and within-item factors. Analyses were performed on the means of each participant, collapsing over items (F1), and for each item, collapsing over participants (F2). In the following, the fixation data for each region will be given within three different eye movement measurements: the first-pass reading time, regression-path time and the second-pass reading time. Only regions that might give information about the accessibility are included in the figures.

In the first-pass reading time measure (see Figures 14a and 14b), main effects of discourse deixis and discourse segments/frontiers and the interaction

between these factors were not seen in the discourse deixis, time duration and connector and adverbial regions (all F 's < 2).

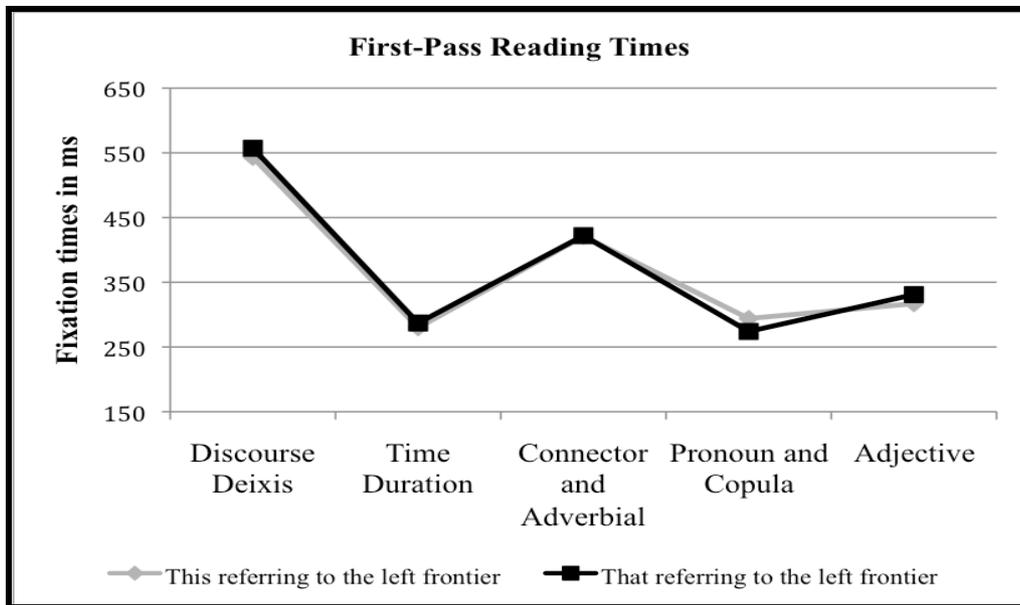


Figure 14a. First-pass reading times (in ms) across regions: left frontier

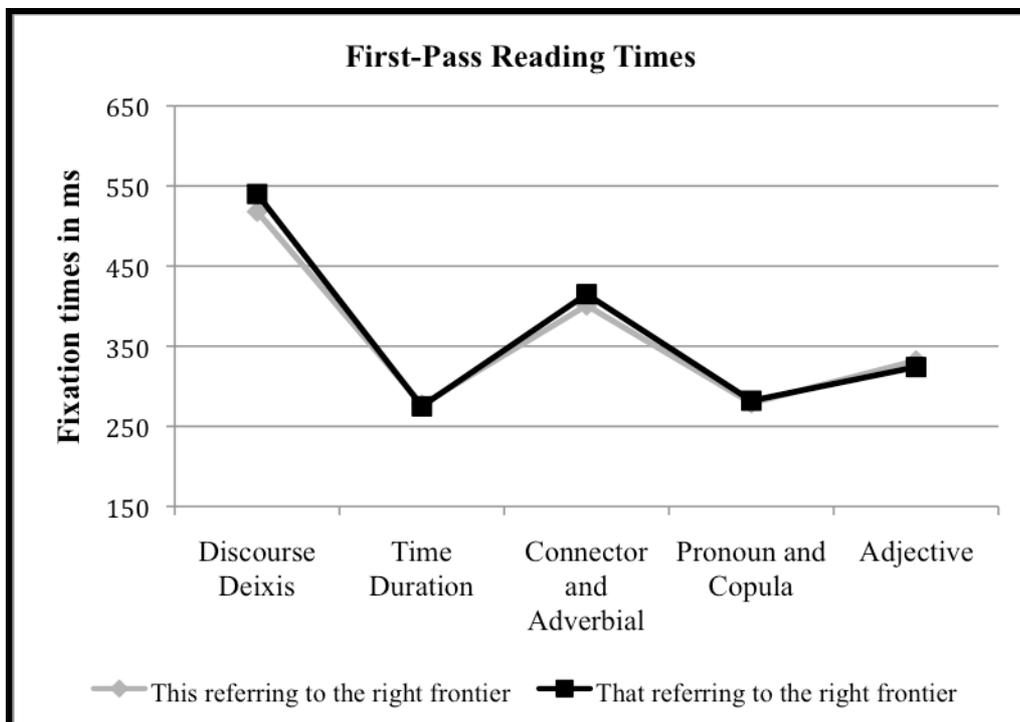


Figure 14b. First-pass reading times (in ms) across regions: right frontier

In the pronoun and copula region (e.g. she was), a marginally significant interaction between discourse deixis and frontiers happened in F1 and a significant interaction between the factors was seen in F2, $F1 (1,51)= 3.591$, $MSE=6747$, $p < .064$; $F2 (1,39)= 4.839$, $p < .034$, $MSE= 4939$; *This referring to long event on the left frontier*= 294ms, $SE=9.891$; *That referring to long event on the left frontier*= 274 ms, $SE=8.019$; *This referring to short event on the right frontier*= 279 ms, $SE= 7.760$; *That referring to short event on the right frontier*= 282 ms, $SE= 8.502$.

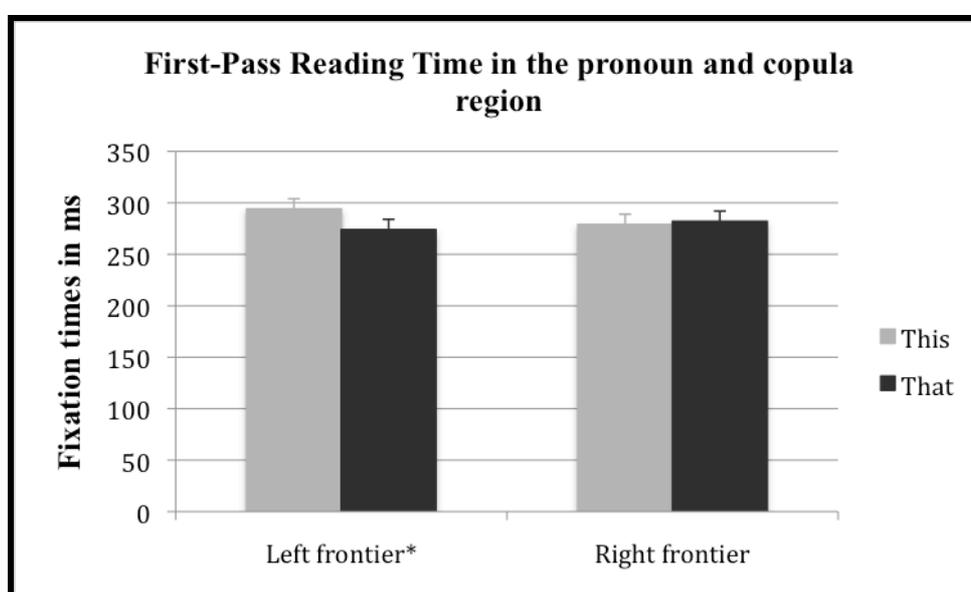


Figure 15. Means of first-pass reading times in the pronoun and copula region as a function of discourse deixis (*this* vs. *that*) and Frontiers (*a left frontier* vs. *a right frontier*)

As seen in Figure 15 above, fixations were longer when *this* referred to the long event on the left frontier than when *that* did so, $t1 (51)= 2.527$ $p=.015$; $t2(39)= 2.276$ $p=.028$.

The t-test comparison of *this* referring to the long event on the left with *this* referring to the short event on the right frontier revealed a trend in $t1$ and $t2$, $t1 (51)= 1.782$, $p=. 081$; $t2 (39)= 1.750$, $p=.088$. References with *this* to the short event on the right frontier were slightly preferred. The t-test comparison of *that* referring to the short event on the right frontier with *that* referring to the long

event on the left frontier was not significant, $t1 (51) = -924, p = .360$; $t2 (39) = -1.107, p = .275$. In the adjective region (i.e. pleased to), main effects and an interaction between the two factors were not significant.

The next result is from the regression-path time measure and the following tables show the regression path times across the regions.

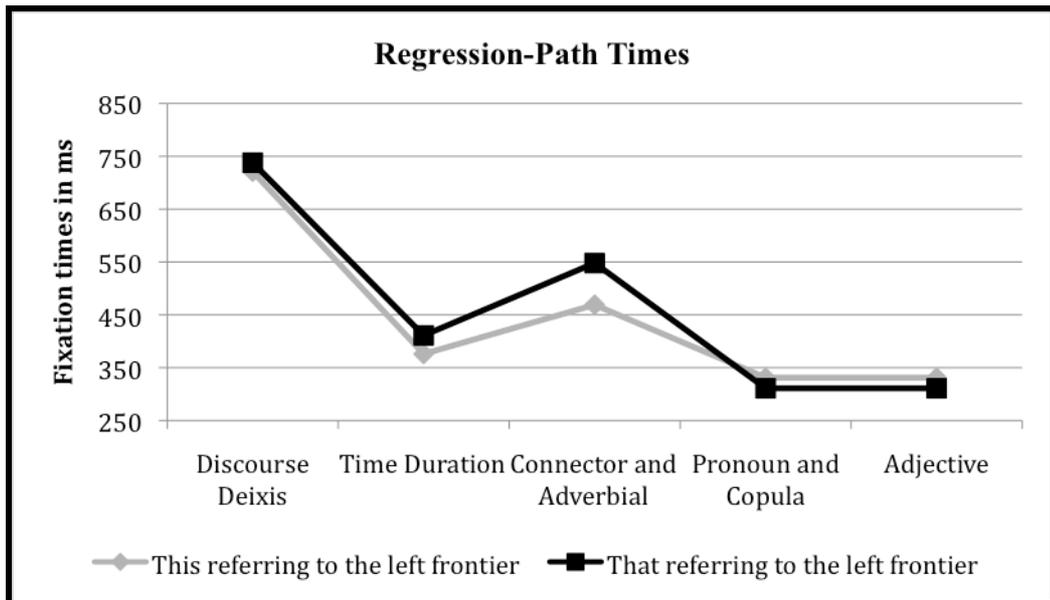


Figure 16a. Regression-Path times (in ms) across regions: left frontier

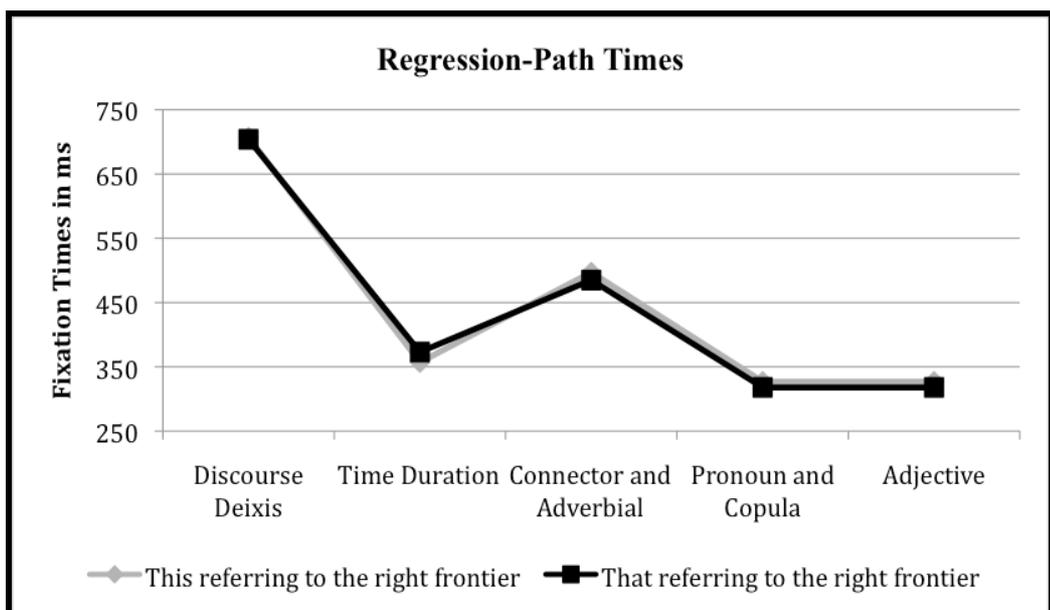


Figure 16b. Regression-Path times (in ms) across regions: right frontier

In the discourse deixis (i.e *this/that*) and time duration regions (i.e *took 7 hours/7minutes*), all the F's were < 2 and main effects were not seen. In the connector and adverbial region (i.e *and afterwards*), an interaction between discourse deixis and frontiers was marginally significant in F1 and there was a trend in F2, see Figure 4; $F1 (1,51) = 3.452, MSE = 110742, p < .069$; $F2 (1,39) = 2.931, p < .095, MSE = 87609$; *This referring to the long event on the left frontier = 469ms, SE = 18.607*; *That referring to the long event on the left frontier = 548ms, SE = 40.128*; *This referring to the short event on the right frontier = 497 ms, SE = 32.463*; *That referring to the long event on the right frontier = 485 ms, SE = 22.405*.

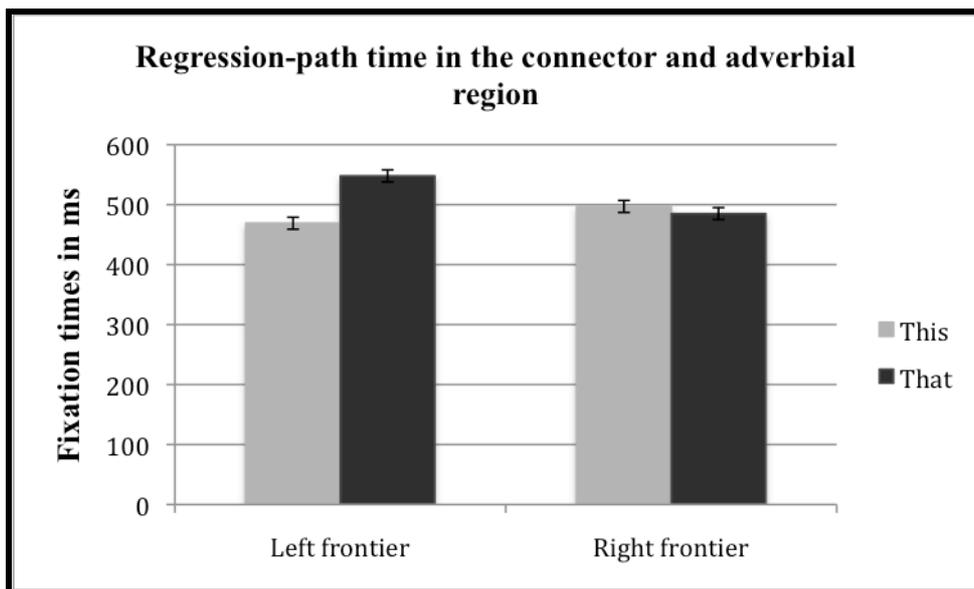


Figure 17. Means of regression-path times in the connector and adverbial region as a function of discourse deixis (*this* vs. *that*) and Frontiers (*a left frontier* vs. *a right frontier*)

The interaction pattern showed that fixations were longer when *that* referred to the long event on the left frontier than when *this* did so, and the pairwise comparison of *this* with *that* referring to the long event on the left frontier was significant in $t1 (51) = -2.090, p = .042$ and marginally significant in $t2 (39) = -1.967, p = .056$. The pairwise comparison of *that* referring to the short event on the right frontier with

this doing so was not significant in $t1$ (51) = .154, p = .878 and in $t2$ (39) = .725, p > .05). Also, the pairwise comparison of *this* referring to the long event on the left frontier with *this* referring to the short event on the right frontier was not significant, $t1$ (51) = 786, p = .435; $t2$ (39) = -745, p = .461. The difference between *that* referring to the short event on the right frontier and *that* referring to the long event on the left frontier was marginally significant in $t1$ (51) = 1.804, p = .077 but not in $t2$ (39) = 1.472, p = .149. In the other regions of regression-path times, any main effects or an interaction between the factors were not seen (all F 's < 2).

The last analysis is the second-pass reading measure (see 18a and 18b below)

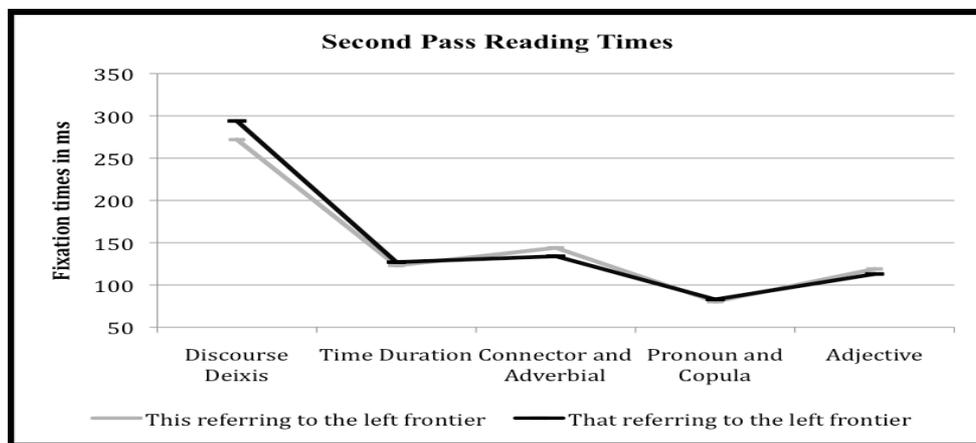


Figure 18a. Second-pass reading times (in ms) across regions: left frontier

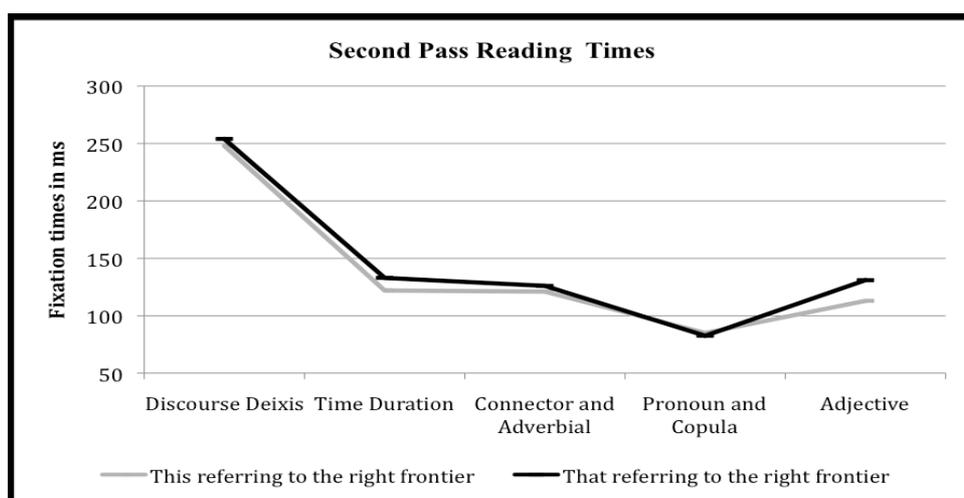


Figure 18b. Second-pass reading times (in ms) across regions: right frontier

The regions of second pass reading time measure did not reveal main effects of discourse deixis and frontier, or an interaction between these two factors (all F 's were < 2). In the connector and adverbial region, in the left frontier condition, fixations for *that* were shorter than for *this* but the pattern here was not strong enough to become significant in the pairwise comparison and ANOVA.

In conclusion, in the connector and adverbial region of regression-path times (i.e. *and afterwards*), Turkish non-native speakers preferred *this* over *that* when referring to the long event on the left frontier. This finding was also supported by the pairwise comparison analysis of *this* and *that* when referring to the long event on the left frontier. The pairwise comparison in this region showed that fixation time differences between *this* referring to the long event on the left frontier and *this* referring to the short event on the right frontier were significant. On the other hand, the comparison of fixation times when *that* referred to the short event on the right frontier with *that* referring to the long event on the left frontier was not significant. All these findings indicate that Turkish non-native speakers of English preferred *this* over *that* when referring to the long event on the left frontier.

In the pronoun and copula region of first-pass reading times, references to the long event on the left frontier with *that* were preferred to those using *this*. The pairwise comparison also confirmed the difference between *this* and *that* when referring to the left frontier.

All these findings indicate that the initial preference of Turkish-non-native speakers was for *this* when referring to the long event on the left frontier in the connector and adverbial region of regression-path times. Here, Turkish non-native speakers of English also had a preference for *that* when referring to the short event on the right frontier. In the next region of first-pass reading time, Turkish non-native speakers' preferences changed in the direction of *that* when referring to the long event on the left frontier. They did not show any preference for *this* when referring to the long event on the left frontier or to the short event on the right frontier.

One of the predictions of this study was that the left-frontier would be inaccessible to both *this* and *that* for Turkish non-native speakers of English, since

it is not open in their mother tongue. This prediction was not supported by the findings, since the left frontier was open and fixations were in fact shorter in the left frontier conditions. However, the results regarding the accessibility of *this* and *that* to the left frontier for Turkish non-native speakers of English were ambiguous. In the initial interpretation of regression-path times for the connector and adverbial region, *this* was preferred, but then in the following pronoun and copula region of the first-pass reading times *that* was preferred to *this* when referring to the long event on the left frontier. There are three possible explanations as to why Turkish non-native speakers of English preferred *this* when referring to the left frontier. (1) In the mental representations of Turkish non-native speaker of English, *this* is a foculiser, and can establish a new focus (2) *This* may be translated as *bu* by Turkish participants. Their initial intuition on *bu* may bring an unfocused entity into focus but then the left frontier for *bu* in the mother-tongue is closed. Therefore, the initial possible preference changes. (3) Initial interpretation of *this* is unmarked and thus the participants regarded *this* as accessing the left frontier but then they fell back upon the grammar rule they know in English: *that* is used for entities that are far away. Therefore, references of *that* to the left frontier were preferred later. All these findings and assumptions were approached tentatively with respect to the findings in the first, second and total reading times and a marginal interaction pattern in F values of regression path-times. In order to explore Turkish non-native speakers' preferences more deeply, Experiment 5 in section 3.3 was also run. The following production experiment would reveal the explicit knowledge that non-native speakers have regarding discourse deixis. Reading and production skills measure different cognitive skills but in this study, it is assumed that reading experiments with non-native speakers measure their implicit grammar knowledge, whereas production experiments measure their explicit knowledge. Therefore, production experiments may give information regarding what they explicitly know about the target structures.

3.6 Experiment 5 with Turkish Non-Natives: Online Completion of Sentences with *This* and *That*

In Experiment 4 above, Turkish speakers' online reading preferences regarding the accessibility of *this* and *that* to discourse segments (i.e. right and left frontiers) were tested. In this production experiment, in which Turkish non-native speakers of English were asked to complete the rest of the sentences beginning with *this* and *that*, their discourse segment preferences were further investigated. In this way, which frontiers were open for topic continuation for Turkish non-native speakers of English would be handled comprehensively. One of our predictions in the current experiment was that since Turkish non-native speakers of English would have enough time to think about the language structure this time, they would apply the rules that they had learnt from language classes. Therefore, our prediction was that *that* would be used to access the entities on the left frontier because these entities would be seen as corresponding to entities that are distant from the speaker in spoken discourse. The next section presents the methods used in the production experiment with Turkish non-native speakers of English.

3.6.1 Method. The methodology used in this experiment was identical to the method used in Experiment 2 in section 3.3 with English native speakers. The stimuli used with Turkish non-native speakers of English in Experiment 5 in section 3.5 were used, with minor changes. After *this* and *that* blank spaces were left, and the participants were asked to orally complete the sentences in a coherent fashion (see the sample stimuli below). The stimuli were adapted to Turkish contexts. While they were completing the blanks, the participants' voices and eye-movements were recorded.

Sample Stimuli

Berk drove from Istanbul to Zonguldak, listening to his favourite Tarkan CDs. When he arrived in Zonguldak, he filled up the car with petrol.

This/that _____

Beytullah planted 50 roses, following all the instructions on the plant packaging. After he planted the roses with great care, he watered them with a watering can. That/this _____

3.6.1.1 Participants. The participants were thirty paid Turkish non-native English-speaking volunteers aged 21-24 from Middle East Technical University. They had not participated in the first experiment. They were advanced fourth-year students of the Foreign Language Teaching Department. Their mean grade in the proficiency exam, which was taken before starting departmental courses, was 75. Participants who had resided outside of Turkey for more than 2 months were not included in the data analysis.

3.6.1.2 Stimuli and Design. The experimental stimuli were identical to the stimuli in sections 3.5.

3.6.1.3 Procedure. The same procedure was followed as in Experiment 2 in section 3.3. Differently from Experiment 2, however, instead of an Eyelink 1000K with a remote desktop control, an Eyelink 1000 with a chin rest had to be used in Turkey.

3.6.1.4 Data Analysis. The regions analyzed were the same as those in Experiment 2 in section 3.3. To recap:

R1 (Long event region):	Berra packed her belongings
R2 (Modifier and adverbial clause region):	with the help of her best friend. Once she had wrapped everything, she put the packages in her small car with great care.
R3 (Short event region)	great care.
R4 (Discourse deixis region):	This/that
R5 (Blank space region):

As stated before, in this experiment we predicted that Turkish non-native speakers would try to use learnt grammar rules while finding suitable antecedents for *this* and *that*, in particular the rule that *that* is used for entities that are unfocused and

far from the speaker, while *this* is used for entities in focus and near to the speaker.

3.6.2 Results and Discussion. As in Experiment 2 in section 3.3, a logistic mixed effect model was used to model the relative proportion of references to the left frontier (long event structure) and the right frontier (short event structure). Statistical computing environment R (version 2.4.1) and the lme4 package (Brysbaert, 2007) were run to perform the analyses. The following figure demonstrates which frontiers Turkish non-native speakers of English selected as antecedents of *this* and *that*. 27% of uses of *this* and of *that* were handled under other categories and excluded from this category in the analysis and from the Figure since they were used prenominally or their antecedents were implicit or unclear.

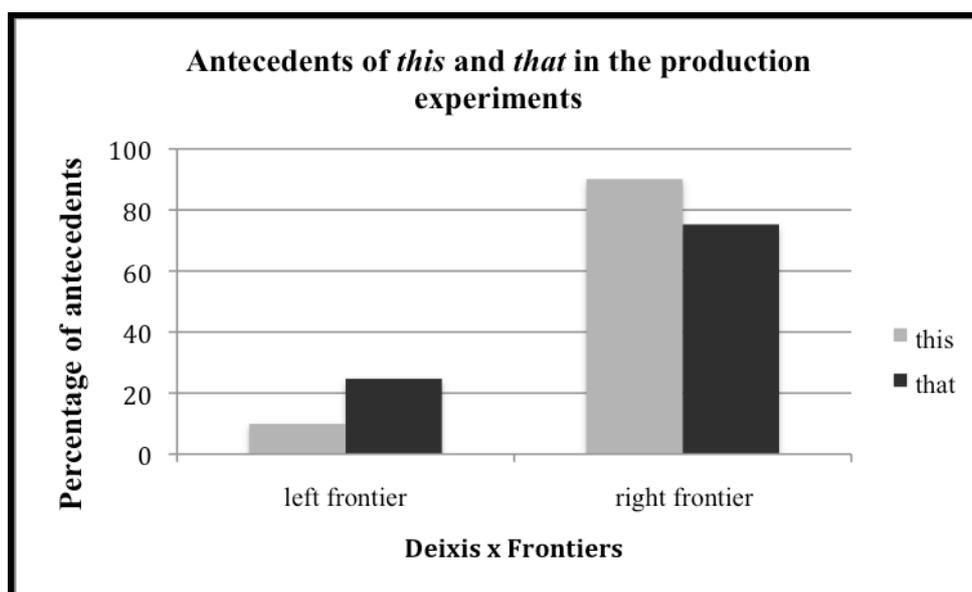


Figure 19. The antecedents of *this* and *that* in a logistic mixed effect analysis

The results of a logistic mixed effect analysis seem to confirm the pattern in the first-pass reading times in Experiment 1, showing that *that* was preferred over *this* in referring to the left frontier, $That = 17.83\%$; $This = 7.17\%$, $Z = -4.915$, $p = .000$. The analysis demonstrated that there were more references with *this* to

the right frontier than of *that*, $Z = 5.579$, $p < .05$; *That* = 54%, *This* = 65%, $Z = 3.804$, $p = .001$. The differences between *that* referring to the right frontier and *that* referring to the left frontier were significant, $t(29) = -15.522$, $p = .000$. The differences between *this* referring to the right frontier and *this* referring to the left frontier were also significant, $t(29) = -13.104$, $p = .000$. All these indicate that in the explicit knowledge, *that* can access the left frontier. However, references to the right frontier with *that* and *this* were more common than references to the left frontier. In the right frontier references, the percentage of uses of *this* was higher than for *that*, which indicates that the participants had a tendency to use *this* to refer to an entity currently in focus and *that* to refer to an entity that is away from the foci. Such a preference is in accordance with the use of *this* and *that* in spoken language and the uses learned from textbooks. In the following section, the results of the linear-mixed effect model for eye movement data are presented in terms of measures of first-time reading times, regression-path times and second-pass reading.

3.6.2.1 Eye movements and Results. As in Experiment 2 in section 3.3, conditions and responses were included as factors (see 3.3.3.1 for the details of analysis). Only the regions that showed a significant interaction are handled below and those that did not show interactions are not included in the discussion but presented in the figures below. Firstly, the results of First-Pass Reading Time measures and the data of this measure are given in ms across regions in Figures 20a and 20b.

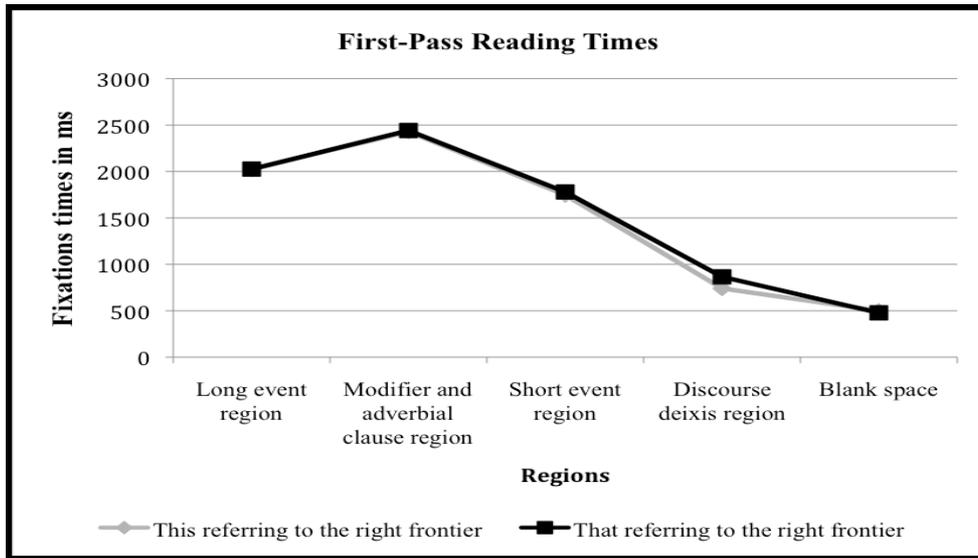


Figure 20a. First-pass reading times (in ms) across regions: right frontier

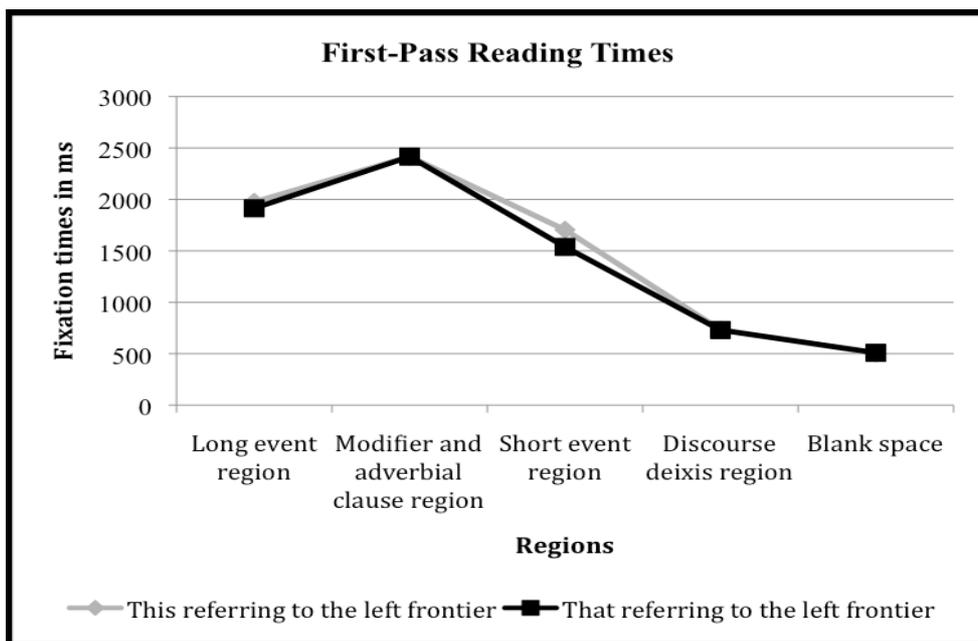


Figure 20b. First-pass reading times (in ms) across regions: left frontier

Measures of the first-pass reading time revealed a significant interaction between condition and response in the short event region (i.e. *she put the packages in her small car with great care*), *Condition X Response* $t = -3.150$, $p < .05$, *This referring to the left frontier* = 1704 ms, *That referring to the right frontier* = 1538

ms, *This* referring to the left frontier = 1748 ms, *That* referring to the left frontier = 1780ms. As seen in Figure 20a, fixations were longer when the participants referred to the left frontier with *this*. However, when the participants referred to the right frontier, there were nearly no fixation duration differences between the use of *this* and *that*.

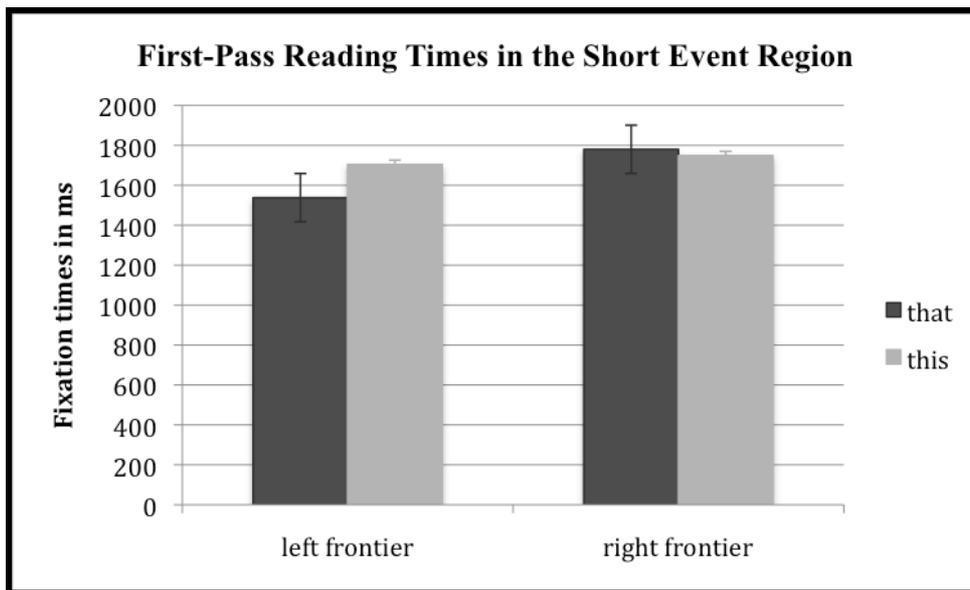


Figure 21. Means of first-pass reading times in the short time event region as a function of discourse deixis (*this* vs. *that*) and Frontiers (*a left frontier* vs. *a right frontier*)

It is worth saying that the interaction pattern in the first-pass reading times in the short event region should be approached with caution since parafoveal reading was not possible to see which discourse deixis was given to them. One possible explanation might be that before arriving at the discourse deixis region, participants may have decided the possible antecedent and where they would make the connection between the anaphoric expression and the previous parts of the text. Another possible reason might be that the third region, the short event region, was a long region, and thus in this region the participants may have found the region either easy or difficult to process and may have made more than one fixation which might be handled under the first-pass reading measures. For all

these reasons, an early effect in the short event region may have occurred, and the pattern here was approached tentatively.

The next eye measure is regression-path times and the results of regression-path times across regions are given in Figures 22a and 22b below.

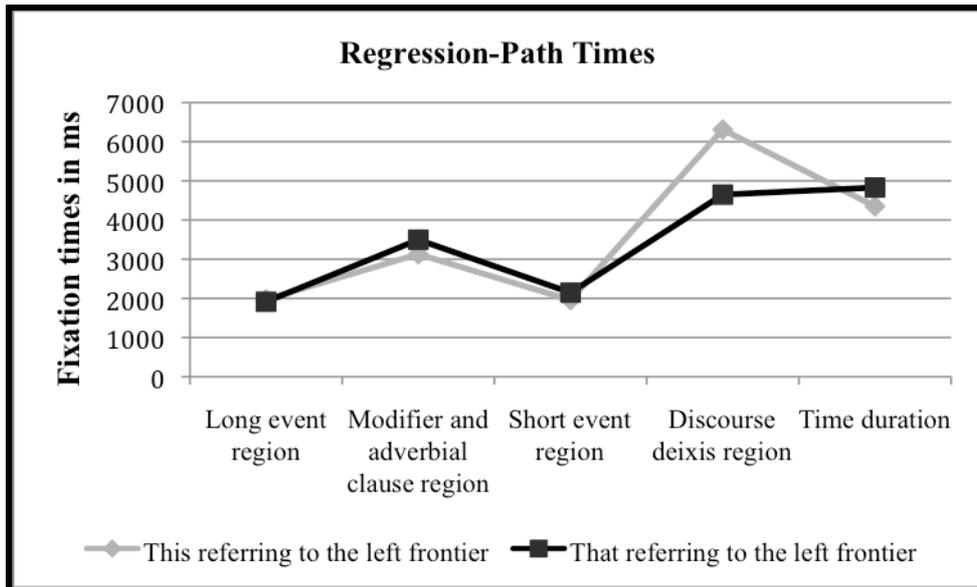


Figure 22a. Regression-path times (in ms) across regions: left frontier

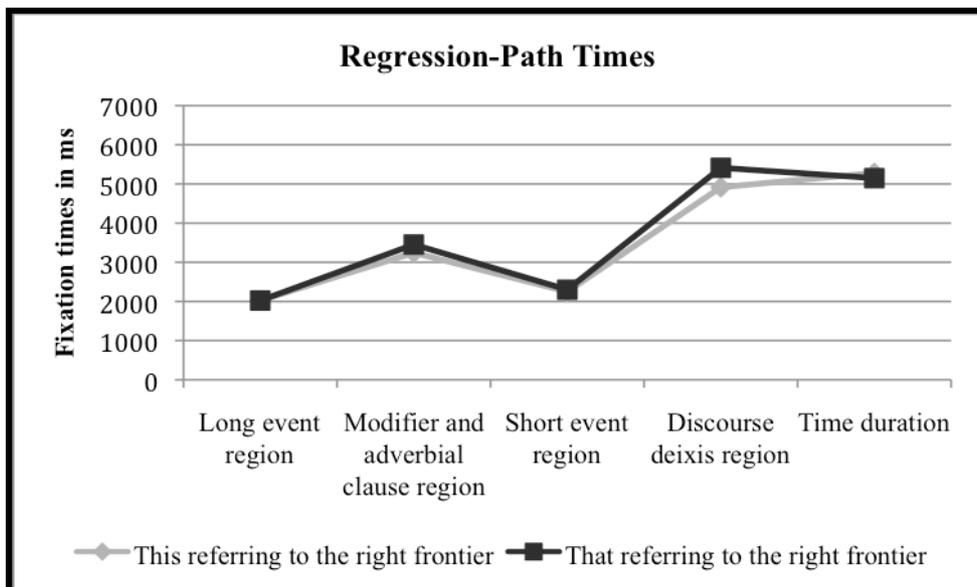


Figure 22b. Regression-path times (in ms) across regions: right frontier

In the measures of regression-path times in discourse deixis region (i.e *this* and *that*), a significant interaction between condition and response occurred, *Discourse deixis X Response: t = -2.755, SE = 958.2, p < .05* (see the interaction in Figure 23 below). References to the left frontier with *this* led to longer fixations than for *that*, *That = 4649 ms; This = 6309ms*. References to the right frontier led to longer fixations with *that* than with *this*, *That = 5412ms; This = 4916ms*.

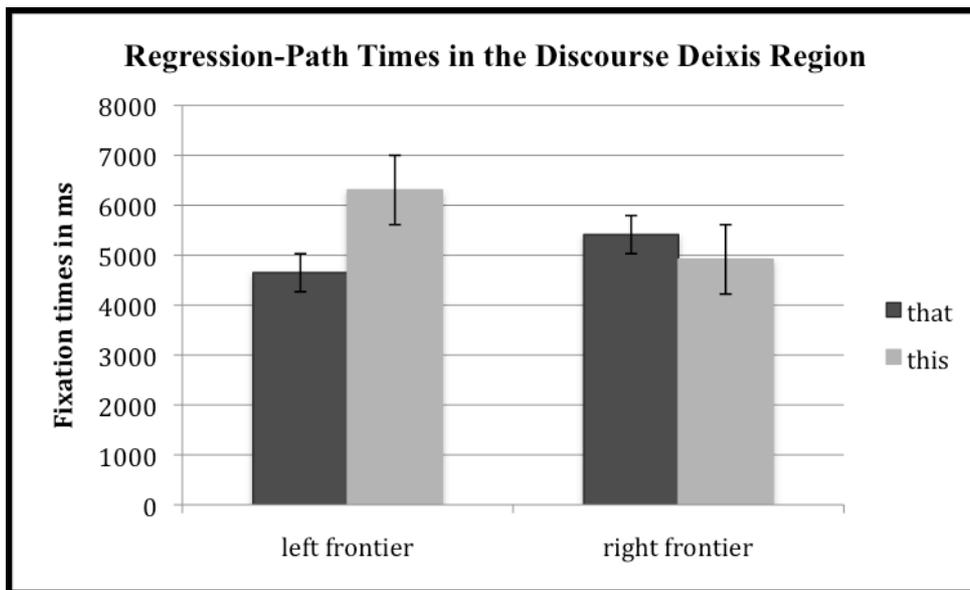


Figure 23. Means of regression-path times in the discourse deixis region as a function of discourse deixis (*this* vs. *that*) and Frontiers (*a left frontier* vs. *a right frontier*)

The last eye-measure is total reading times and all means of total reading times across regions are given in Figures 24a and 24b.

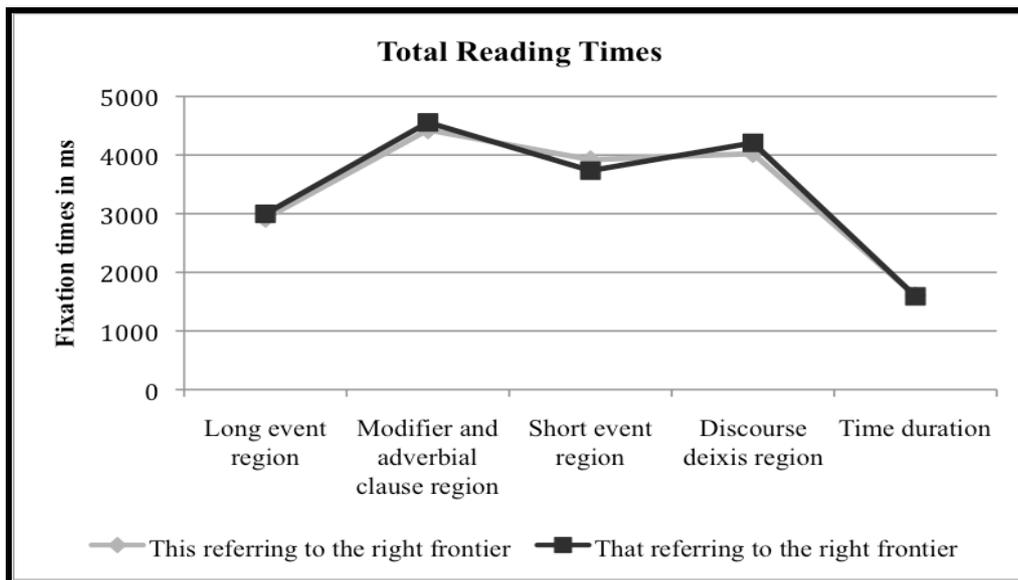


Figure 24a. Total reading times (in ms) across regions: right frontier

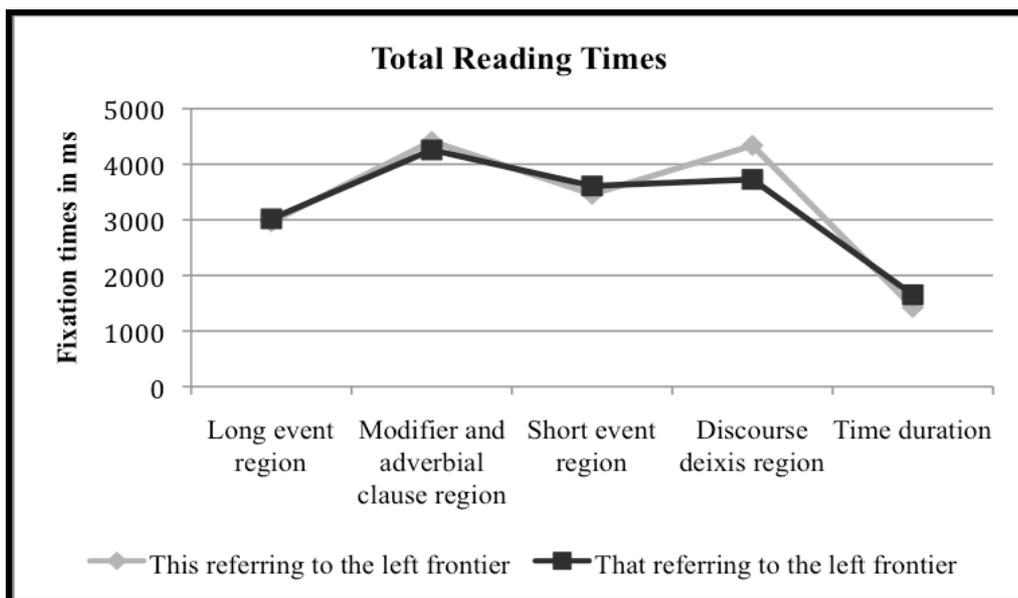


Figure 24b. Total reading times (in ms) across regions: left frontier

Total reading time measures in the discourse deixis region revealed the same interaction pattern between condition and response, $t = -2.352$, $SE = 396$, $p < .05$ (see Figure 25). Again, fixations were longer when the participants referred to the left frontier with *this* than with *that*, $That = 3727$; $This = 4338$. References to the right frontier with *that* led to longer fixations, $That = 4208ms$; $This = 4024$.

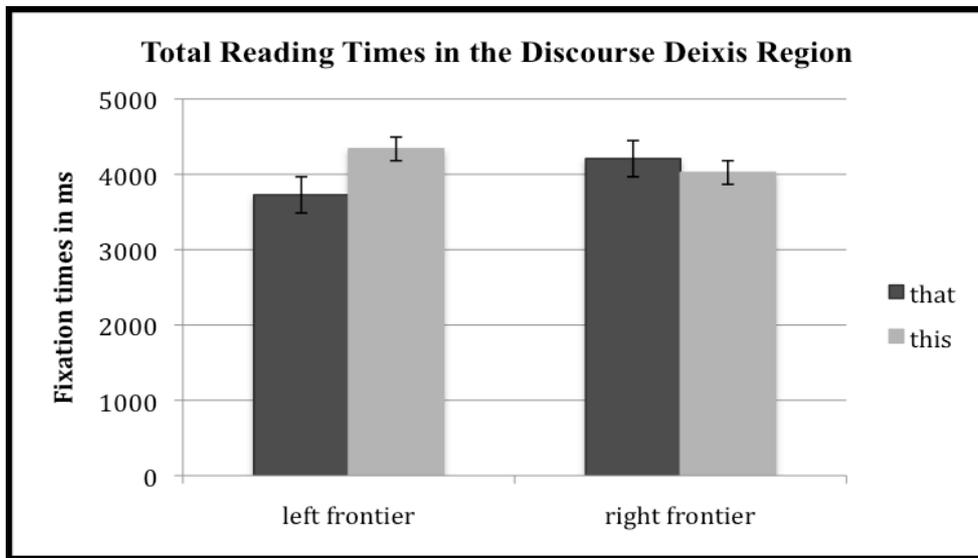


Figure 25. Means of total reading times in the discourse deixis region as a function of discourse deixis (*this* vs. *that*) and frontiers (*a left frontier* vs. *a right frontier*)

So far, in the discourse deixis region of total reading times and regression path times, references to the left frontier with *this* led to longer fixations than did *that*. There were slight preferences for *this* when referring to the right frontier. All these indicate that Turkish non-native speakers of English used their explicit grammar knowledge, obeying the rules learnt in language classes. This finding was in line with our predictions. Turkish non-native speakers, when they had time, they reverted to their grammar knowledge of the target language. In the next section, the uses of *this* and *that* in other categories are given.

3.6.2.2 Other Categories in Experiment 2 with non-native speakers. The participants also used *this* and *that* pronominally and such cases were handled under other categories. Figure 26 below gives the percentage of other categories.

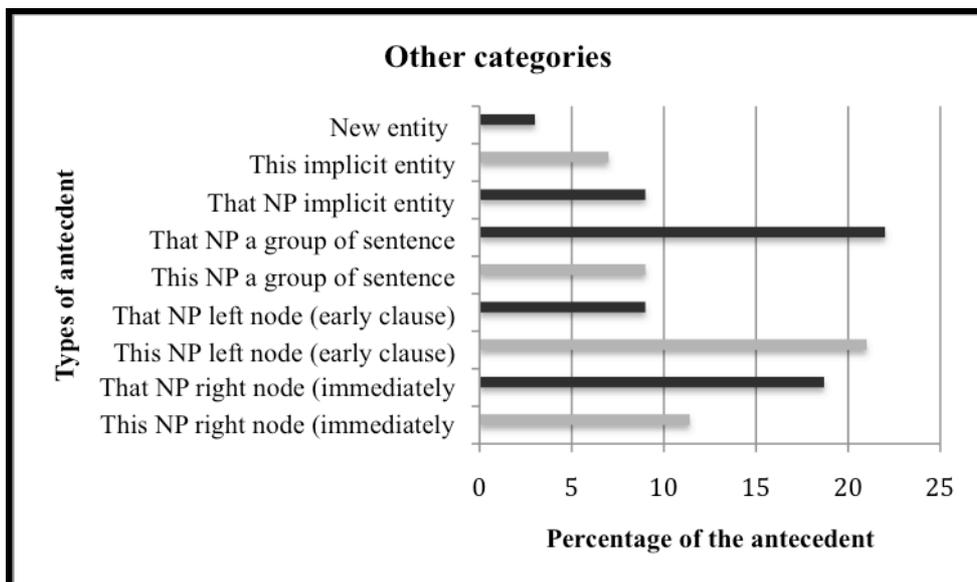


Figure 26. Percentage of other categories

21% of pronominal uses of *this* referred to the left frontier, whereas only 9% of the pronominal uses of *that* referred to the left frontier. Only 11.4 % of the pronominal uses of *this* pointed to the right frontier, as opposed to 18.7% of pronominal uses of *that*. Here, cases in which pronominal *this* referred to the left frontier were higher than for *that*. On the other hand, uses in which *that* referred to the right frontier were more frequent than references with *this*. 9 % of pronominal uses of *this* picked up a group of sentences as antecedent, while 22% of the pronominal uses of *that* referred to a group of sentences. In 9% of the sentences, the antecedents of *this* were implicit and were not stated clearly. In 7% of the sentences, the antecedents of *that* were also implicit, being inferred from the previous texts. In 3% of uses, *this* and *that* referred to a new entity that had not mentioned before.

To summarize the findings of Experiment 5, Turkish non-native speakers' processing times changed for *this* and *that* in the direction our prediction suggested and in line with grammar books' rules on the use of *this* and *that* in spoken language. They preferred to refer to the long event on the left frontier with *that* and the short event on the right frontier with *this*.

3.7 Experiment 6 with Non-Natives: The change of the positions of right/left frontiers

Experiment 6 explored the discourse segment preferences (left frontier vs right frontier) of Turkish Non-native speakers of English when the positions of events on the right and left frontiers were changed. The same method was followed in Experiment 3 with native speakers of English (see 3.4). The same stimuli as in Experiment 4 were used, with small changes. Differently from Experiment 4, this time the long event was given on the right frontier instead of the left frontier, and the short event was given on the left frontier instead of the right frontier. The conditions in Experiment 6 were as follows:

Condition 1: (*this* referring to a long event on the right frontier of discourse)

Berke filled up the car with petrol, being careful not to spill any over his white wedding trousers. Then he drove from Istanbul to Zonguldak. This took him 5 hours, and afterwards he was happy not to have had to stop on his way.

Condition 2: (*that* referring to a long event on the right frontier of discourse)

Berke filled up the car with petrol, being careful not to spill any over his white wedding trousers. Then he drove from Istanbul to Zonguldak. That took him 5 hours, and afterwards he was happy not to have had to stop on his way.

Condition 3: (*this* referring to a short event on the left frontier of discourse)

Berke filled up the car with petrol, being careful not to spill any over his white wedding trousers. Then he drove from Istanbul to Zonguldak. This took him 5 minutes, and afterwards he was happy not to have had to stop on his way.

Condition 4: (*that* referring to a short event on the left frontier of discourse)

Berke filled up the car with petrol, being careful not to spill any over his white wedding trousers. Then he drove from Istanbul to Zonguldak. That

took him 5 minutes, and afterwards he was happy not to have had to stop on his way.

The prediction for this experiment was that the change of events on the right and left frontiers would not effect Turkish participants' preferences since they would be using the learnt grammar rule, which is not under the influence of event types.

3.7.1 Method. The same method was used as in Experiment 3 in section 3.4. The next section briefly presents the method used in the experiment.

3.7.1.1 Participants. Forty paid Turkish non-native speakers of English participated. Their proficiency level was advanced, and a few of them stated that they knew German and/or French. However, they asserted that their proficiency level in these languages were not as good as their English. They considered themselves more confident and much more proficient in English than in German and/or French. In daily life and courses, they used English much more often. Therefore, their data were included in the analysis.

3.7.1.2 Stimuli and design. Identical design and stimuli to those used in Experiment 3 (see section 3.4.1.2) were employed.

3.7.1.3 Procedure. As in Experiment 3 in section 3.4, one hundred and ten texts were given in a fixed random order. Ten participants were assigned to each list. The experiment began with eight fillers, in order to familiarize the participants with the experimental procedure. We used an Eyelink 1000 eye-tracker in a table-mounted mode and a chin rest was used to stabilize the participant's head.

3.7.1.4 Data Analysis. Data analysis of eye-movement data was performed for the 40 experimental stimuli and the same number of regions as in Experiment 4 was used, as shown below:

R1 (short event on the left frontier):	Berra phoned to book a taxi to the airport for 7 pm,
R2 (Modifier and discourse marker):	becoming stressed by the busy operator. Afterwards,
R3 (Long event on the right frontier)	she packed her suitcases with all her holiday clothes.
R4 (Discourse deixis):	This/that
R5 (Time duration):	took her 1 hour/5 minutes
R6 (Connector and adverbial) :	and afterwards
R7 (Pronoun and copula verb):	she was
R8 (An adjective):	sad to be
R9 (Region after the adjective):	leaving the country.

3.7.2 Results and Discussion. As in Experiment 4 in section 3.5.2 with Turkish non-native speakers of English and in Experiment 1 in section 3.4.2 with native speakers, the means were analyzed using repeated measures ANOVA treating Discourse Deixis (*this* vs. *that*) and Discourse segments (left frontier vs. right frontier). In the following Figures 27a and 27b, fixation times of first-pass reading times across all regions treating discourse deixis (*this* vs. *that*) and frontiers (a left frontier vs. a right frontier) are shown:

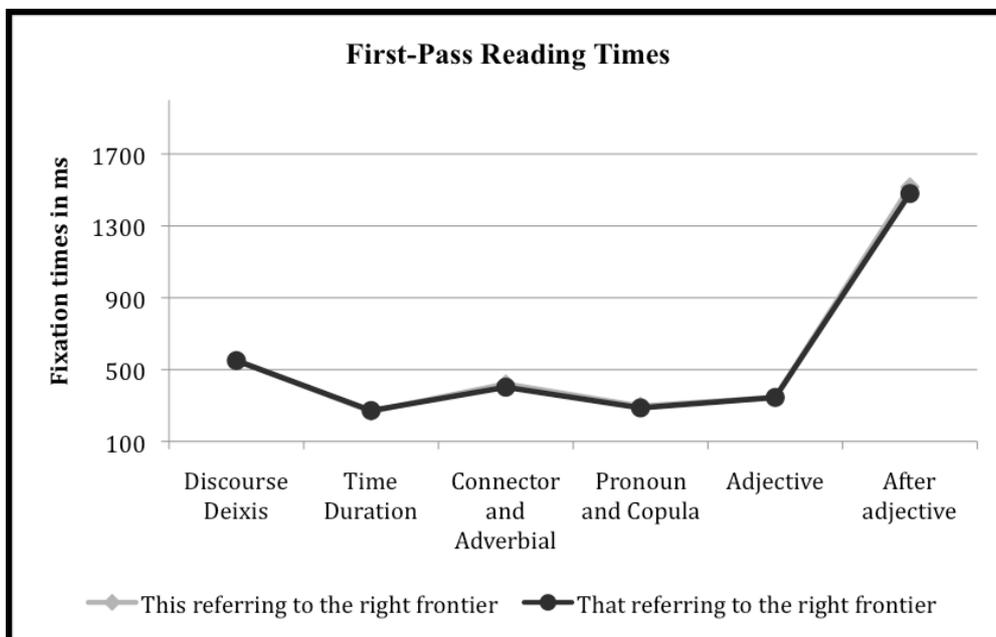


Figure 27a. First-pass reading times (in ms) across regions: right frontier

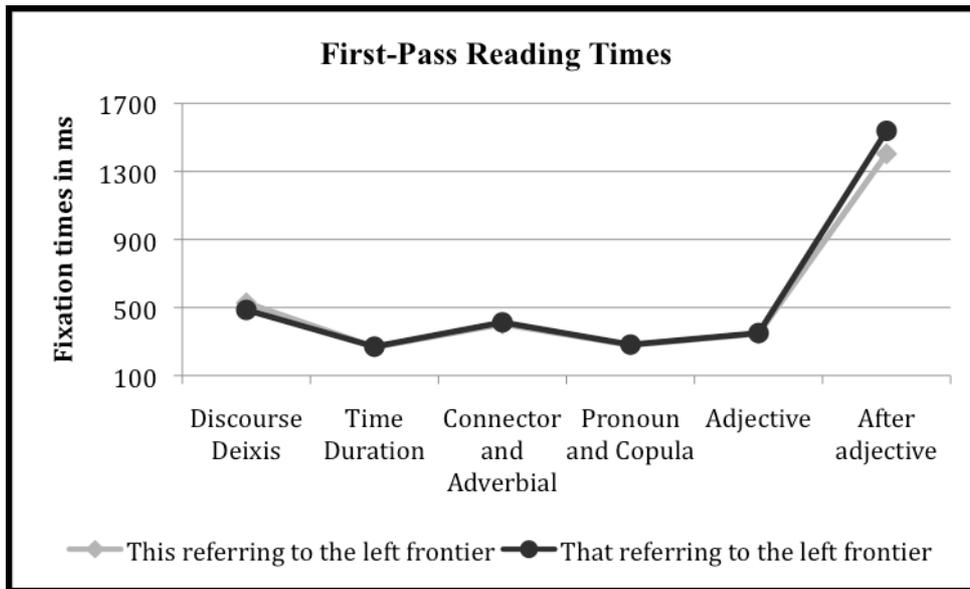


Figure 27b. First-pass reading times (in ms) across regions: left frontier

Main effects of discourse deixis and frontiers and interaction between these factors were not seen until the last region of first-pass reading times. The region after an adjective showed a significant interaction between discourse deixis and frontiers in the subject analysis but the interaction was only marginally significant in the item analysis, Discourse deixis X Frontiers: $F_1(1,39) = 5.614$, $MSE = 53169$, $p = .023$; $F_2(1,39) = 3.360$, $MSE = 75426$, $p = .074$; see Figure 28 for the interaction pattern below.

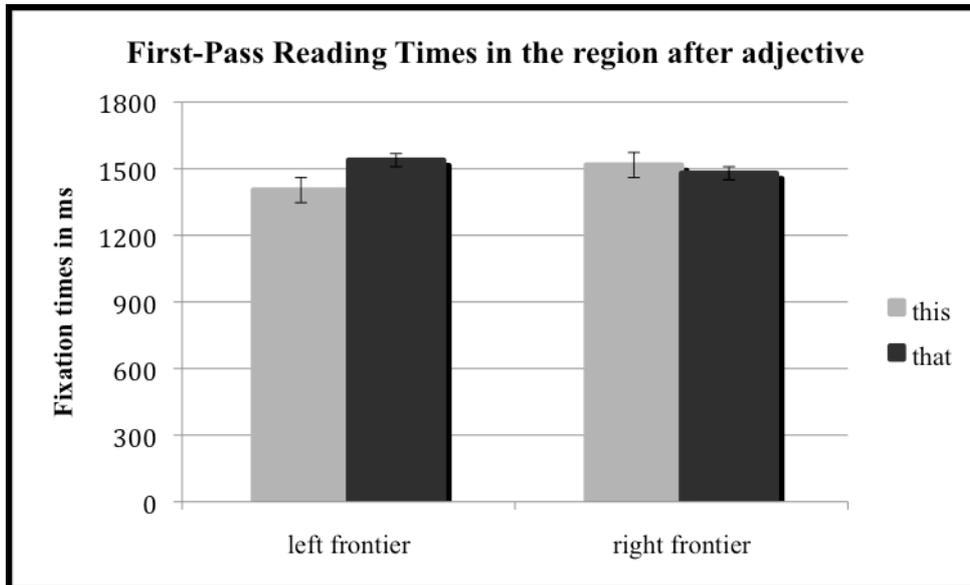


Figure 28. Means of first pass reading times in the region after adjective as a function of discourse deixis (*this* vs. *that*) and Frontiers (*a left frontier* vs. *a right frontier*)

Fixations in the *this* condition referring to the short event were longer than when *that* referred to the short event on the left frontier. The pairwise comparison of *this* referring to the short event on the left frontier with *that* doing so was significant in both $t1(39) = -2.800, p = .008$ and $t2(39) = -2.296, p = .027$. Also, the fixation times between *this* referring to the long event on the right frontier and *that* doing so were marginally significant in $t1(39) = 1.991, p = .053$, but not significant in $t2(39) = .591, p = .558$. The difference between *that* referring to the short event on the right frontier and *that* referring to the long event on the left frontier was also insignificant in the pairwise comparison, $t1(39) = -1.093, p = .281, t2(39) = -.583, p = .563$. The region after an adjective of regression-path time measures did not provide an interaction between discourse deixis and frontiers, all F 's < 2 ; *This referring to the long event on the right frontier* = 3131ms, SE = 298.446, *That referring to the long event on the right frontier* = 3152ms, SE = 301.759, *This referring to the long event on the left frontier* = 3499ms, SE = 391.030, *This referring to the short event on the right frontier* = 3491ms, SE = 367.365.

In the next figures, 28a and 28b, the means of second-pass reading times are given across the regions treating discourse deixis and frontiers.

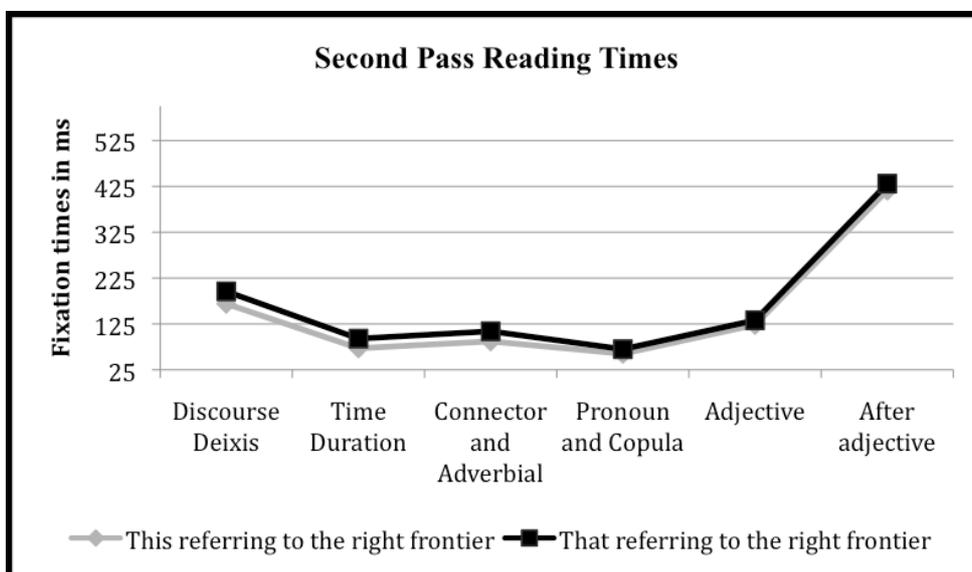


Figure 28a. Second-pass reading times (in ms) across regions: right frontier

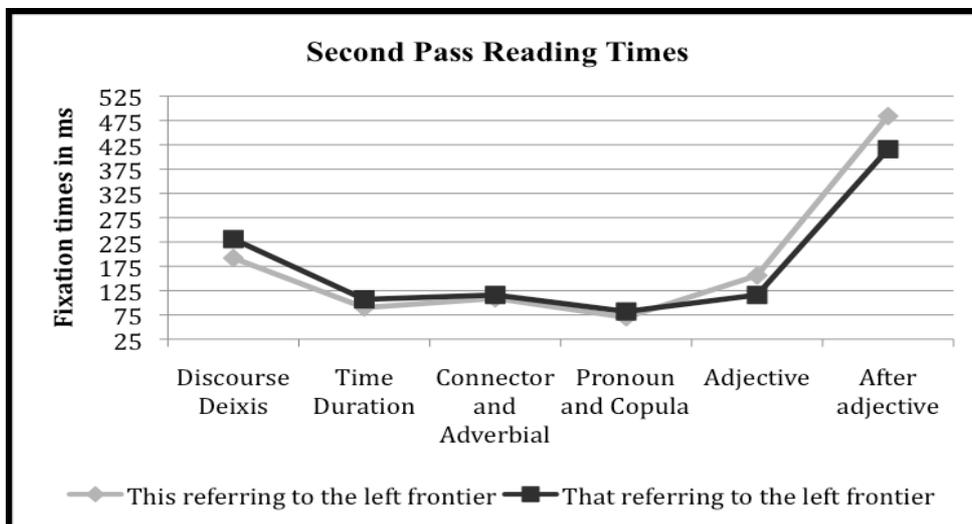


Figure 28b. Second-pass reading times (in ms) across regions: left frontier

In the discourse deixis region of second-pass reading times, the main effect of frontier and marginal effect of discourse deixis were revealed in the subject analysis but only main effect of discourse frontiers was a trend in the item analysis, discourse frontiers: $F1(39) = 4.490, p = .041$; $F2(39) = 3.175, p = .083$;

Discourse Deixis: $F1(39)= 3.950, p=.054$; $F2 (39)= 2.721, p=.107$; *Left frontier*=212ms $SE=26.258$; *Right frontier*=180ms, $SE=23.339$; *This*=180ms, $SE=23.339$; *That*=214ms, $SE=23.339$. Fixations were longer when the short event on the left frontier was referred to. In the same region, fixations were longer in the conditions of *that* than of *this*. In the time duration and the pronoun and copula regions, main effects or interaction between the factors were not seen. In the adjective region of second-pass reading time measures, an interaction was marginally significant, *Discourse deixis X Frontiers*: $F1(39)=3.928, p=.055$; $F2(39)= 3.619, p=.065$; see Figure 29 below.

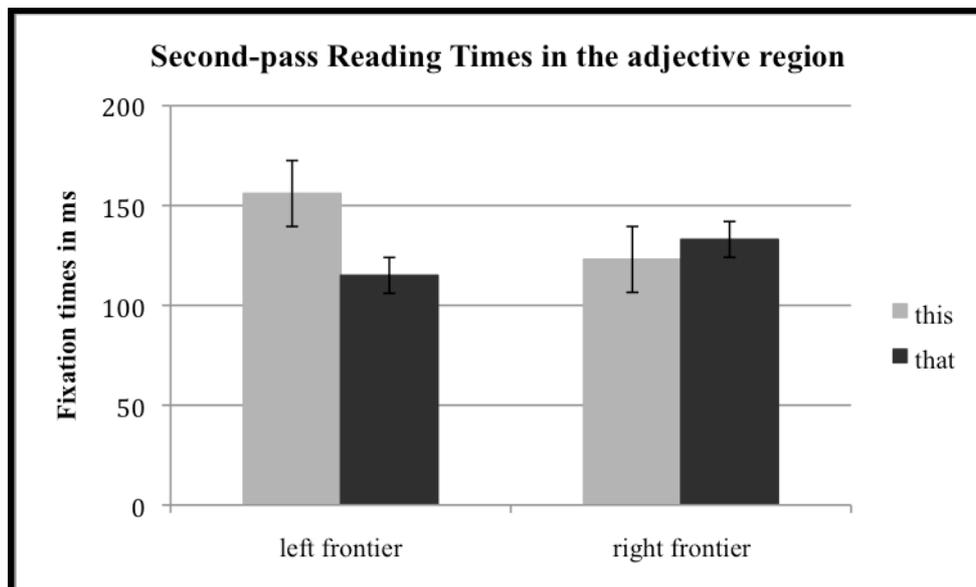


Figure 29. Means of second-pass reading times in the adjective region as a function of discourse deixis (*this* vs. *that*) and Frontiers (*a left frontier* vs. *a right frontier*)

References to the short event on the left frontier with *this* led to longer fixations than with *that*, *This*= 156ms, $SE= 22.670$; *That*= 116ms, $SE= 17.549$. Pair-wise comparison also confirmed the difference between *this* and *that* referring to the short event on the left frontier, $t1 (39)=2.314, p= .026$; $t2 (39)=2.032, p= .049$. Fixations became longer when *that* referred to the long event on the right frontier than when *this* did so, *That*= 133ms, $SE= 18.910$; *This*= 123ms, $SE= 18.580$. The

difference between *this* and *that* referring to the long event on the right frontier was only significant in $t1 (39)=-2.266, p=.029$ but not in $t2 (39)=-.561, p=.578$.

In conclusion, the eye-movement measures for Experiment 6 showed that discourse segment (left frontier vs. right frontier) preferences for *this* and *that* were independent of the position of the short or long event in the discourse segments. Turkish non-native speakers of English had a tendency for asymmetrical discourse segments as antecedents for *this* and *that* in the adjective region of second-pass reading times. In the adjective region of second pass reading times, they preferred *that* referring to the short event on the left frontier much more than *this*. They showed a slight preference for *this* when referring to the long event on the right frontier instead of the left frontier. In the region after an adjective region/last region of the first pass reading times, their preference for accessibility to the left frontier was slightly changed. They tended to prefer *this* when referring to the short event on the left frontier, but this preference was only a trend in the last region. Since the pattern in the first-pass reading times was not replicated in other eye measures, it can be hypothesized that Turkish non-native speakers of English may have had two competing options for the accessibility of the left frontier. One option was influenced by their acquired grammar knowledge, and the other option may have been influenced by the frequency of *this* in natural data and their assumption that *this* fulfilled a focaliser function. Their grammar knowledge is based on textbooks and language teaching in classrooms. The first functions of *this* and *that* that are learned in school were the references of *this* to a close entity and of *that* to a distant entity. If we apply this rule to the left and right frontiers, the references of *this* to the right frontier/close unit and of *that* to the left frontier/distant were suitable. In order to clear the ambiguity the Turkish non-native speakers of English followed their grammatical understanding. However, later their preference might have been slightly under the influence of the unmarkedness of *this* in natural data and thus the focaliser function of *this* in their mental representation of discourse deixis in English and Turkish. They showed a slight tendency to prefer *this* when referring to the short event on the left frontier.

3.8 General Conclusion on Online and Offline Experiments with Non-Native Speakers

Experiment 4, Experiment 5 and Experiment 6 aimed to investigate whether the left frontier was open to access by *this* and *that*. The reason Turkish non-native speakers were chosen as an experimental group was the character of the Turkish language. In Turkish, the left frontier is closed for *bu*, the only deictic correspondent to *this* and *that*. Therefore, it was predicted that Turkish learners would not regard the left frontier as open in English because of the influence of the mother tongue. Our online reading Experiments 4 and 6, however, showed that for Turkish non-native speakers of English the left-frontier *was* open for topic continuation, but the accessibility of *this* and *that* to the left frontier showed variations. In Experiment 4, the regression path times in the connector and adverbial region demonstrated that the participants preferred *this* when referring to the long event on the left frontier. However, the first pass reading times revealed that this initial preference changed in the adjective region. They preferred *that* when referring to the long event on the left frontier. In Experiment 6, the first-pass reading time in the region after the adjective revealed that references to the short event on the left frontier with *that* led to longer fixations. However, the second pass reading times in the adjective region revealed that fixations with *this* where the short event was on the left frontier were longer than with *that*. References to the long event/right frontier with *that* led to slightly longer fixations than references with *this*. All these findings showed that, contrary to the predictions made, the left frontier *was* open to L2 learners, even though their mother tongue does not allow such openness.

The participants' initial preferences indicate that in their mental lexicon *this* functioned like a focalizer, bringing an unfocused entity into focus. This might be their own assumption from the natural data rather than taught in the language classrooms explicitly. Kang (2004) and Niimura and Hayshi (1996) also found the focalizer function of demonstratives in L2 users' discourse because they did not have other discourse markers to link the ideas. The another reason they pointed out that L2 learners marked the information by using *this* since their mother tongue does not have indefinite and definite articles. On the other hand,

their online preferences changed in line with the explicit language rule applied in spoken language. As with the function of *that* in spoken discourse, the references of *that* to the short event on the left frontier were accepted since it was referring to the entity that was not recent or in focus. The preference for *that* referring to the entity on the left frontier accorded with predictions. In addition, the difference between *this* referring to the events on the right and the left frontiers were not big, which might indicate that for Turkish non-native speakers, the access of *this* is less clear than *that*. This might be because they have no explicit rules to follow, as they do have in the case of *that*.

The completion part of the production experiment displayed the Turkish non-native speakers' access preferences for *this* and *that*. Firstly, the access of both *this* and *that* to the short event on the right frontier was higher than either's access to the left frontier. If they wanted to refer to the event on the left frontier, they preferred *that* over *this*. The findings of the production experiment match with those in the online reading experiment

Since Zwaan (1996) and Garrod and Sanford (1977) do not mention L2 learners' representation in their models, the findings here cannot be applied directly to these models: nevertheless, they do seem to have certain implications. Zwaan proposed that the first event was deactivated when the second event was introduced with adverbial clauses or time expressions indicating the end of the first event. In this study, it was seen that the first event in the online and offline experiments can be activated for Turkish non-native speakers. Garrod and Sanford claimed that the first event was the introduction of a scenario and it thus became inaccessible when the second event was introduced. They also explained this inaccessibility through the idea of implicit and explicit foci. The recent event is in explicit focus and is therefore accessible, whereas the first event was in the implicit focus, which was not open to access. Contrary to Zwaan's and Garrod and Sanford's assumptions regarding native speakers, our L2 online and offline data showed that the left frontier was open to the L2 learners. Naturally, in the offline production experiment, the degree of access of discourse deixis to the right frontier was higher than for the left frontier, but the left frontier was still open. There might be several reasons for the openness of the left frontier: (1) L2

learners stick to the information given in the text and their mental representation is limited to the information there. They did not elaborate on the text or interpret it more deeply. Therefore, each point of the text was in their short-term memory and in their implicit focus. (2) Because of exam-based language learning, (i.e. TOEFL exam, university entrance exam, proficiency exam for preparation classes, language exams in high and secondary schools), the L2 learners' reading strategy was based on problem solving, ambiguity resolution and finding the correct answer. Since their reading processing is based on ambiguity resolution, regressive eye movements and re-reading were seen when referential expressions referred to the left frontier. (3) Their short-term memory was able to memorize all the details in the text. They probably tried to keep all the information in their memory till they moved to the next experimental item. (4) They may have lacked processing resources. Instead of using recency strategy to find an antecedent, they preferred to resolve the ambiguity.

To sum up, for the Turkish L2 users of English, in online and offline processing, the event on the left frontier was open for *that*.

3.9 Experiments 1 and 4: Comparison of Native speakers of English with Turkish Non-native speakers of English in Processing of right/left frontiers

This section compares native with Turkish non-native speakers of English in the processing of *this* and *that* when referring to the right and left frontiers. Such a comparison helps us to understand (1) whether Turkish non-native speakers have similar preferences regarding the access of *this* and *that* to the left and right frontiers as native speakers of English (2) what kind of resources they use in order to resolve ambiguity (i.e. explicit rules vs. intuitions) (3) mental representations of *this* and *that* in the lexicon of native and non-native speakers of English. The prediction of the study was that there would be a difference between native speakers and non-native speakers in the accessibility of the left and right frontiers by *this* and *that*. In order to test our prediction and to explore the issues stated above, eye-measures of native speakers of English in Experiment 1 (see section 3.3) were compared with those of Turkish non-native speakers of English in Experiment 4 (see section 3.5).

3.9.1 Method. In this section, the method used to perform the analysis is described.

3.9.1.1 Participants. Fifty-two native speakers of English from Edinburgh University and fifty-two Turkish non-native speakers participated in the experiments. These were new participants who did not participate in the previous experiments. All were paid and were unaware of the purpose of the study. For further details of the demographics regarding the Turkish non-native speakers please see section 3.5.1.1.

3.9.2 Results and Discussion. Independent analyses were performed on the data for each group. Also, three-way ANOVAs were conducted for the fixation times for each region, with repeated measures for Discourse deixis (*this* vs. *that*), Discourse segments (left frontier vs. right frontier), and Language Groups (English vs. Turkish) as a between-participant factor (F1) and as a within-subject (F2). In the following, the means for the first pass reading times, regression path times and total reading times are given in Tables 4, 5 and 6. Only the regions where main effects or a significant interaction between the factors were displayed are discussed.

Table 4: Means and standard deviations for first-pass reading time of all regions as a function of Group (English speakers vs. Turkish speakers), Discourse deixis (this vs. that) and frontier types (left vs. right frontier)

	FIRST-PASS READING TIMES			
	<i>this</i> referring to the left frontier	<i>that</i> referring to the left frontier	<i>this</i> referring to the right frontier	<i>that</i> referring to the right frontier
Discourse deixis region (R4)				
English	341	335	307	329
SD	113	118	93.429	109.225
TURKISH	543	557	518	540
SD	170	160	177	135
Time Duration(R5)				
ENGLISH	205	206	209	207
SD	45	55	47	59
TURKISH	280	287	277	275
SD	69	79	65	78
Connector and adverbial region(R6)				
English	287	308	277	285
SD	82	111	90	101
TURKISH	421	422	401	415
SD	97	98	98	108
Pronoun and copula verb region (R7)*				
English	218	228	228	220
SD	67	88	83	66
Turkish	294	274	279	282
SD	71	58	56	61
An adjective region (R8)*				
English	242	226	214	213
SD	78	69	66	62
TURKISH	317	331	332	324
SD	69	81	89	79

* $p < .05$

In the discourse deixis region of first pass reading times, the main effect of frontier was seen in the subject analysis but the same effect was not seen in the item analysis, $F1(102) = 6.021, p = .016$; $F2(39) = 1.523, p = .225$. Fixations were longer in the left frontier conditions than in the right frontier conditions, *Left frontier* = 444 ms, $SE = 12.826$, *Right frontier* = 423, $SE = 11.442$. In the item analysis of the same region, main effect of discourse deixis was seen, *Discourse deixis*: $F1(102) = 2.328, p = .130$, $F2(39) = 339.977, p = .000$. Fixations took longer in the *this* conditions than in the *that* conditions, *This* = 544, $SE = 10.892$; *That* = 331, $SE = 7.103$. The main effect of language was marginally significant in the item analysis but it did not become significant in the subject analysis of the same region, $F1(102) = 2.328, p = .130$; $F2(39) = 3.848, p = .057$. Turkish participants' fixation times were longer than those of English participants, *Turkish*

participants= 544ms, *SE*= 10.862; *English participants*= 331ms, *SE*= 7.103. In the time duration region, no main effects or interaction were seen in the subject analysis, whereas in the item analysis the main effect of language and a significant interaction between discourse deixis and language were seen, *Discourse deixis*: *F1*(102)=.073, *p*=.788; *F2*(39)= 137.841, *p*=. 000; *Discourse deixis X language*: *F1* (102)= .158, *p*= .691; *F2* (39)= 4.894, *p*=. 033. Fixations in the *this* conditions were longer than those in the *that* condition, *Turkish participants*= 284ms, *SE*=5.908; *English participants*= 213ms, *SE*= 2.108. References with *this* led non-native speakers to have longer fixations than native speakers: *English participants' fixations in the this conditions*= 289ms, *SE*= 7.315, *Turkish participants' fixations in the this conditions*= 278 ms, *SE*= 6.29. On the other hand, fixations in the *that* conditions in the time duration region of first-pass reading times were similar for native and non-native speakers: *English participants' fixations in the that condition*= 210 ms, *SE*= 3.199; *Turkish participants' fixations in the that condition*= 214 ms, *SE*= 3.915. In the connector and adverbial region of first-pass reading measure, the main effects of discourse deixis and frontiers were seen in the subject and item analyses, *discourse deixis*: *F1* (102)= 4.267, *p*= .041; *F2* (39)= 4.307, *p*=. 045; *Frontiers*: *F1* (102)= 8.330, *p*=.005; *F2* (39)= 5.413, *p*=.025. References with *that* led to longer fixations than those with *this*, *This*= 346ms, *SE*= 8.454, *That*= 357ms, *SE*= 9.569. References to the long event on the left frontier led to longer fixations than references to the short event on the right frontier: *Left frontier*= 359ms, *SE*= 8.984; *Right frontier*= 344, *SE*= 8.946. Item analysis of the connector and adverbial region displayed a main effect of language, *F2* (39)= 5.413, *p*= .025; *Turkish participants* = 416ms, *SE*=7.590; *English participants*= 289ms, *SE*=4.272. So far, first-pass reading times showed (1) the processing of the left frontier took longer than the processing of the right frontier (2) processing of *this* took longer than that of *that*.

In the pronoun and copula region of first pass reading times, a three way interaction occurred, see Figure 30 for three way interaction; *Discourse deixis X Language X Frontiers*: *F1* (102)= 5.861, *p*= .017, *F2* (39)= 5.741, *p*= .021. Separate ANOVA's demonstrated a marginally significant interaction between discourse deixis and frontiers in the non-native speakers' *F1* results, and a

significant interaction in their F2 results, *Discourse deixis X Frontiers*: $F1(51)=3.591$, $p=.064$; $F2(39)=4.839$, $p=.034$. Separate ANOVA's did not show a significant interaction in the native speakers' F1 results and F2 results, all p 's = .133

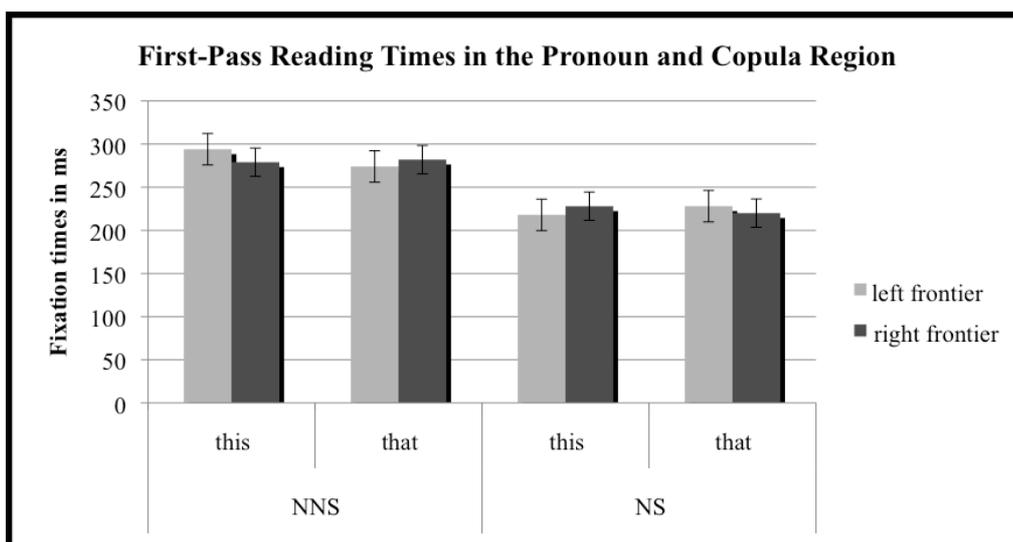


Figure 30. Means of first-pass reading times in the pronoun and copula region as a function of discourse deixis (*this* vs. *that*), frontiers (*a left frontier* vs. *a right frontier*) and language (*English natives* vs. *Turkish non-natives*)

English native speakers did not show any preference for *that*, whereas they had a slight preference for *this* referring to the long event on the left frontier. The pairwise comparison, however, did not confirm a significant difference between *this* referring to the left and the right frontier, *English participants*: *This referring to the left frontier* = 218 ms, $SE=9.579$; *This referring to the right frontier* = 228ms, $SE=9.849$; $t(51)=-1.308$, $p=.197$; $t(39)=-1.433$, $p=.160$; *That referring to the left frontier*: 228ms, $SE=9.849$, *That referring to the right frontier* = 220ms, $SE=8.852$, all t 's < 2. On the other hand, Turkish participants preferred *this* when referring to the right frontier and had a slight tendency to prefer *that* when referring to the left frontier. The pairwise comparison only showed a trend for the differences of the *this* conditions but not the differences in the *that* conditions, *Turkish participants*: *This referring to the left frontier* = 294 ms, $SE=9.579$; *This*

referring to the right frontier= 279ms, 9,849; This referring to the right/left frontiers: $t_1(51) = 1.782, p = .081$; $t_2(39) = 1.782, p = .081$; That referring to the left frontier: 274ms, $SE = 10.291$; That referring to the right frontier= 282ms, $SE = 8.852$; That referring to the left/right frontiers: $t_1(51) = -0.924, p = .360$; $t_2(39) = -1.107, p = .275$.

Similarly, an adjective region of first-pass reading times revealed a three-way interaction, *Discourse deixis X Language X Frontiers*: $F_1(102) = 4.430, p = .040$; $F_2(39) = 5.741, p = .021$, see Figure 31 for three way interaction. Separate ANOVA's did not show a significant interaction between discourse deixis and frontiers in the native speakers' F_1 and F_2 results, all F 's < 1. Separate ANOVA's did not show a significant interaction between the discourse deixis and frontiers in the non-native speakers' F_1 results but showed a trend in their F_2 results, $F_1(51) = 1.984, p = .105, F_2(39) = 2.996, p = .091$.

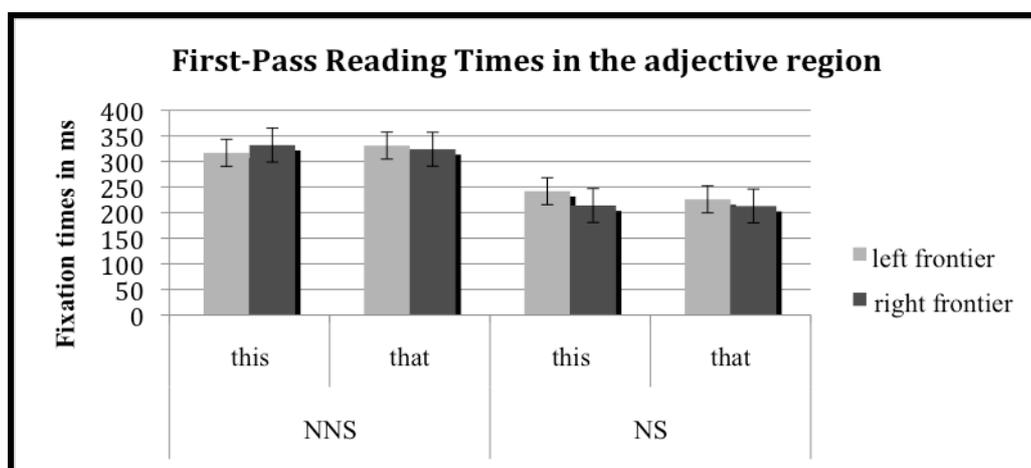


Figure 31. Means of first-pass reading times in the adjective region as a function of discourse deixis (*this* vs. *that*), frontiers (*a left frontier* vs. *a right frontier*) and language (*English natives* vs. *Turkish non-natives*)

Though first-pass reading time measures in the adjective region showed a three way interaction, there were no clear preferences on the part of either native and non-native speakers for *this* or *that* in accessing the left and right frontiers. The native and non-native speakers' preferences regarding *this* and *that* revealed a slight pattern. In the non-native speakers' results for first pass reading times in the

adjective region, though there were nearly no differences between *this* referring to the short event on the right frontier and *this* referring to the long event on the left frontier, the pattern indicates that fixation times were slightly longer for *this* than for *that* when *this* referred to the short event on the right frontier in the adjective region, *Discourse deixis X Frontiers: This referring to the long event on the left frontier*= 317ms, SE= 10.240; *That referring to the short event on the right frontier*= 332ms, SE= 81.246. The pairwise comparison of *this* referring to the left and *this* referring to the right frontiers only revealed a trend in $t1 (51) = 1.782$, $p = .081$ but not a trend in $t2 (39) = -1.554$, $p = .128$; *Turkish participants: This referring to the short event on the right frontier*= 332 ms, SE=10.864; *This referring to the long event on the left frontier*=317ms, SE= 10.240. On the other hand, in the same region of first-pass reading times, native-speakers' fixations were longer when *this* referred to the long event on the left frontier, *English participants: This referring to the short event on the right frontier*= 242 ms, SE= 10.240; *This referring to the long event on the left frontier*= 214ms, SE= 10.864. However, the native speakers preferences regarding *this* revealed a slight pattern, which was also supported in the pairwise comparison in $t2 (39) = 2.821$, $p = .007$, but not in $t1(51) = -.1315$, $p = .194$. Neither native speakers nor non-native speakers had any preference for *that* when accessing the long event on the left or short event on the right frontier: *Turkish participants: That referring to the long event on the left frontier*= 331ms, SE=10.441; *That referring to the short event on the right frontier*= 324ms, SE= 9.807; *English participants: That referring to the long event on the left frontier*= 226ms, SE=10.447; *That referring to the short event on the right frontier*= 213ms, SE= 9.807.

The next findings are from regression-path time measures. Table 2 gives means of regression path times in each region as a function of discourse deixis, frontiers and language.

Table 5. Means and standard deviations for regression-path time of all regions as a function of Group (English speakers vs. Turkish speakers), Discourse deixis (this vs. that) and frontier types (left vs. right frontier)

	REGRESSION PATH TIMES			
	<i>this</i> referring to the left frontier	<i>that</i> referring to the left frontier	<i>this</i> referring to the right frontier	<i>that</i> referring to the right frontier
Discourse deixis region (R4)				
English	519	444	472	440
SD	293	200	263	239
TURKISH	721	738	707	704
SD	283	253	290	259
Time Duration(R5)				
ENGLISH	284	318	311	273
SD	119	206	193	92
TURKISH	376	411	357	373
SD	169	210	179	222
Connector and adverbial region(R6)*				
English	369	361	309	319
SD	166	133	115	127
TURKISH	469	548	497	485
SD	134	289	234	162
Pronoun and copula verb region (R7)				
English	288	301	278	248
SD	139	218	141	98
Turkish	331	311	327	318
SD	95	100	103	104
An adjective region (R8)				
English	318	276	337	298
SD	184	107	208	133
TURKISH	431	395	405	444
SD	418	156	164	372

* $p < .05$

Discourse deixis and time duration regions of regression-path times did not display any main effects or interactions. Separate ANOVA analysis of native speakers in the time duration region revealed a trend of two-way interaction between discourse deixis and frontiers in the subject analysis but not in item analysis, *Discourse deixis X Frontiers: F1 (51) = 4.207, p = .045; F2(39) = 1.023 p = .31*. That interaction pattern was not strong enough to appear in the three-way ANOVA analysis (see Figure 32 below).

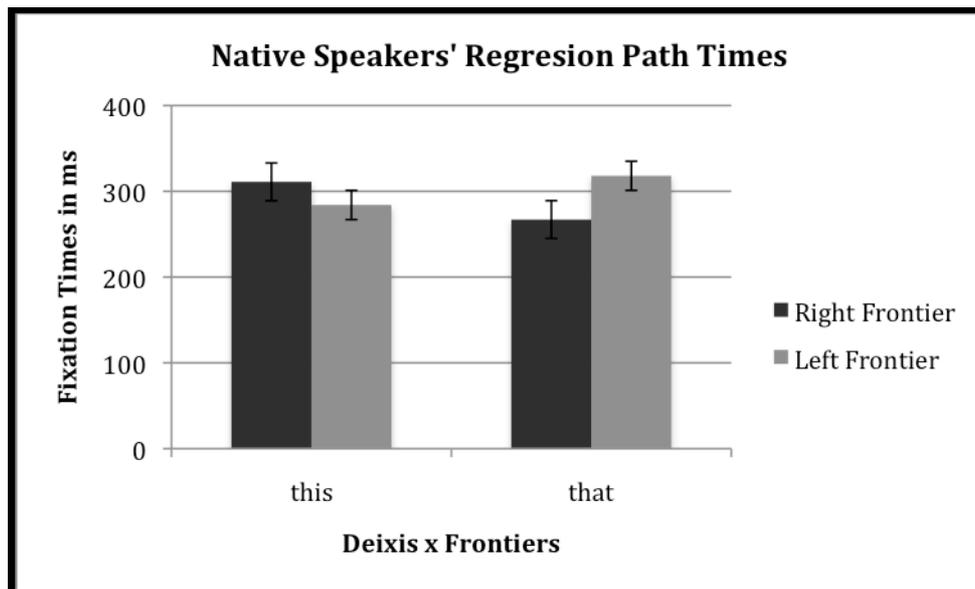
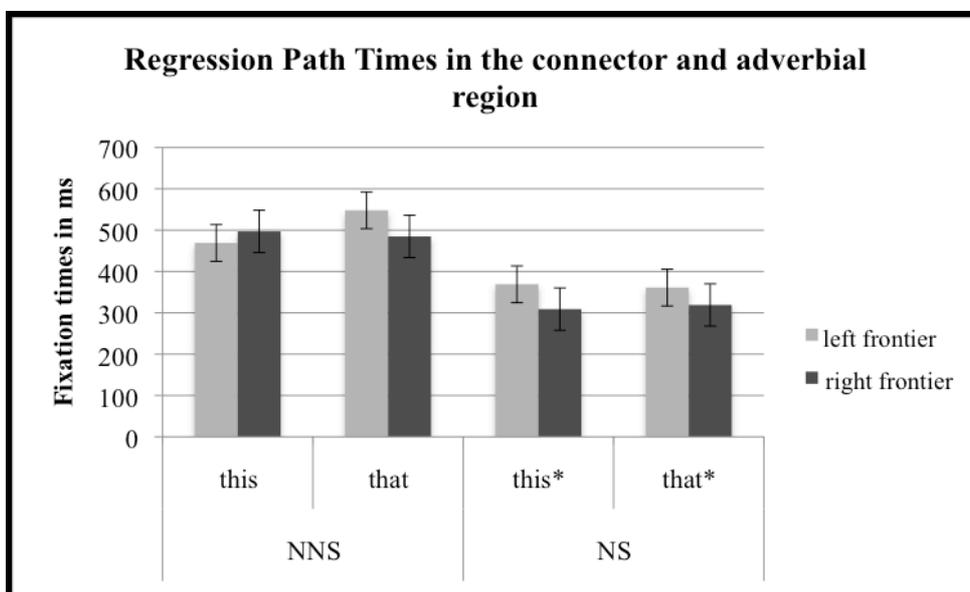


Figure 32. Means of regression path times in the time duration region as a function of discourse deixis (*this* vs. *that*) and frontiers (*a left frontier* vs. *a right frontier*)

The interaction pattern indicates that references to the long event on the left frontier with *this* led to shorter fixations than references with *that*, *This referring to the long event on the left frontier*= 284ms, *SE*= 16.500; *That referring to the long event on the left frontier*= 318ms, *SE*= 28.605; but the difference between *this* referring to the long event on the left frontier and *that* referring to the short event on the right frontier was not significant in *t*₁ (51)= -1.304, *p*= .306. Also, fixations with *that* referring to the short event on the right frontier were longer than for *this* doing so, *That referring to the short event on the right frontier*=267 ms, *SE*= 13.749; *This referring to the short event on the right frontier*= 311ms, *SE*= 26.713 and *t*₁ analysis only showed a trend for such a distinction between *this* and *that*, *t*₁ (51)= 1.710, *p*=.093. The findings here indicate that for native speakers, the right and left frontiers were more open to *this* than to *that*. Processing of the *that* conditions were longer than for the *this* conditions.

The connector and adverbial region of regression-path times demonstrated a three-way significant interaction in the subject analysis but this was only marginally significant in the item analysis, *Discourse Deixis X Language X*

Frontiers: $F1(102) = 4.179, p = .044$, $F2(39) = 4.014, p = .052$, see Figure 33 for the interaction.



* $p < .05$

Figure 33. Means of regression path times in the connector and adverbial regions as a function of discourse deixis (*this* vs. *that*), frontiers (*a left frontier* vs. *a right frontier*) and language (*English natives* vs. *Turkish non-natives*)

Separate ANOVA's did not reveal a two-way interaction in the native speakers' item and subject analyses, all F 's < 1). The three-way interaction of regression path times indicates that irrespective of *this* and *that*, the fixation times of native speakers in the left frontier conditions were longer than those in the right frontier conditions: *This referring to the long event on the left frontier* = 369ms, $SE = 20.952$; *This referring to the short event on the right frontier* = 309ms, $SE = 25.592$; *That referring to the short event on the right frontier* = 361ms, $SE = 31.240$; *That referring to the long event on the left frontier* = 319ms, $SE = 20.127$. They preferred *this* and *that* referring to the right frontier and the differences between *this* referring to the right and *this* referring to left frontier were significant in $t1$, *This referring to the left frontier/the right frontier*: $t1(51) = 2.777, p = .008$, $t2(51) = 2.649, p = .012$. Again, the difference between *that* referring to the left and *that* referring to the right frontier was significant, *That*

referring to the left frontier/right frontier: $t1 (51)=2.915, p= .005, t2 (39)=2.126, p= .040$.

On the other hand, the fixations of non-native speakers were longer for *this* than for *that* when *this* referred to the left frontier, *This referring to the long event on the left frontier= 469ms, SE= 20.952; That referring to the long event on the left frontier= 548ms, SE=31.240*. The pairwise comparison of *this* referring to the long event on the left frontier with *that* doing so was significant in $t1 (51)= -2.090, p= .042$ and marginally significant in $t1 (39)= -1.967, p=.056$. The fixations of non-native speakers were longer in the condition with *that* referring to the long event on the left frontier than with *that* referring to the short event on the right frontier, which was a trend in $t1$ but not a significant pattern in $t2$, *That referring to the long event on the left frontier= 548ms, SE= 31.240, That referring to the short event on the right frontier= 485ms, SE= 20.127; That referring to the long event on the left frontier/ referring to the short event on the right frontier $t1 (51)= 1.804, p= .077, t(39)= 1.472, p= .149$* . In the pronoun and copula region of regression path times, no interaction and main effects were seen, all p 's $>.05$. In the adjective region, while the subject analysis of regression path times showed an interaction pattern between language and discourse deixis, the item analysis did not display the same interaction, *Discourse deixis X Language: $F1 (101)= 3.3.05, p= .072; F2(39)= .715 p= .403$* . In the same region, the main effect of discourse deixis was seen in the item analysis but not the subject analysis, *$F1 (101)= 2.735, p= .101; F2(39)= 36.808, p= .000$* . Fixations with the *this* conditions were longer than for the *that* conditions: *This= 407 ms, SE= 22.905; That= 299ms, SE= 12.281*.

The next findings are from Total Reading Time measures and Table 6 below gives the means of regression-path time measure for all regions as a function of Group (English speakers vs. Turkish speakers), Discourse deixis (*this* vs. *that*) and frontier types (left vs. right frontier):

Table 6. Means and standard deviations for total reading times of all regions as a function of Group (English speakers vs. Turkish speakers), Discourse deixis (this vs. that) and frontier types (left vs. right frontier)

	TOTAL READING TIMES			
	<i>this</i> referring to the left frontier	<i>that</i> referring to the left frontier	<i>this</i> referring to the right frontier	<i>that</i> referring to the right frontier
Discourse deixis region (R4)				
English	531	518	479	476
SD	228	829	175	505
TURKISH	804	845	758	790
SD	264	270	234	235
Time Duration(R5)				
ENGLISH	283	291	290	287
SD	116	96	101	103
TURKISH	404	417	403	391
SD	100	127	140	138
Connector and adverbial region(R6)				
English	378	388	365	368
SD	130	144	168	183
TURKISH	556	560	521	539
SD	156	170	146	167
Pronoun and copula verb region (R7)				
English	280	277	286	258
SD	114	117	125	99
Turkish	364	361	361	364
SD	111	117	106	110
An adjective region (R8)				
English	306	280	296	293
SD	134	99	143	106
TURKISH	435	449	446	444
SD	120	150	161	130

In total reading time measures, a three-way interaction was not observed, but the main effect of frontier was seen in the subject analyses of discourse deixis, time duration, connector and adverbial region and adjective regions, in discourse deixis region but not in the item analyses.

Before drawing conclusions, it is worth recalling the regions of the stimuli in the current experiment in order to understand the results better. The regions of the experimental item were as follows:

R1 (Long event region): Berra packed her belongings	R2 (Modifier and adverbial clause region): with the help of her best friend. Once she had wrapped everything,	R3 (Short event region): she put the packages in her small car with great care.	
R4 (Discourse deixis region): This/that took her	R5 (Time duration): 8 minutes/3 hours	R6 (Connector and adverbial region): and subsequently	R7 (Pronoun and copula verb region): she was
R8 (An adjective region): pleased to	R9 (Region after the adjective): have fitted them all into her car/ have finished everything on time		

In the time region of regression path times, the native speakers preferred *this* referring to the long event on the left frontier, but then in the connector and adverbial region (R6) of regression path times, native speakers of English preferred both *this* and *that* referring to the short event on the right frontier over their referring to the long event on the left frontier. It might be the case that in the initial analysis the references of *this* to the left frontier were acceptable, and then the participants used a recency strategy to clarify the ambiguity in the sentences. They preferred the recent event as the antecedent of *this* and of *that*. On the other hand, in the same region of regression-path time measure, non-native speakers had different frontier preferences for *this* and *that*. Contrary to our predictions in the study, they preferred *this* referring to the long event on the left frontier over *that*, and this evidence of a difference between *this* and *that* was also supported by the pairwise comparison. This indicates that non-native speakers' might regard *this* as serving a focaliser function, bringing an unfocused entity into focus. There was also a preference for *that* referring to the right frontier over *this* referring to the right frontier, which was also significant in the t1 and t2 analyses.

On the other hand, in the pronoun and copula region of first pass reading times, native speakers had a slight preference for *this* referring to the long event on the left frontier. Also, they did not have any frontier preference for *that*. On the other hand, non-native speakers of English showed a different preference for *this* from native speakers of English in this region. It seemed that their initial preference in the regression path times also differed. They preferred *this* referring to the short event on the right frontier over *that* but this finding was only supported in the t1 analysis, not the t2 analysis. There was a trend to the preference of *that* referring to the left frontier, but in fact, the pattern was not significant.

In the first pass reading times for the adjective region, though a three-way interaction was found, in the *that* conditions there was no difference between native and non-native speakers' preferences. They did not show any frontier preference for *that*. On the other hand, the pattern in the non-native speakers' data indicated that non-native speakers had a tendency to prefer *this* referring to the

long event on the left frontier, but again, this was only slight. In contrast, native speakers preferred references of *this* to the short event on the right frontier, which was only supported in t1. Their preference for *this* varied from the left frontier to the right frontier across the first pass reading times for different regions: *this* referring to the short event on the right frontier in the copula and pronoun region of the first pass reading measure, *this* referring to the long event on the left frontier in the adjective region of first pass reading measure. They did not have any clear frontier preference for *that* in these regions.

In addition, the non-native participants' frontier preferences for *this* also varied in the different regions of eye movements: in the connector and adverbial region of regression path times, references of *this* to the long event on the left frontier were preferred, but then in the pronoun and copula region references of *this* to the short event on the right frontier were preferred: meanwhile references of *this* to the left frontier were preferred in first pass reading times in the adjective region.

What, then, do all these findings suggest regarding online reading processes for *this* and *that* and their access to left and right frontiers for native and non-native speakers? Firstly, the time duration of regression path times showed that in native speakers' initial analysis and preferred *this* referring to the long event on the left frontier. They did not have any frontier preference for *that*, but in the next region, the connector and adverbial region, they opted for the recent/right frontier as the antecedent for both *this* and *that*. They then used a recency strategy to resolve the ambiguity. Even if their interpretation was not correct, they did not opt to correct it. On the other hand, instead of using a recency strategy, non-native speakers had a tendency to resolve the ambiguity. They tended to have different frontier preferences for *this* and *that* in the connector and adverbial region for regression path times. *This* and *that* led to a lower processing when *this* referred to the left frontier and when *that* referred to the right frontier. These preferences were unexpected, but indicate that Turkish non-native speakers have different mental representations for *this* and *that*. These representations do not coincide with the proximity approach in spoken discourse. However, in the first pass reading time measures, non-native speakers' preferences varied slightly. This

time they liked when *this* referred to the right frontier and their frontier tendency for *that* disappeared. The pattern in the first pass reading time measure was not as strong as in the regression path times. These results can lead to two possible explanations, although it seems too early to accept either one of them, further research being required. The two alternative explanations are as follows. The first is that the non-native speakers of English started with a preference for *this* referring to the long event on the left frontier because of their initial assumption that *this* serves as a focaliser in English. Then, they changed their frontier preference for *this* to prefer it referring to the short event on the right frontier, due to a transference of the proximity/distal rules regarding *this* and *that* to this context. This might indicate that the focaliser function of *this*, which is implicit knowledge, and explicit knowledge which was acquired from the textbooks and a special temporal function of *this* and *that*, compete with each other. They started by drawing on implicit knowledge, but later fell back upon their explicit knowledge. At the last region, they had a tendency to return back once more to a reliance upon their implicit knowledge, but this was not a very strong tendency.

The second explanation for the non-native speakers is that since the patterns in the first pass reading time measures were not strong enough they can be discounted: they preferred *this* referring to the long event on the left frontier, and opted out of the proximity rule in online reading and stuck to the ‘focaliser assumption’ in their own interlanguage.

The explanation in the case of native speakers of English might be that they start by performing an analysis initially, and thus preferred *this* referring to the long event on the left frontier, but that they then used a recency strategy and thenceforth preferred the right frontier as antecedent.

Upon completion and analysis of these experiments, all these explanations were still merely hypothetical, and further comparative experiments with native and non-native speakers of English were still needed to understand their preferences regarding the access of *this* and *that* to the left and right frontiers. The following comparative analysis of native and non-native speakers of English in the online sentence completion experiments were conducted in order better to understand the phenomena thus far revealed.

3.10 Experiments 2 and 5: Comparison of Native Speakers of English with Turkish Non-Native speakers of English in the Online Completion of Sentences with *This* and *That*

In this section, the comparison of native with Turkish non-native speakers of English in Experiments 2 (section 3.3) and 5 (section 3.6) is made with respect to their discourse segment (the left frontier vs. the right frontier) preferences as antecedents of *this* and *that*. Firstly, their sentence completions are analyzed and then their eye-movements during the sentence completion task are compared.

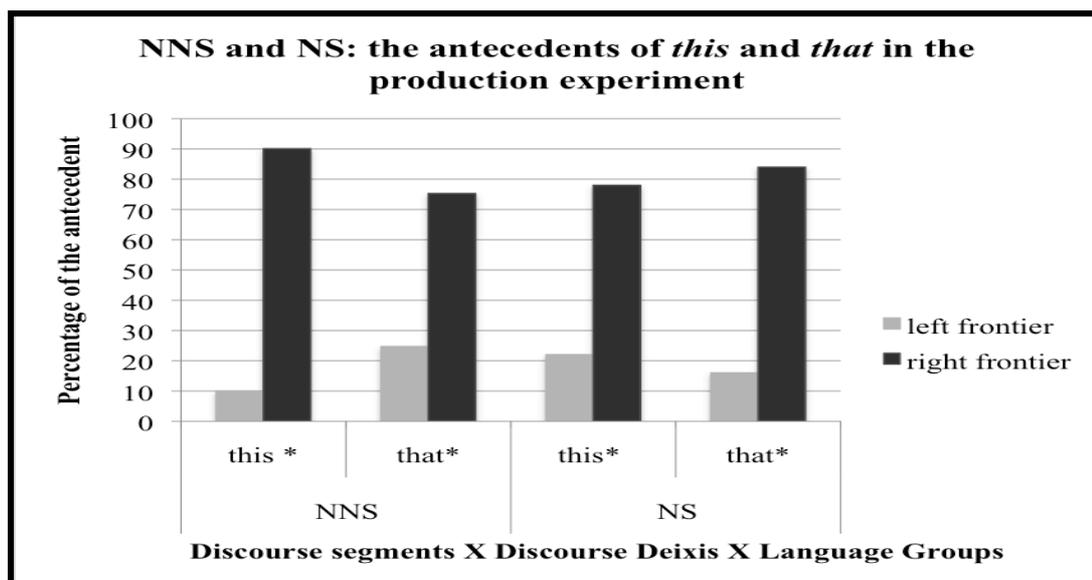
3.10.1 Method. Identical stimuli were used to those in Experiment 2 section 3.2. The parts after *this* and *it* were left blank, to be completed.

3.10.1.1 Participants. Sixteen paid non-native speakers from Middle East Technical University and sixteen paid native speakers from the University of Edinburgh participated.

3.10.1.2 Data Analysis. Continuations were categorized in accordance with the regions defined in Experiment 1 in section 3.1 and Experiment 4 in section 3.5.

3.10.2 Results and Discussion. A logistic mixed effect analysis (LME) was conducted, treating the relative proportion of references to Discourse Segments (left frontier vs. right frontier) and Discourse Deixis (*this* vs. *that*) between Language Groups (English vs Turkish). The lmer analysis showed the differences between groups and their antecedent preferences for *this* to be significant $z = -5.863$ $SE = 0.2667$. The main effect of language and the main effect of condition *this* were seen, *Language*: $z = 2.460$, $SE = 0.2207$; *Conditionthis*, $z = 5.354$, $SE = 0.2074$ and an interaction between language and condition *this*, $z = -5.863$, $SE = 0.2667$ (see Figure 34 below); Natives: *English participants: Conditionthat* $Z = 2.746$, *This left frontier/This right frontier* $t (29)$

=-15.629, $p = .000$; *That left frontier/That right frontier* $t(29) = -12.845, p = .000$;
Turkish participants: z = 5.579, This left frontier/This right frontier: t(16) = 7.741, p = .000;
This left frontier/This right frontier $t(29) = -15.522, p = .000$;
746 That left frontier/That right frontier $t(29) = -13.104, p = .000$.



* $p < .05$

Figure 34. Percentage of antecedents that natives and non-natives prefer for *this* and *that*

The comparative analysis showed that in the uses of native speakers of English there were more references to the left frontier with *this* than with *that*, whereas in the uses of Turkish non-native speakers of English, references to the left frontier with *that* were higher than with *this*, *Turkish participants: This referring to the left frontier = 9.9 %*, *That referring to the left frontier = 24.71%*; *English participants: This referring to the left frontier = 22%*, *That referring to the left frontier = 16%*. The native speakers used *that* to refer to the right frontier, whereas the non-native speakers used *that* to refer to the left frontier, *English participants: That referring to the right frontier = 84%*, *This referring to the right frontier = 78%*, *Turkish participants: That referring to the right frontier = 75.29%*, *This*

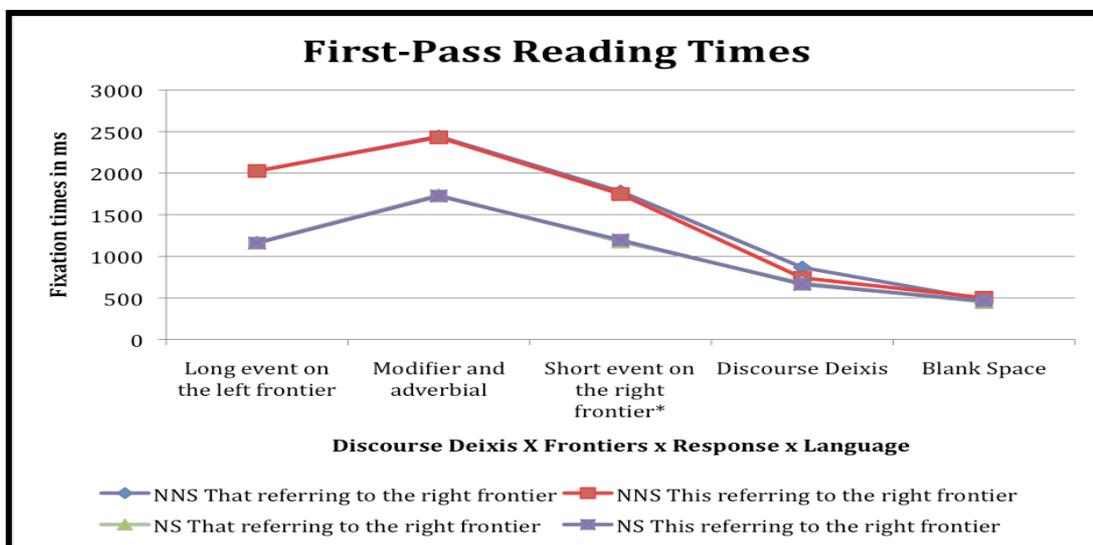
referring to the right frontier= 90%. Though references to the right frontier were more common than references to the left frontier in the sentence completions of both groups, asymmetrical antecedent preferences for *this* and *that* were observed between the two groups. Interestingly (although the implications of this finding lie beyond the scope of this study), in the completions of Turkish non-native speakers, it was seen that they try to select a noun phrase on the right or left frontier as an antecedent of *this* and *that*, whereas the native speakers also selected events or verb phrases as antecedents of *this* and *that*. The cases where *this* and *that* refer to noun phrases on the right and left frontiers were also included under the category of referring to the left frontier or right frontier, since our focus in this study was not whether native and non-native speakers mostly prefer noun phrases or verb phrases as antecedents of *this* and *that* but which frontiers provide antecedents for *this* and *that*. Therefore, inclusion of noun phrase cases did not matter as long as they were on the right or left frontiers. However, this finding is worthy of further investigation and experiment. This finding could be a reason why the non-native speakers do not have recency effect in online data.

To sum up, in the completions, native speakers tended to use *this* to refer to the left frontier rather than *that*, whereas non-native speakers tended to employ *that* to refer to the left frontier instead of *this*. On the other hand, while native speakers used *that* to refer to the right frontier more than *this*, non-native speakers used *this* to refer to the right frontier more than *that*.

In the next section, the linear-mixed effect model was used to compare native and non-native speakers' eye movements. The results of the linear-mixed effect model will be presented in terms of measures of first-time reading times, regression-path times and second-pass reading.

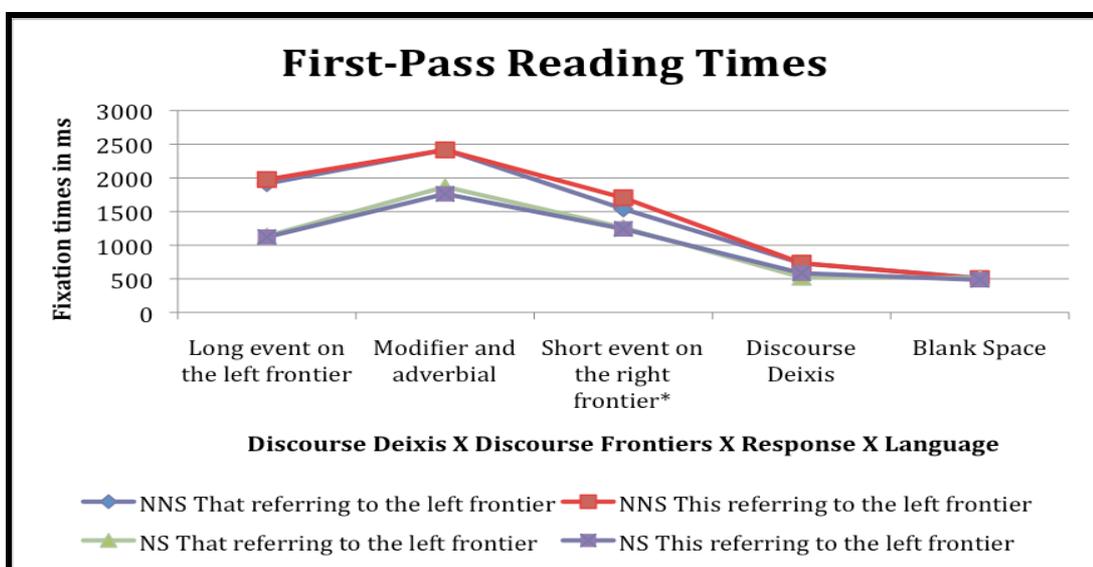
3.10.2.1 Eye Movements and Results. A linear mixed effect model (LME) was conducted, treating the relative proportion of references to Discourse segments (left frontier vs. right frontier) and Discourse Deixis (*this* vs. *that*) between Language Groups (English vs Turkish). The lme analysis showed the differences between groups and their antecedent preferences for *this* to be

significant. Here the results of First-Pass Reading Time measures are reported, and the data of this measure is given in ms across regions in Figures 35a and 35b.



*p<.05

Figure 35a. First-pass reading times (in ms) across regions: right frontier



*p<.05

Figure 35b. First-pass reading times (in ms) across regions: left frontier

Measures of first-pass reading time showed that the effect of language was seen in the long event region on the left frontier, $t = -6.020$. The fixation times of Turkish non-native speakers of English were longer than those of native speakers of

English. Again, in the modifier and adverbial region, the effect of language was observed: $t = -5.052$. The processing of Turkish non-native speakers of English took longer than that of native speakers of English. In the short event region on the right frontier, the effect of language was observed, $t = -5.416$. Also, a significant interaction between discourse deixis and discourse segments was recorded, $t = -2.091$. A significant three-way interaction was seen in the same region, $t = 2.273$ (see Figure 36).

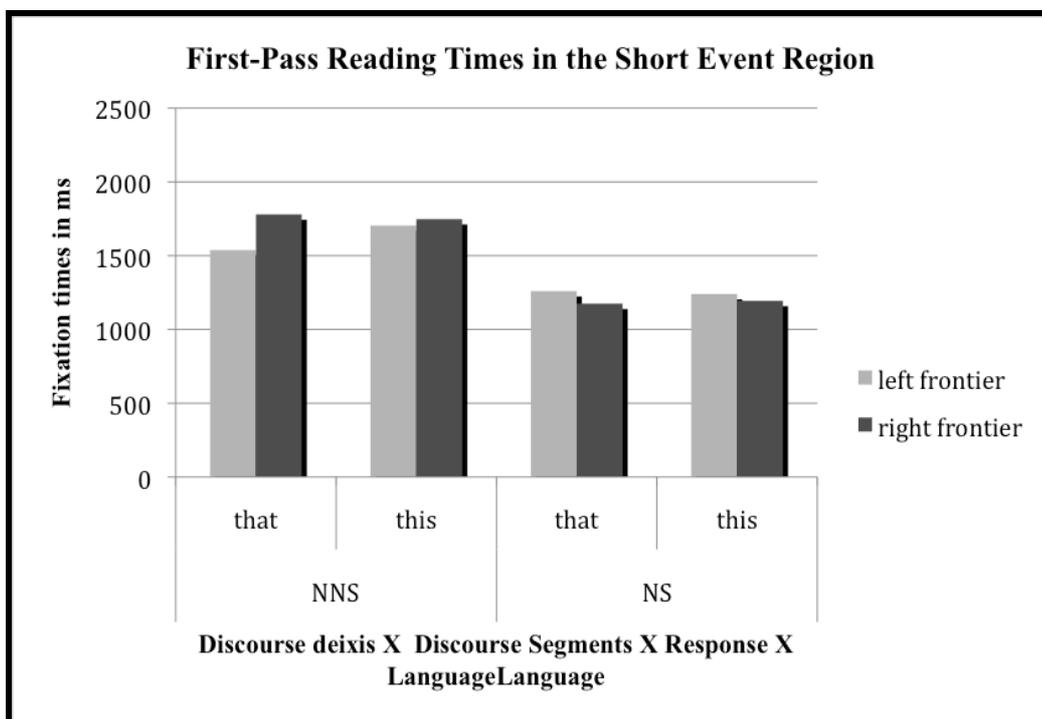
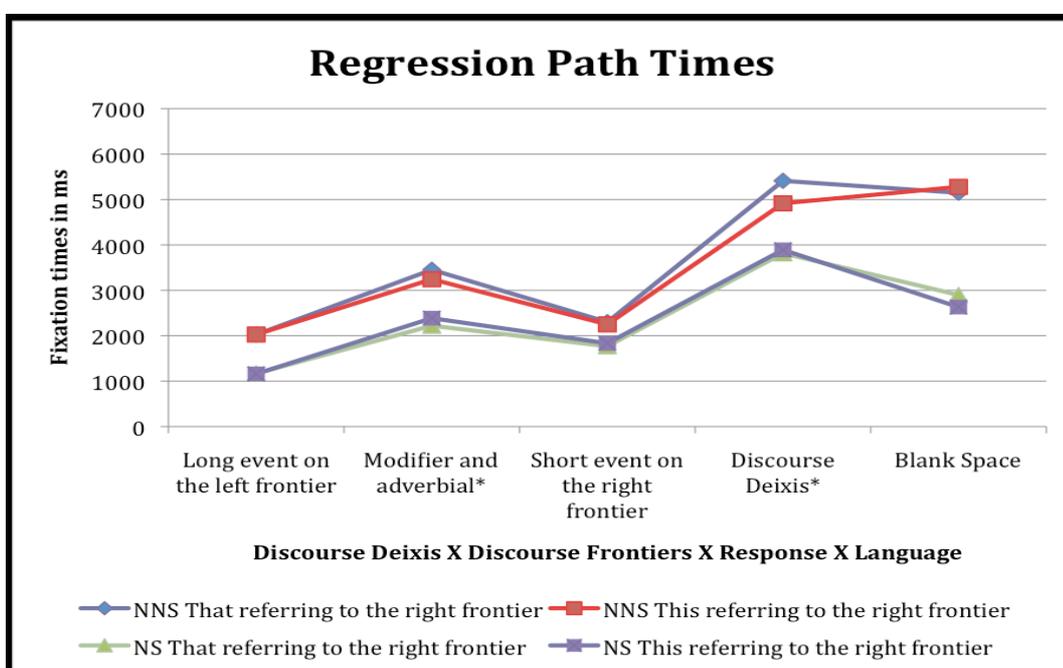


Figure 36. Means of first-pass reading times in the short event on the right frontier region as a function of *Discourse Deixis* (*this* vs. *that*), *Discourse segments* (*left frontier* vs. *right frontier*) and *Language Groups* (*English* vs. *Turkish*)

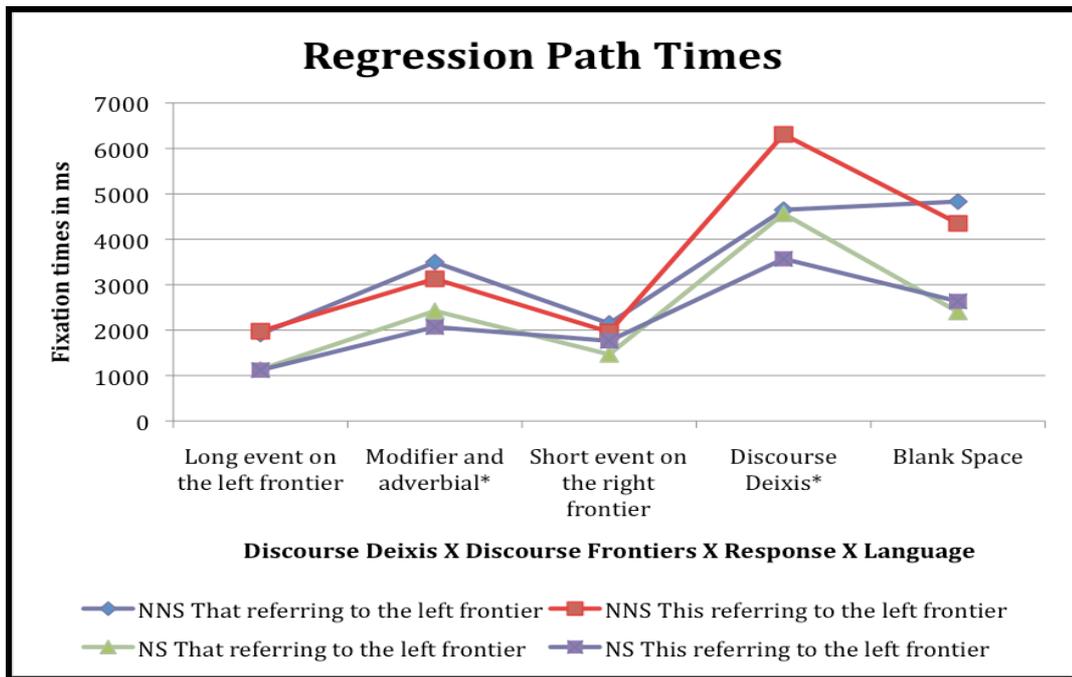
The three-way interaction showed that in both groups, there were not any significant frontier preferences for *this*, *Turkish participants*: *This* referring to the long event on the left frontier=1704ms, *This* referring to the short event on the right frontier=1748ms; *English participants*: *This* referring to the long event on the left frontier= 1240ms, *This* referring to the short event on the right frontier=1194ms. Similarly, while native speakers did not show any preference

for *that*, the fixations of Turkish non-native speakers of English were longer when they wanted to refer to the right frontier with *that*, *Turkish participants: That referring to the long event on the left frontier*= 1538ms, *That referring to the short event on the right frontier*= 1780ms; *English participants: That referring to the long event on the left frontier*=1260ms, *That referring to short event on the right frontier*= 1175ms. The results indicated that while Turkish non-native speakers of English preferred *that* referring to the left frontier, native speakers of English did have a preference for *that*. The next analysis was of regression path times, and its results in fixation times across regions are given in Figures 37a and 37b (see below).



*p<.05

Figure 37a. First-pass reading times (in ms) across regions: right frontier



*p<.05

Figure 37b. First-pass reading times (in ms) across regions: left frontier

Similar to the measures of first-pass reading times, in the long event on the left frontier region, the main effect of language was seen, $t = -4.829$. Fixations of non-native speakers were longer than those of native speakers. In the modifier and adverbial region, the effect of deixis was $t = -2.058$, the main effect of language was $t = -5.043$ and a significant two-way interaction between deixis and language happened, $t = 2.211$ (see Figure 38 below).

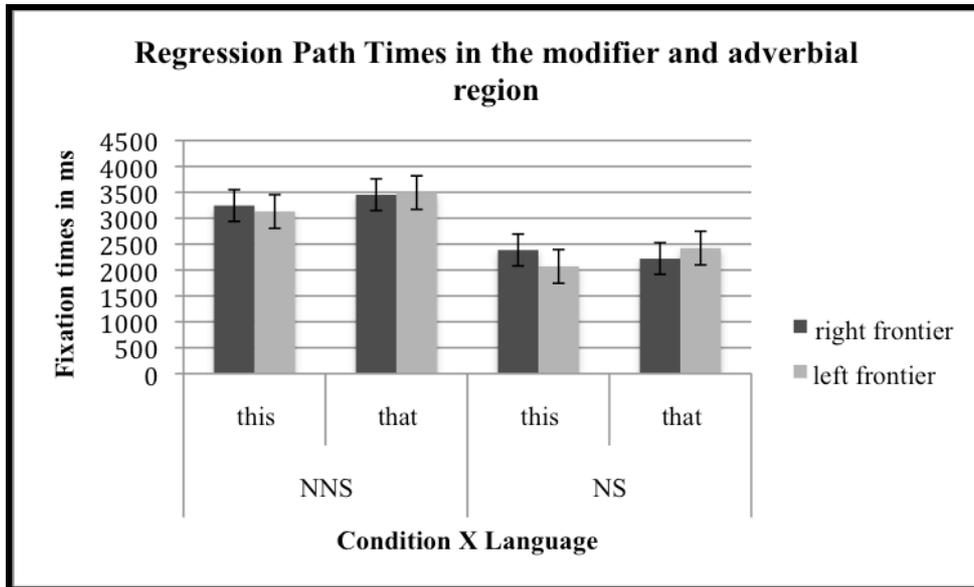


Figure 38. Means of regression path times in the modifier and adverbial region as a function of *Discourse Deixis* (*this* vs. *that*), *Discourse segments* (*left frontier* vs. *right frontier*) and *Language Groups* (*English* vs. *Turkish*)

The two-way interaction indicated that native speakers' fixations were longer when they wanted to refer to the short event on the right frontier with *this*, whereas non-native speakers' fixations were slightly longer for *this* when they wanted to refer to the long event on the left frontier, *English participants: This referring to the right frontier= 2386ms, This referring to the left frontier 2069ms; Turkish participants: This referring to the right frontier= 3244ms, This referring to the left frontier 3129ms*. This showed that native speakers preferred *this* referring to the left frontier but the non-native speakers did not. In the *that* conditions, when native speakers of English wanted to refer to the left frontier with *that*, their fixations became longer: *English participants: That referring to the right frontier= 2221ms, That referring to the left frontier= 2423ms*. However, the non-native participants did not show any preferences for the condition *that*, *Turkish participants: This referring to the right frontier= 3453ms, This referring to the left frontier 3494ms*. Again, the measure of regression path times in the short event on the right frontier region showed the effect of language, $t = -2.522$. In the discourse deixis region of regression path time measures, the main effect of

response (i.e references to the right or left frontier) was $t= 2.162$, the main effect of language was $t= -2.232$, a two-way interaction between condition and response was $t= -3.792$, a two-way interaction between response and language was $t= -3.163$. A three-way interaction among condition, response and language was seen: $t= 2.523$ (see Figure 39 below).

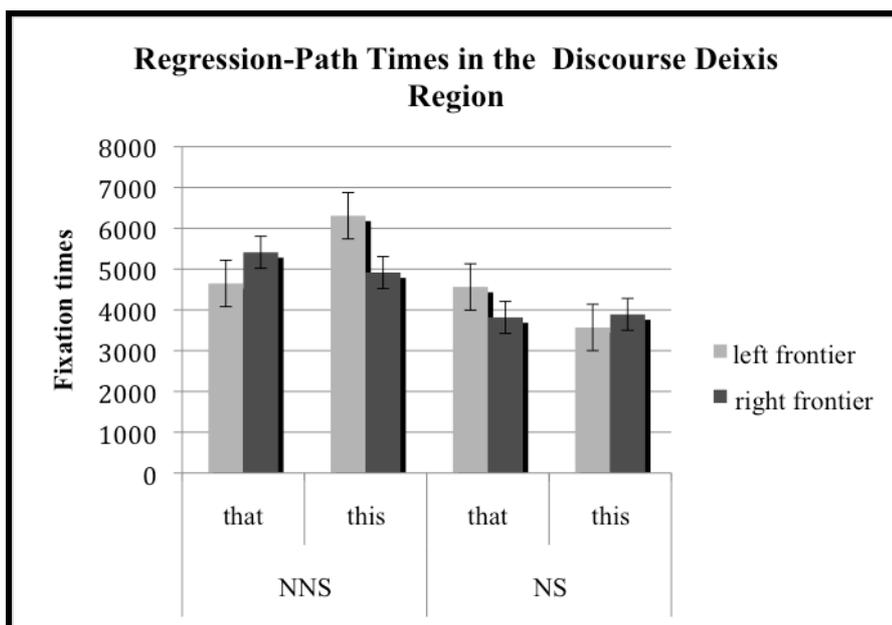
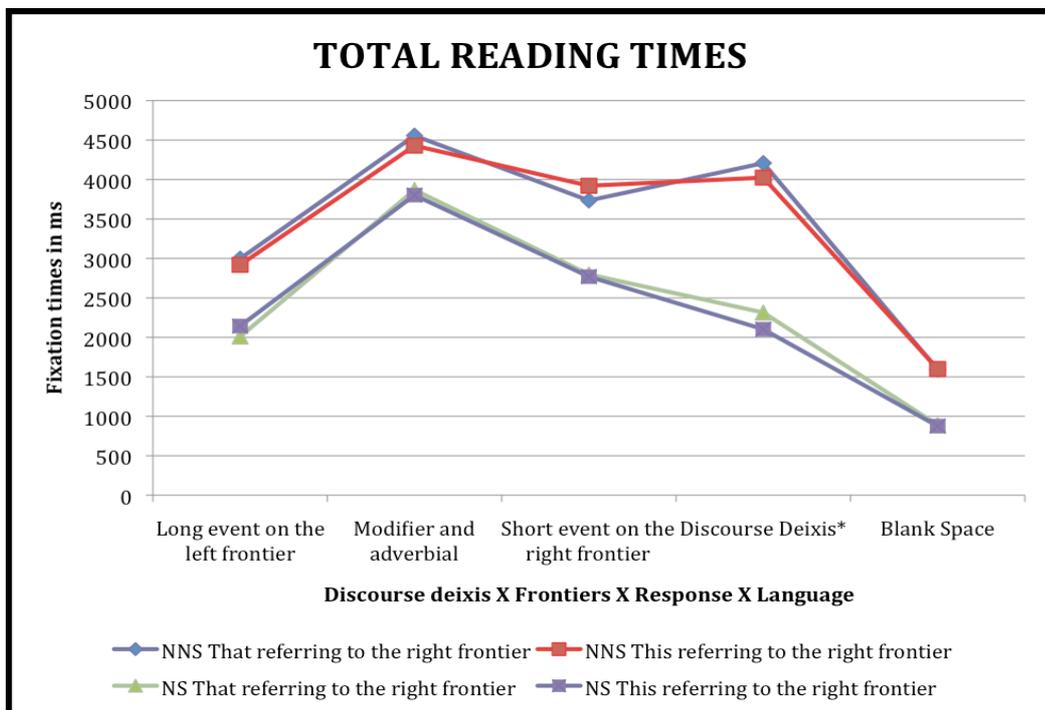


Figure 39. Means of regression path times in the discourse deixis region as a function of *Discourse Deixis* (*this* vs. *that*), *Discourse segments* (*left frontier* vs. *right frontier*) and *Language Groups* (*English* vs. *Turkish*)

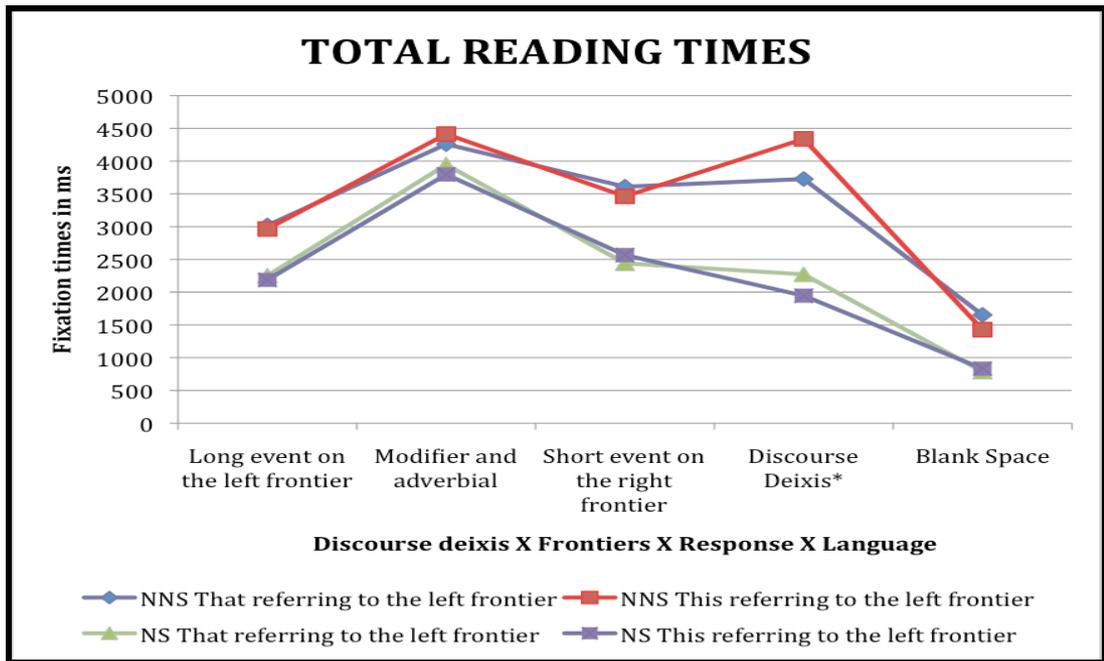
In the discourse deixis region of regression-path times, native speakers' fixations were long where the participant referred to the long event on the left frontier with *that*, *That referring to the left frontier* = 4563 ms; *That referring to the right frontier* = 3815ms. Fixations were long where the participant referred to the right frontier (short event) as the antecedent of *this*, *This* = 3569ms; *That* = 3891ms. This would seem to indicate that for native speakers, *this* more easily focalizes a long event on the left frontier, and *that* a short event on the right frontier. For Turkish non-native speakers, fixations of non-native speakers were long where the non-native speakers referred to the short event on the right frontier with *that*, *That referring to the long event on the left frontier* = 4649ms; *That referring to the right frontier* = 5412ms. Fixations were long where the non-native speakers referred to

the left frontier with this, *This* referring to short event on the left frontier= 6309ms; *This* referring to the short event on right frontier= 4916ms. Contrary to the preferences of native-speakers of English, *that* focalizes a long event on the left frontier, and *this* a short event on the right frontier. The next analysis was of total reading times and its results in fixation times across regions are given in Figures 40a and 40b (see below).



* p<.05

Figure 40a. Total reading times (in ms) across regions: right frontier



*p<.05

Figure 40b. Total reading times (in ms) across regions: left frontier

The long event on the left frontier of total reading times showed the main effect of language, $t = -3.763$ ms. In the modifier and adverbial region of total reading time measures, there were no main effects or interactions among the factors, *all t's* < 2. In the modifier and adverbial region, the main effect of language was significant, $t = -2.763$. Discourse deixis of total reading time measures revealed a significant effect of language, $t = -5.478$; *Response*, $t = 2.305$; *Condition*, $t = -2.039$; *Condition X Language*, $t = -2.076$; *Condition X Response X Language*, $t = -2.018$ (see Figure 41).

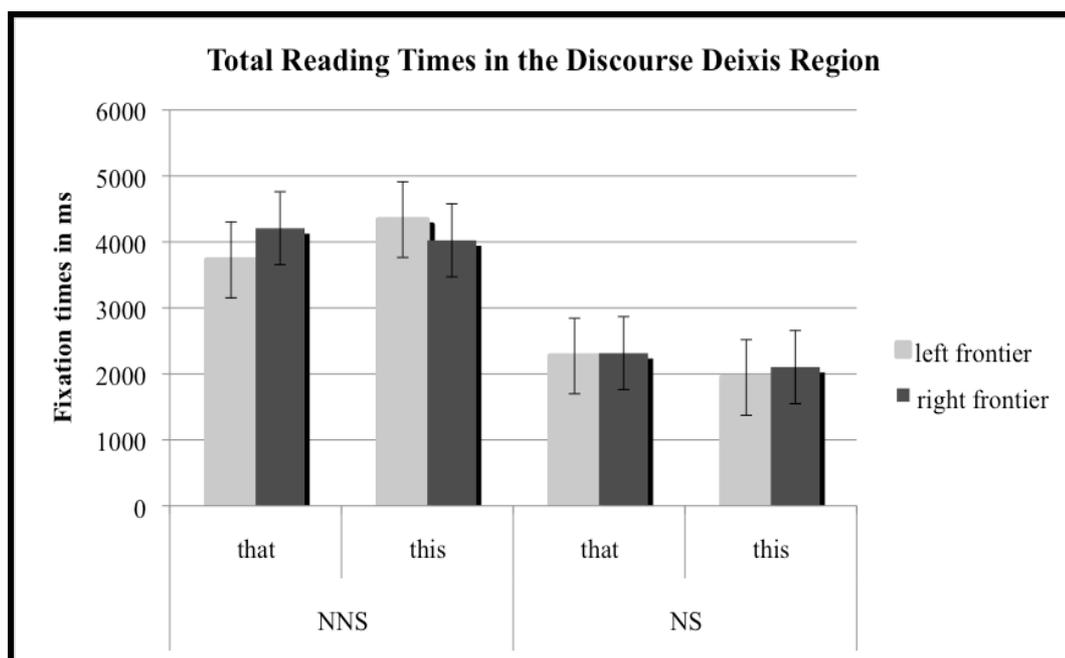


Figure 41. Means of total reading times in the discourse region as a function of *Discourse Deixis* (*this* vs. *that*), *Discourse segments* (*left frontier* vs. *right frontier*) and *Language Groups* (*English* vs. *Turkish*)

While native speakers of English did not show any frontier preference for *that* as an antecedent, Turkish non-native speakers preferred *that* when they wanted to refer to the left frontier, *English participants: That referring to the short event on the right frontier= 2271ms, That referring to the long event on the left frontier= 2314ms; Turkish participants: That referring to the short event on the right frontier= 3727ms, That referring to the long event on the left frontier= 4208ms.* The Turkish participants' fixations were longer when they wanted to refer to the short event on the right frontier with *that* than when they wanted to use it to refer to the long event on the left frontier. While the native speakers of English preferred *this* referring to the long event on the left frontier as a focaliser, the non-native speakers of English preferred *this* referring to the short event on the right frontier.

To sum up the findings of the production experiment with native and non-native speakers, in the regression path times for the modifier of the adverbial region, the Turkish non-native speakers of English did not have any discourse

segment preferences for *this* and *that* as antecedents. However, native speakers had discourse segment preferences for *this* and *that*: references to the long event on the left frontier with *this* led to fewer fixations, while references to the short event on the right frontier with *that* also led to fewer fixations. In the regression path times for the discourse deixis region, native and Turkish non-native speakers' antecedent preferences were much more clearly in line with the results of the eye-measurements mentioned above. Native and Turkish non-native speakers' discourse segments as antecedents for *this* and *that* differ. Native speakers of English wanted to use *this* to refer to the long event on the left frontier and *that* to refer to the short event on the right frontier. Turkish non-native speakers of English wanted to use *this* to refer to the short event on the right frontier and *that* to refer to the long event on the left frontier. The total reading time measures for discourse regions also supported the different discourse segments as antecedents of *this* and *that* across native and non-native speakers.

All these findings regarding completions and eye-movement measures demonstrated that native and non-native speakers of English chose different discourse segments as antecedents for *this* and *that*. Contrary to the results of the regression path-time measures in Experiment 1, the non-natives preferred *that* referring to the left and *this* referring to the right frontier. However, the native speakers of English displayed the same preference for *this* and they had also a much clearer preference for *that*: *this* for the left frontier and *that* for the right frontier. The reason the Turkish non-native speakers had a tendency to have different antecedent preferences for *this* and *that* across experiments can be explained by applying Clahsen and Felser (2005)'s notions regarding explicit and implicit knowledge to the different experiments. Due to the nature of online reading experiments, non-native speakers did not have time to think deeply about the target language structures and thus in such experiments their implicit knowledge is measured. On the other hand, in the offline task, they had enough time to think and to activate the grammar rules they had in their minds. Our production experiment results with non-native speakers seem to be a good example of the use of explicit knowledge in offline experiments. The Turkish participants seemed to have used the 'proximity/distal' grammar rule in

determining the antecedents of *this* and *that*. As in spoken language, they used *that* for the entity which is not near to the speaker and *this* for the entity that is available or near to the speaker. It is also worth noting that the left frontier was open for topic continuations in both groups but the number of cases where the right frontier was accessed as the antecedent for *this* and *that* was higher than that for the left frontier in the completion part. So far, in the production experiment, the native and the non-native speakers of English made different deixis choices regarding the discourse segments chosen as antecedents. In the online reading experiment, however, the non-native speakers' preferences varied for *this* regarding access to the right frontier and the left frontier: in the initial analysis, *this* was preferred to refer to the left frontier but later *this* was preferred to refer to the right frontier. On the other hand, in their initial analysis they did not have any frontier preference as antecedent of *that* but later they preferred *that* referring to the left frontier. In order to further investigate the online processing of native and non-native speakers' preferences for different discourse segments as antecedents of *this* and *that*, the next experiment was designed to explore whether the native and non-native speakers' preferences would still have the same antecedent preferences for *this* and *that* when the positions of the events were changed.

3.11 Experiments 3 and 6: Comparison of Native Speakers of English with Turkish Non-Native speakers of English in the Processing of right/left frontiers when events were changed

In this section, the results of the comparison of native and Turkish non-native speakers of English in Experiments 3 (section 3.5) and Experiment 6 (section 3.8) are given when the positions of the events were changed. In the comparison of native and non-native speakers of English in Experiment 1 (see section 3.8), the event which took a long time was given on the left frontier/distal clause (i.e. driving from Istanbul to Gaziantep or driving from Edinburgh to Birmingham – both actions that would take some hours), whereas in the current experiment it was given on the right frontier/recent clause. Again, in Experiment 1 in section 3.8, the short event (i.e. filling up the car with petrol – an action lasting a few minutes) was presented on the right frontier/recent clause, but in this experiment,

the short event was given on the left frontier/distal clause. By changing the positions of the events on the frontiers, it was possible to observe whether the native speakers or non-native speakers' preferences for *this* and *that* as antecedents would change in relation to the previous experiments in section 3.8 and 3.9.

3.11.1. Method. The same method was used in the current experiment as in Experiment 2 in section 3.8.

3.11.1.1 Participants. Forty paid native speakers from the University of Edinburgh and forty paid Turkish non-native speakers from Middle East Technical University participated. All of them were unaware of the purpose of the experiment. They were the same participants in Experiment 3 and Experiment 6.

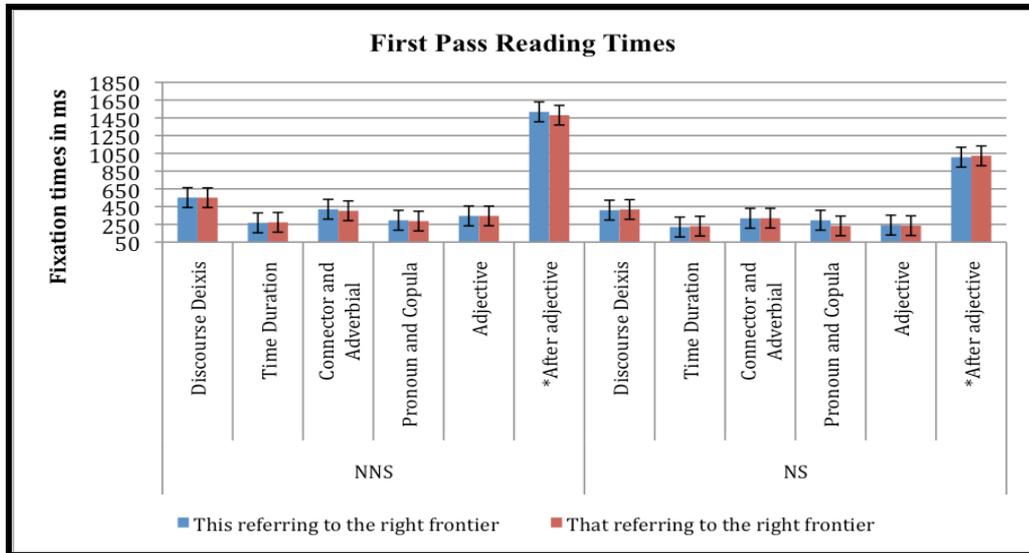
3.11.1.2 Data Analysis. Data analysis of eye-movement data was done for the 40 experimental stimuli and the same number of regions:

R1 (short event on the left frontier):	Berra phoned to book a taxi to the airport for 7 pm,
R2 (Modifier and discourse marker):	becoming stressed by the busy operator. Afterwards,
R3 (Long event on the right frontier)	she packed her suitcases with all her holiday clothes.
R4 (Discourse deixis):	This/that
R5 (Time duration):	took her 1 hour/5 minutes
R6 (Connector and adverbial) :	and afterwards
R7 (Pronoun and copula verb) :	she was
R8 (An adjective) :	sad to be
R9 (Region after the adjective):	leaving the country.

3.11.2 Results and Discussion.

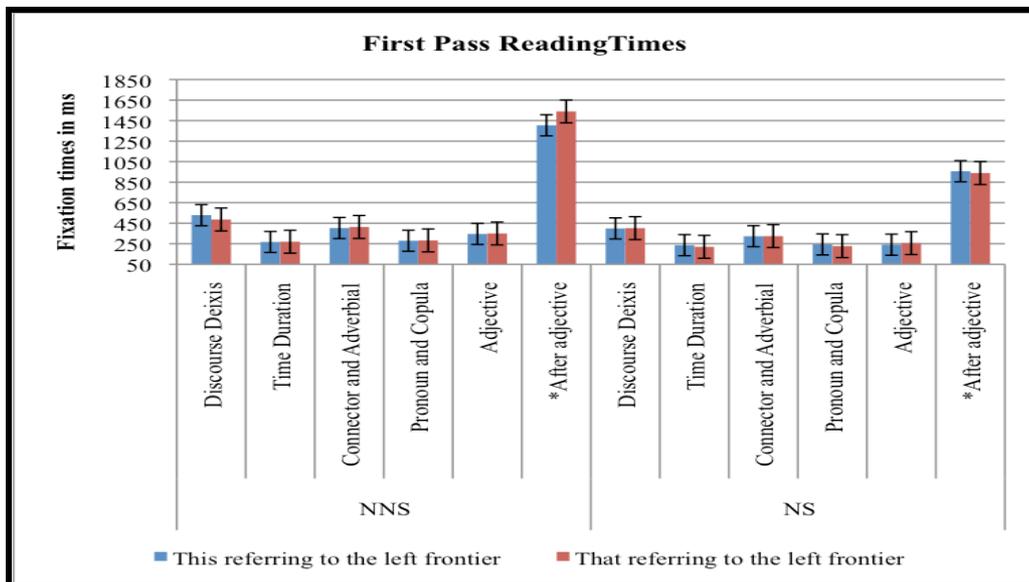
Independent analyses were performed on the data for each group. Also, three-way ANOVAs were conducted for the fixation times for each region, with repeated measures for Discourse Deixis (*this* vs. *that*), Discourse Segments (left frontier vs. right frontier) and Language Groups (English vs. Turkish) as a between-

participant factor (F1) and as a within-subject (F2). In the following, the means for the first pass reading times, regression path times and second pass reading times are given in Figures 42a, 42b, 43, 44a, 44b, 45 and 46a and 46b. Only the regions of interest are discussed below.



* $p < .05$

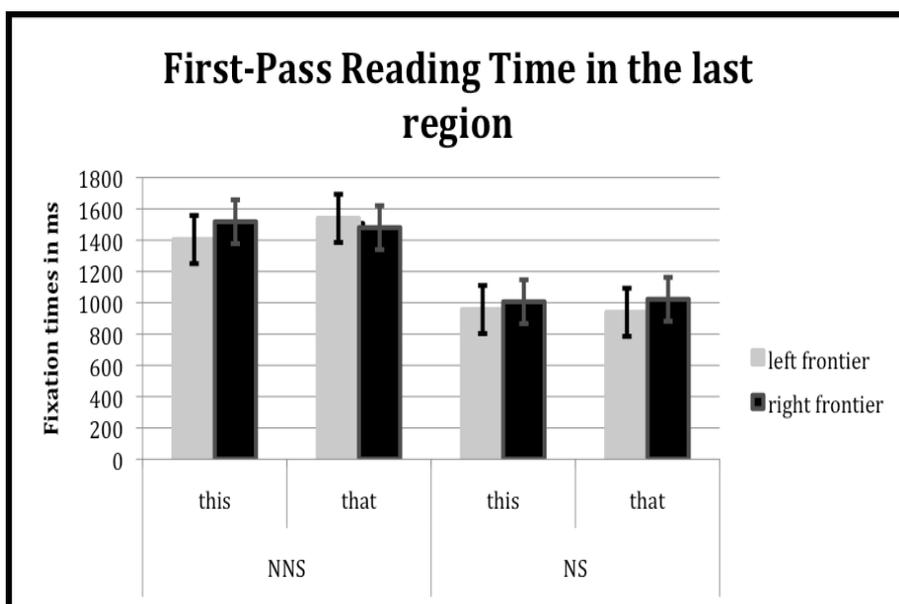
Figure 42a. First-pass reading times (in ms) across regions: right frontier



* $p < .05$

Figure 42b. First-pass reading times (in ms) across regions: left frontier

In the discourse deixis regions of first-pass reading times, the effect of frontier and a marginally significant interaction between the frontier and language were seen in the subject analysis, *Frontier: F1 (79)=12.608, p= .001, Frontier X Language: F1 (79)= 3.744, p= .057*. However, the same interaction pattern and the effect did not emerge from the frontier item analysis, *Frontier: F2 (39)= .057, p= .812; Frontier X Language: F2(39)= .577, p=.452*. The item analysis of the same region showed a different, marginally significant interaction and effect: the main effect of discourse deixis, *F2(39)= 110.115, p=.000; Marginally significant effect of language, F2(39)= 3.248, p=.079*; and a marginally significant interaction between discourse deixis and language, *F2(39)= 3.374, p= .074*. The item analysis of first-pass reading measures revealed an effect of discourse deixis but no effect was seen in the subject analysis: discourse deixis, *F1 (79)= .007, p= .935; F2 (39)= 38.731, p= .000*. The same effect of discourse deixis was seen again in the item analysis of first-pass reading times of the connector and adverbial region, *F1 (79)= .035, p= .852; F2 (39)= 172.135, p= .000*. Fixations in the *that* conditions were longer than those in the *this* conditions, *This= 323 SE= 4.965; That= 415 SE= 6.501*. In the pronoun and copula region and adjective regions of the first-pass reading time measure, all the F's were insignificant, *all the F's < 2*. In the last region of the first-pass reading time measure, the effect of frontier and a significant three way interaction were seen in the subject analysis but not in the item analysis, *F1 (79)= 4.714, p= .033; F2 (39)= 2.592, p= .115* (see Figure 31 for the interaction pattern in F1). Separate ANOVA's with non-native speakers of English showed a two way significant interaction in the subject and a trend in the item analysis, *F1 (39)= 5.614, p= .023; F2(39)= 3.360, p= .074*. Separate ANOVA's with native speakers of English did not show a two way interaction in the subject and item analysis: all F's < 1.



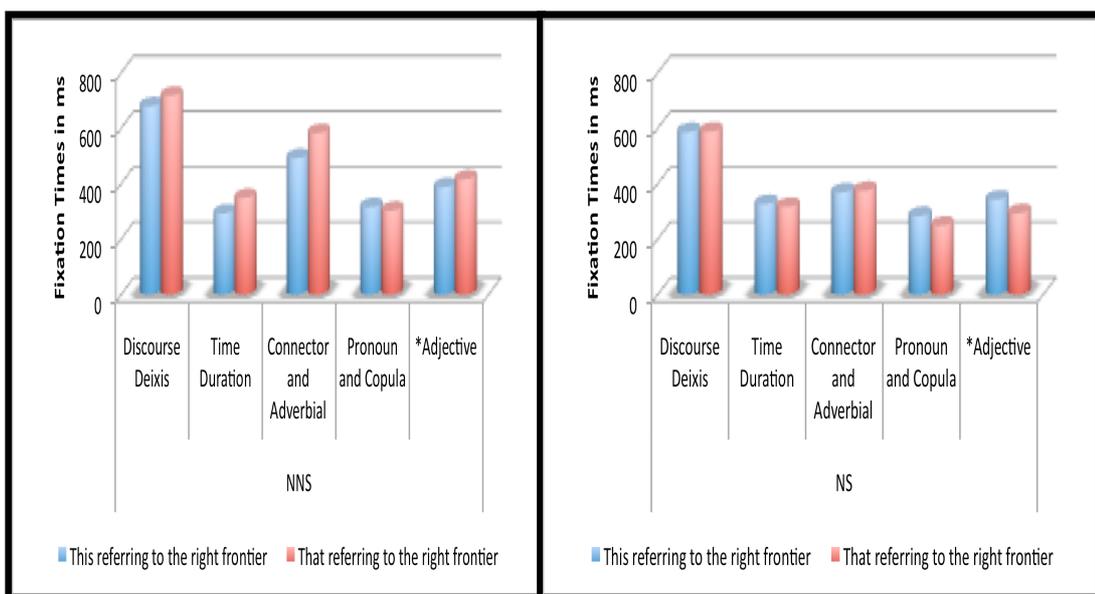
* $p < .05$

Figure 43. Means of first-pass reading time in the last region as a function of *Discourse Deixis* (*this* vs. *that*), *Discourse segments* (*left frontier* vs. *right frontier*) and *Language Groups* (*English* vs. *Turkish*).

Both native and Turkish non-native speakers of English preferred *this* referring to the left frontier in the last region of the first pass reading time. The fixations of native speakers of English with *this* were slightly longer when *this* referred to the long event on the right frontier than when *this* referred to the short event on the left frontier, *This referring to the short event on the left frontier* = 956ms, $SE = 51.177$, *This referring to the long event on the right frontier* = 1006ms, $SE = 900.612$. Similarly, the fixations of Turkish non-native speakers of English were longer when *this* referred to the long event on the right frontier than when *this* referred to the short event on the left frontier, *This referring to the short event on the left frontier* = 1404, $SE = 51.177$, *This referring to the long event on the right frontier* = 1517ms, $SE = 53.349$. The pairwise comparison of native speakers' preferences of *this* revealed a marginally significant difference between *this* referring to the long event on the right frontier and *this* referring to the short event on the left frontier in $t1$ (39) = 1.991, $p = .053$ but not in $t2$ (39) = .696, $p = .491$. The preferences of native and Turkish non-native speakers of English changed in the *that* conditions. References to the long event on the right frontier with *that* led

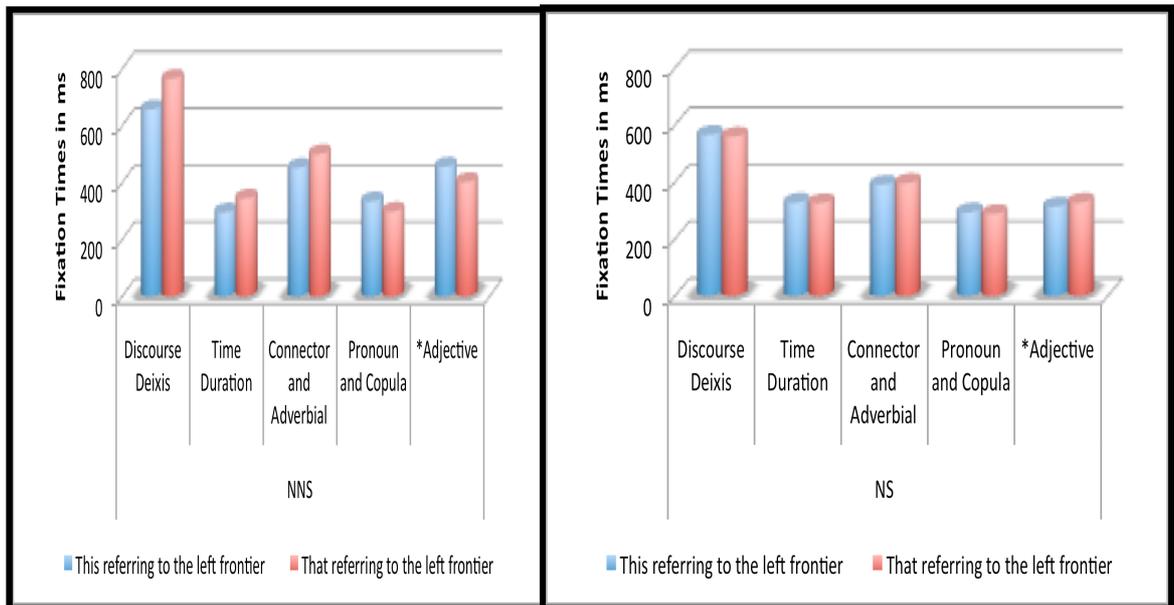
to longer fixations in the native speakers' first pass reading time measures, whereas in the non-native speakers' first-pass reading time measures, references with *that* to the short event on the left frontier led to longer fixations, *English participants: That referring to the short event on the left frontier =939ms, SE= 49.977, That referring to the long event on the right frontier=1022 ms, SE= 50.878, t1 (39)= 2.420, p= .020 t2 (39)= -583, p= .563; Turkish participants: That referring to the short event on the left frontier =1539ms, SE= 49.977, That referring to the long event on the right frontier= 1517ms, SE= 53.349, t1 and t2 < 1.*

The next analysis was of regression-path times, and Figures 44a and 44b give the means of regression-path time measures across the regions of interest.



* $p < .05$

Figure 44a. Regression Path times (in ms) across regions: right frontier



* $p < .05$

Figure 44b. Regression Path times (in ms) across regions: left frontier

In the discourse deixis region of regression-path times, the effect of language was marginally significant in the subject analysis and significant in the item analysis, $F_1(79) = 3.019, p = .086$; $F_2(39) = 31.991, p = .000$. For the same region subject analysis but not item analysis showed a marginally significant interaction between discourse deixis and language, *Discourse deixis X Language*: $F_1(79) = 3.409, p = .069$; $F_2(39) = .030, p = .863$. The fixations of non-native speakers were longer in the *that* conditions than those of the native speakers, *Turkish participants: That = 741ms, SE = 31.352*; *English participants: That = 573ms, SE = 36.421*. Also, the fixations of non-native speakers were longer in the *this* conditions than those of native speakers, *Turkish participants: This = 668ms, SE = 31.352*, *English participants: That = 575ms, SE = 31.352*. In the time duration and pronoun and copula regions, all F 's < 2. In the adjective region, the effect of discourse deixis was marginally significant in the subject analysis and was significant in the item analysis, $F_1(79) = 3.379, p = .070$; $F_2(39) = 11.134, p = .002$. Differently from the discourse deixis region, fixation times for *this* were longer than those for *that*, *That = 313.544ms, SE = 8.230*; *This = 281ms, SE = 7.933*. In the regression-path times for the adjective region, a three-way interaction was seen in the subject

analysis but not in the item analysis, $F_1(79) = 4.111$, $p = .046$; $F_2(39) = 2.246$, $p = .142$. Separate ANOVA's of non-native speakers did not reveal a significant interaction (all F 's < 1), whereas Separate ANOVA's of native speakers revealed a significant interaction in the subject analysis, $F_1(1,39) = 3.17$, $MSE = 13053.816$, $p < .05$; $F_2(1,39) = .073$, $MSE = 18571.768$, $p > .05$.

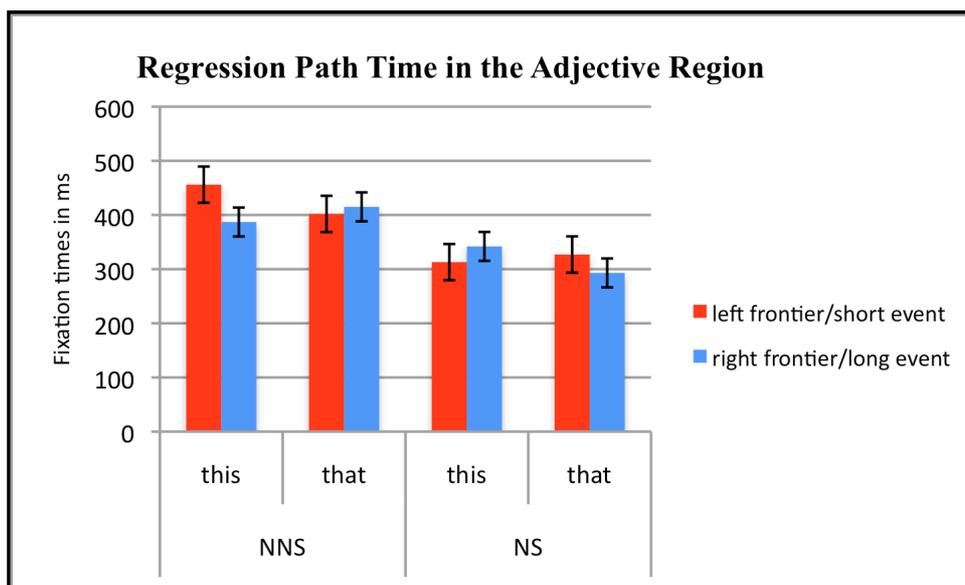
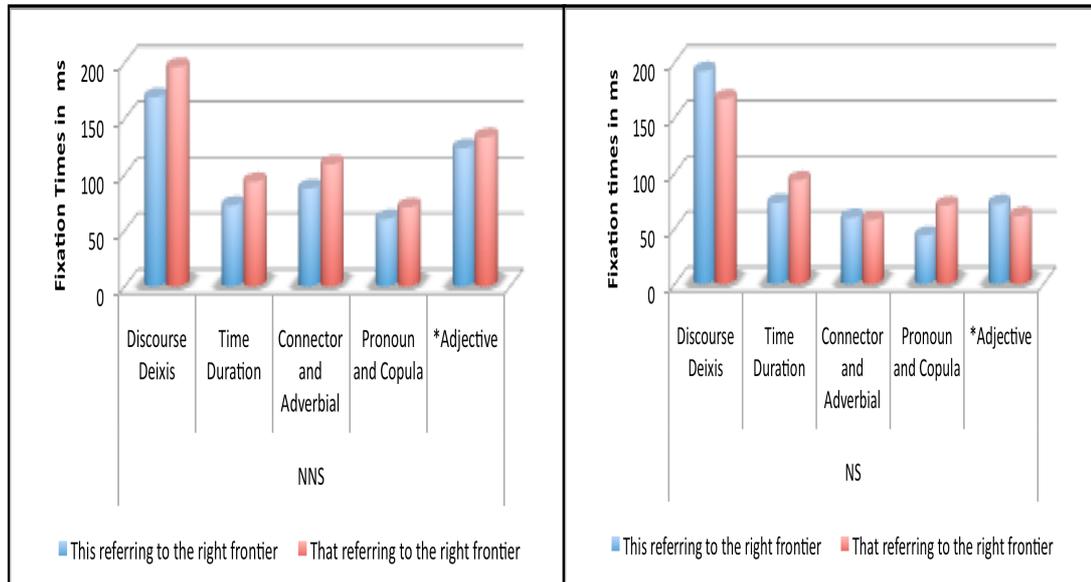


Figure 45. Means of regression-path times in the last region as a function of *Discourse Deixis* (*this* vs. *that*), *Discourse segments* (*left frontier* vs. *right frontier*) and *Language Groups* (*English* vs. *Turkish*).

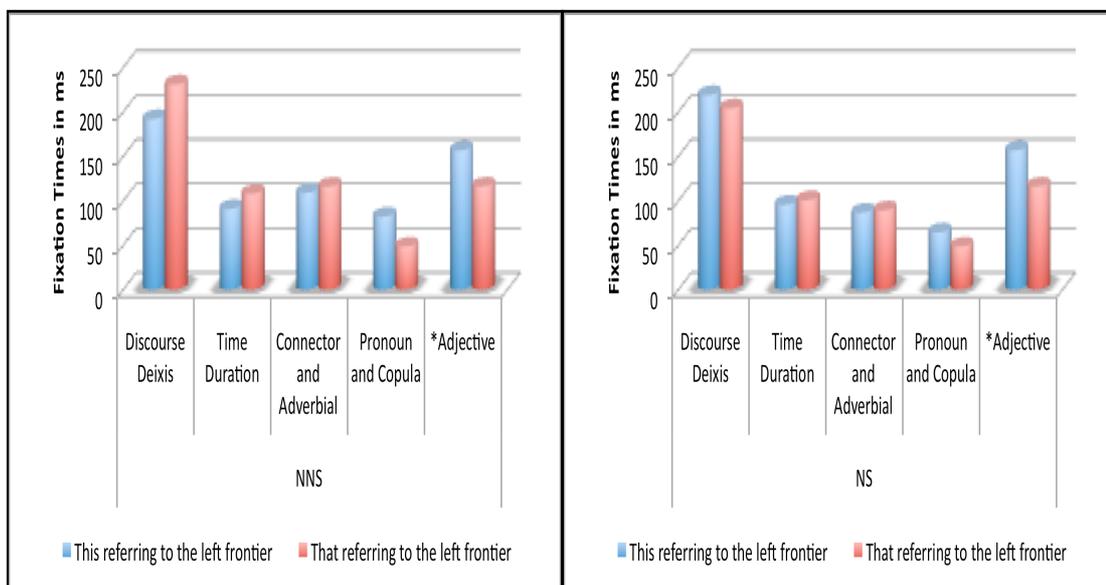
Contrary to the first pass reading time in the last region, the 3 way interaction pattern showed that in the non-native speakers' data, references to the short event on the left frontier with *this* led to higher fixations than for *that* with the long event on the right frontier, *This referring to the short event on the left frontier* = 456ms, $SE = 36.982$, *This referring to the long event on the right frontier* = 387ms, $SE = 25.520$. The fixations of non-native speakers of English were different from those they made in the first-pass time measures of the last region, and from those of native speakers. The fixations of non-native speakers were longer with *this* referring to the short event on the left frontier than with *this* referring to the long event on the right frontier. On the other hand, native speakers preferred *this* referring to the left frontier rather than referring to the long event on

the right frontier. The findings here indicated that the initial analyses of native speakers had *this* referring to the left frontier, whereas for the non-native speakers, their first impression was that *this* referred to the right frontier. While the Turkish non-native speakers of English did not show any preference for *that*, the native speakers of English had a tendency to prefer *that* referring to the right frontier, *Turkish participants: That referring to the short event on the left frontier =402ms, SE= 22.831, That referring to the long event on the right frontier =415ms, SE= 24.520, English participants: That referring to the short event on the left frontier=327ms, SE= 22.831, That referring to the long event on the right frontier= 293ms, SE= 24.520.* The native speakers' preference for *that* was different from that in the last region of the first-pass reading times. The pairwise differences between *this* referring to the left and right frontier or *that* referring to the right frontier were not upheld by the results of t-tests, *all t<1*. The following were the findings for the second-pass reading times and the means of the second-pass reading times:



*p<.05

Figure 46a. Second-pass reading times (in ms) across regions: right frontier



* $p < .05$

Figure 46b. Second-pass reading times (in ms) across regions: left frontier

While discourse deixis and time duration regions did not provide significant effects or an interaction between the factors, the connector and adverbial region showed the effect of frontier in the subject analysis and the effects of anaphora and language separately in the item analysis, *Frontier*: $F_1(79) = 7.528, p = .008$; $F_2(39) = .302, p = .586$; *Anaphora*: $F_1(79) = .324, p = .571$; $F_2(39) = 5.543, p = .024$, *Language*: $F_2(39) = 6.491, p = .015$. Fixations of *this* were longer than fixations of *that*: *This* = 91.844ms, $SE = 7.683$, *That* = 74.975ms, $SE = 6.615$. The fixations of native speakers were longer than those of non-native speakers of English: *Turkish participants*: 151.456ms, $SE = 9.192$, *English participants*: 201.913ms, $SE = 19.751$. Also, the processing of the left frontier took longer than that of the right frontier, *Left frontier*: 78.438ms, $SE = 9.631$, *Right frontier*: 100.510ms, $SE = 9.884$. The subject analysis of pronoun and copula region showed the frontier effect again, but not the item analysis, $F_1(79) = 7.231, p = .009$; $F_2(39) = .062, p = .805$. Differently from the subject analysis, the item analysis in the same region showed the effects of discourse deixis and language, *Deixis*: $F_1(79) = .163, p = .668$; $F_2(39) = 16.613, p = .000$, *Language*: $F_2(39) = 14.456, p = .000$. In the

adjective region of the second-pass reading time measure, the three-way interaction was significant in the subject analysis and marginally significant in the item analysis, $F1(79) = 5.003, p = .028$; $F2(39) = 3.673, p = .063$ (see Figure 35 below for the three way interaction in the adjective region). Separate ANOVA's with non-native speakers revealed a marginally significant two way interaction in the subject and item analyses, $F1(39) = 3.928, p = .055$; $F2(39) = 3.619, p = .065$. Separate ANOVA's with the non-native speakers did not show a two way interaction in the subject and item analyses: *all F's* < 1. This means that the native speakers did not show any different preferences between *this* and *that*.

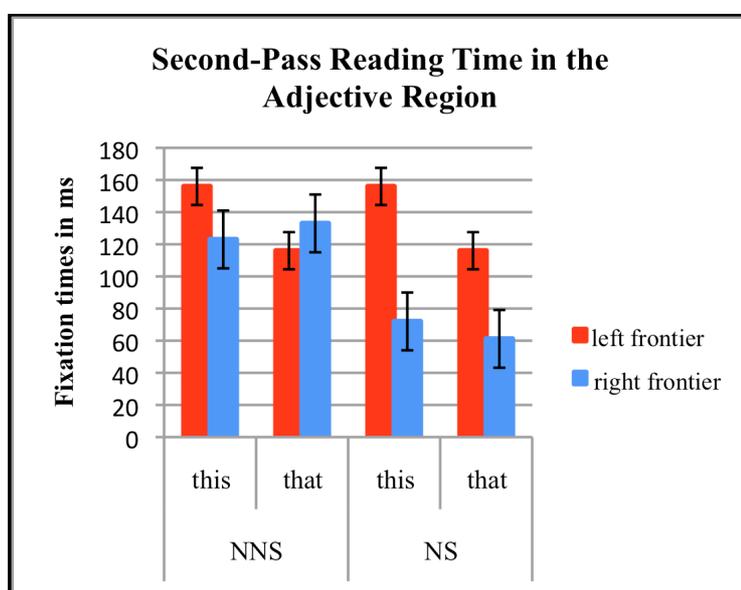


Figure 47. Means of second pass reading times in the last region as a function of *Discourse Deixis* (*this* vs. *that*), *Discourse segments* (*left frontier* vs. *right frontier*) and *Language Groups* (*English* vs. *Turkish*).

As in the regression path time analysis of the adjective region, in the second pass reading time measure of the same region, the Turkish non-native speakers preferred *this* referring to the long event on the right frontier. This time they preferred *that* referring to the short event on the left frontier, *Turkish participants: This referring to the long event = 156ms, SE = 143.376; That referring to the long event = 116ms, SE = 110.992*. This matches with the grammar rules they learned in the language classroom. Differently from the results on *that* in the regression path

times, the non-native participants did not show any frontier preferences for *that* – English participants: *That* referring to the left frontier= 64ms, SE= 55.546, *This* referring to the right frontier= 61.146ms, SE= 48.289. However, all these differences between *this* and *that* in the fixation durations of native and non-native speakers were not supported by t1 and t2 analyses.

To summarize the results so far, in the adjective region (the penultimate region) both regression path time and second-pass reading time measures revealed a three way interaction and showed different frontier preferences as antecedents of *this* and *that* for native and non-native speakers of English. While native speakers of English did show any frontier preferences for *this* and *that* in the adjective region of regression path and second pass reading time measures. In the adjective region of second pass reading times, the non-native speakers of English preferred *that* referring to the short event on the left frontier. According to the regression path times of the non-native speakers, *this* referring to the long event on the right frontier was acceptable and there were no frontier preferences regarding antecedents of *that*. In their second pass reading time measure of the same region, their preference for *this* referring to the right frontier was still the same and the left frontier was preferred as an antecedent for *that*.

In the last region of the first pass reading time measure, the non-native speakers' frontier preference for *this* changed. The non-native speakers preferred *this* referring to the short event on the left frontier as a focaliser. They also seemed to prefer *that* referring to the long event on the right frontier. The explanation regarding the processes of non-native speakers is that non-native speakers showed a time-based processing approach to the discourse deixis when they referred to the left and right frontiers. They initially used their basic and simple grammar rules but later they seemed to change their intuitions in the direction of their implicit knowledge regarding *this* and *that*. Their preference for *this* was shared by native speakers.

However, for the following reasons, the findings in the first time measure of the last region and time-course of anaphora processing by non-native speakers were approached with caution: (1) the findings of the first pass reading time were not seen in the item analysis; (2) the interaction pattern did not occur in the same

region as the other eye-movement measures; and (3) the interaction pattern in the final region. There were differences between native and non-native speakers of English in the selection of frontier preferences: natives accepted the access of *this* to the left frontier, whereas the non-natives accepted the access of *this* to the right frontier. While the natives preferred the access of *that* to the right frontier in their first analysis and then did not have any frontier preference later, the non-native speakers of English did not have any initial frontier preference for *that* but later preferred *that* referring to the left frontier.

In the next section, general conclusions on the processing by native and Turkish non-native speakers of English when *this* and *that* referred to the right and left frontier are given.

3.12 General Conclusion on the Comparative Analyses of Native and Non-Native Speakers of English

The purpose of online reading Experiments 1, 3, 4 and 6 and the completion Experiment with the native and Turkish non-native speakers of English was to explore the discourse segment preferences of native speakers of English and the Turkish non-native speakers of English when *this* and *that* referred to the left and right frontiers. One of the predictions was that the left frontier would be closed for topic continuation to the non-native speakers, since the corresponding sentences in Turkish revealed the inaccessibility of left-frontier antecedents to Turkish *bu*. Alternatively, if the left frontier was open for non-native speakers, it was predicted that they would apply the basic distal/proximity rule to determine possible discourse segments as antecedents of *this* and *that*. The online reading and sentence completion experiments firstly revealed that the left frontier was open for topic continuation. The Turkish L2 learners' sensitivity to the left frontier also supported the findings of Tokowicz and MacWhinney (2005). Though Tokowicz and MacWhinney's (2005) study was focused on the violations of the features that were unique to L2, this study showed that L2 learners can be sensitive even if a feature of the target language is different from their mother tongue.

In Experiment 1, in the time region for regression path time measure, native speakers firstly preferred *this* referring to the long event on the left frontier instead of the short event on the right frontier. Later, in the connector and adverbial region for the regression path times, the native speakers preferred *this* and *that* referring to the short event on the right frontier, which indicated that they used a recency strategy to resolve the ambiguity. On the other hand, in the same region of regression path times in Experiment 4, the Turkish non-native speakers of English had a tendency towards asymmetrical preferences for these deictic expressions. At first, in the connector and adverbial region of regression-path times, they preferred *this* referring to the left frontier and *that* referring to the right frontier. That finding contradicted the prediction that non-native speakers would fall back on the proximal/distal approach to deictic use. In the next region of first pass reading time, the non-natives' preferences changed: *this* for the right frontier, but no preference for *that*. The native speakers' preferences also changed: for *that* no frontier preference, but a tendency for *this* to refer to the left frontier. All these results in Experiments 1 and 4 indicated that the native speakers started to resolve the ambiguity earlier than the non-native speakers of English: native speakers started in the time duration region and the non-native speakers started in the connector and adverbial region. In the initial interpretation, both groups preferred *this* referring to the left frontier. However, while the non-natives had a tendency for *that* referring to the right frontier, the natives had no preference. Later, the natives preferred *this* referring to the right frontier and the non-natives preferred *this* referring to the left frontier and *that* referring to the right frontier. Lastly, the non-native speakers preferred *this* referring to the right frontier while the native speakers had a tendency for *this* referring to the left frontier. Both groups did not have antecedent preferences for *that*. In the initial analysis, the native and non-native speakers of English had the same initial preferences for *this* in different regions but thereafter their preferences differed.

Differently from Experiments 1 and 4 mentioned above, the significant two-way or three-way interactions were found in later regions (i.e adjective or the last region) rather than time duration, pronoun and copula, or connector and adverbial regions. Similar to the time duration region of the first pass reading

time measure in Experiment 1, the native speakers of English in Experiment 3 preferred *this* referring to the left frontier and *that* referring to the right frontier in the adjective region of the regression path times. In the same region, the initial interpretation of the non-native speakers was different from the initial preferences in the connector and adverbial region of regression path times in Experiment 4. This time in Experiment 6 the non-natives preferred *this* referring to the right frontier instead of the left frontier and they did not have any preference for *that*. Similarly, the second pass reading times of the same region showed that the non-native speakers preferred *this* for the right frontier and *that* for the left frontier and the native speakers still had a left frontier preference for *this* and no preference for *that*. In the last region of first pass reading times, similar to the pronoun and copula region of first pass reading times in Experiment 1, non-native speakers' frontier preferences for *this* changed again but differently from Experiment 1, they preferred *this* referring to the left frontier and *that* referring to the right frontier.

To give answer, then, to one of our research questions, regarding whether *this* and *that* signal the same procedural instructions to native and non-native speakers, these reading experiments showed that, though the initial frontier preference for *this* and *that* on the parts of native and non-native speakers were the same in different regions, in the following region, they had different preferences for frontiers as antecedents for *this* and *that* (see Experiments 1 and 4 in section 3.1 and 3.5). Native and non-native speakers initially preferred *this* referring to the left frontier and they did not have any preference for *that*. Later, the non-native speakers preferred *this* referring to the right frontier and they still showed no preference with regard to *that*. On the other hand, native speakers preferred the right frontier as antecedent of both *this* and *that*. In online Experiments 3 and 6, there were differences between native and non-native speakers in the frontier preferences for *this* and *that*. While in the initial analysis the native speakers of English preferred *this* referring to the left frontier and *that* referring to the right frontier, the non-native speakers preferred *this* referring to the left frontier and did not have any preference regarding *that*. In the second pass reading times, the native speakers had the same preference for *this* but did not have any preference for *that*. Similar to the initial analysis, the non-native

speakers liked *this* referring to the right frontier and *that* referring to the left frontier. So far, then, the non-native and native speakers had different frontier preferences for *this* and *that* in the experiments. However, the last region of first pass reading times indicated that non-native speakers later reached the same frontier preference for *this* referring to the left frontier, but still had different preferences from native speakers. While natives started to prefer *that* referring to the left frontier, the non-natives preferred *that* referring to the right frontier. The answer to this question, then, is *this* and *that* signal different procedural instructions to native and non-native speakers. Though their initial interpretations started in the same way in Experiments 1 and 4 their preferences for *this* changed in the later regions. For native speakers, the focaliser function of *this* was more prominent than the proximal function of *this* in the written discourse, whereas the focaliser and proximal functions compete during processing. In Experiment 4, the non-natives started the interpretation with *this* serving a focaliser function, but later the proximal rule became active. In Experiment 6, they started by applying the proximal/distal rule for *this* and *that* and then they came under the influence of the focaliser rule for *this*. For native speakers, the activation of these rules and their dominance led to different preferences and variations during online reading. The native speakers did not opt for the proximal/distal rule but instead the focaliser function of *this* was active throughout reading and competed with the recency strategy. The use of recency strategy by non-native speakers was not seen in these two online reading experiments. While native speakers did not have an asymmetrical preference for *this* and *that* in the online readings, the non-native speakers tended to have asymmetrical preferences for *this* and *that*.

The sentence completion Experiment also confirmed the focaliser function of *this* in the native speakers' completions, but in addition it also confirmed the use of recency strategy in the determination of the antecedents of *this* and *that*. On the other hand, the non-native speakers' completions showed that their frontier preferences were based on the proximal/distal use of *this* and *that*; *this* for the recent entity on the right frontier and *that* for the distal entity on the left frontier. With regard to the research question regarding whether non-native speakers of English have native-like referent preferences, in these experiments, it was seen

that non-native speakers of English had different frontier preferences from native speakers of English. As said before, while the native speakers used *this* to refer to the left frontier and references of *this* and *that* to the right frontier were also highly frequent, the non-native speakers used *this* for the right frontier and *that* for the left frontier. Such asymmetrical antecedent preferences of native speakers reflected the proximal/distal function of *this/that*, whereas the preferences of the native speakers were based on a recency strategy and the focaliser function of *this*.

Another research question regarded whether native speakers displayed asymmetrical referent preferences for these expressions. In these experiments, asymmetrical preferences for *this* and *that* were not observed in the online or the offline experiments. Only once in Experiment 3 (see section 3.4) did the adjective region of regression path times suggest that natives preferred *this* referring to the left frontier and *that* referring to the right frontier, but this was not seen in other regions, other eye-movement measures and other experiments. When the overall preferences of the native speakers across three experiments are taken into account, it can be concluded that they did not have asymmetrical preferences. Unlike the native speakers, the non-native speakers did have asymmetrical preferences (i.e. the connector and adverbial region of regression path times in Experiment 4 or the adjective region of second pass reading times in Experiment 6). This finding also has some further implications for Kaiser and Trueswell's (2008) multi-functional approach to anaphoric expressions, which is based on Finnish native speakers' processing of demonstratives (*tämä*) and anaphors (*hän*). Kaiser and Trueswell proposed that the sensitivity of anaphoric expressions to different referents varies from one form to another. However, while native speakers did not show sensitivity to different frontiers for *this* and *that*, non-native speakers had different frontier preferences for *this* and *that*. The asymmetrical preference of non-native speakers seemed to be a result of a language teaching effect. In language classes, the proximal/distal functions of *this* and *that* are taught and the non-native speakers overgeneralise the rule to reading. The focaliser function of *this*, or their preference for the recent frontier/entity is not drawn to the learners' attention or taught in language classrooms. Also, the existence of an asymmetrical pattern in the non-native speakers' completions, and its non-occurrence in the native

speakers' completions, indicated the difference between prescriptive and descriptive grammar. According to descriptive grammar, *this* and *that* have different antecedent preferences. In both online readings and completions of non-native speakers, just such different frontier preferences for *this* and *that* were observed. However, in the native speakers' online readings and completions, the effect of prescriptive grammar was seen, since their frontier preferences for *this* and *that* were not in line with theoretical linguists' assumptions.

Contrary to Niimura and Hayashi (1996)'s finding on the use of the nearest entity as antecedent of the demonstrative in order to compensate for their deficiency regarding demonstratives, this study showed that, unlike the native speakers of English, the non-native speakers did not use the recency strategy and select the nearest entity as the antecedent of both *this* and *that*. This finding supports Sorace's (2006) argument on L2 learners' deficiencies in parsing strategies. Our L2 learners did not use a recency parsing strategy, which seems to be contradictory to Clahsen and Felser's (2006) assumption that parsing strategies such as minimal attachment and recency strategy are universal. Our results indicate that the recency strategy was not universal and can vary across tasks. In fact, they indicated that the L2 learners used a strategy of recency in the offline data but in the online data they were especially focused on the application of grammatical rules and did not use a mechanism that triggered both grammatical and parsing strategies at the same time. In that sense, the findings seemed to be consistent with Clahsen and Felser's shallow processing, with the non-native processing being only grammar processing. As both Sorace and Clahsen and Felser's work suggested would be the case, Turkish L2 learners knew the syntactic rules well, and therefore tried to perform form function mappings in the online and the offline task. As suggested by both Sorace and Clahsen and Felser, since they did not have full representation and they did not know implicit rules in the sense of Sorace's interface level (i.e. where *this* can be a focaliser, or the access of *that* was not preferred more often than *this*, or that the recent frontier was more acceptable than the left frontier in written discourse), they only tried to apply the rules they knew, but differed in their language use from native speakers. In the line with the findings of Witzel, Witzel and Nicol (2012), our study also

showed that non-native speakers' online processing of *this* and *that* was deeper than that of native speakers of English. While native speakers in the processing of demonstratives used recency as a reading strategy, non-native speakers of English made a higher attachment for the processing of *this* and *that*. Also, the non-native speakers' preferences for the right frontier. This was especially the case in experiment 3, where the stimuli were not coherent, but the native speakers accepted them. Such findings with native speakers also support Fernanda et al.'s 'not good enough' hypothesis. Contrary to the Failed Functional Feature hypothesis of Hawkins and Chan, the uninterpretable features of *this* and *that* exist in the online reading processing but these uninterpretable features compete with the demonstrative functions of *this* and *that*. However, in the offline experiment, uninterpretable features were not active: instead, the grammar rules were active.

3.13 Turkish Deictic *Bu* and *O*

It was originally intended that in this part of the study, the experiments conducted on the deictic uses of *this* and *that* would be replicated with the Turkish deictic expressions *bu*, *şu* and *o*. However, in the translation of the experimental stimuli for Experiment 1, it became apparent that the deictic expressions *this* and *that* invariably translated as *bu*, never as *o* or *şu*, as can be seen in the following examples:

Condition 1: *this* referring to a long event on the left frontier of discourse

John drove from Edinburgh to Birmingham, listening to his favourite jazz CDs. When he arrived in Birmingham, he filled up the car with petrol. **This took 5 hours**, and afterwards he was happy to have time to go to his hotel to take a rest.

John, Edinburg'dan Birmingham'a arabasıyla gidiyordu, en sevdiği jazz CD'sini dinleyerek.

*Birmingham'a ulaştığı zaman depoya benzin doldurdu. **Bu, 5 saat sürdü** ve sonra otele dinenmeye gidecek zamani bulduguna memnun oldu.*

Condition 2: *that* referring to a long event on the left frontier of discourse

John drove from Edinburgh to Birmingham, listening to his favourite jazz CDs. When he arrived in Birmingham, he filled up the car with petrol. **That 5 hours took** and afterwards he was happy to have time to go to his hotel to take a rest.

John, Edinburg'dan Birmingham'a arabasıyla gidiyordu, en sevdiği jazz CD'sini dinleyerek.

*Birmingham'a ulaştığı zaman depoya benzin doldurdu. **5 saat bu sürdü** ve sonra kahve içecek zamani kalmasına sevindi*

Condition 3: *this* referring to a short event on the right frontier of discourse

John drove from Edinburgh to Birmingham, listening to his favourite jazz CDs. When he arrived in Birmingham, he filled up the car with petrol. **This took 5 minutes** and afterwards he was happy to have time to go to his hotel to take a rest.

John, Edinburg'dan Birmingham'a arabasıyla gidiyordu, en sevdiği jazz CD'sini dinleyerek.

*Birmingham'a ulaştığı zaman depoya benzin doldurdu. **Bu, 5 dakika sürdü** ve sonra kahve içecek zamani kalmasına sevindi.*

Condition 4: *that* referring to a short event on the right frontier of discourse

John drove from Edinburgh to Birmingham, listening to his favourite jazz CDs. When he arrived in Birmingham, he filled up the car with petrol. **That took 5 minutes** and afterwards he was happy to have time to go to his hotel to take a rest.

John, Edinburg'dan Birmingham'a arabasıyla gidiyordu, en sevdiği jazz CD'sini dinleyerek.

*Birmingham'a ulaştığı zaman depoya benzin doldurdu. **5 dakika bu sürdü** ve sonra kahve içecek zamani kalmasına sevindi.*

A grammatical judgement survey of native speakers of Turkish was carried out to confirm the initial impression that in the English experimental sentences both *this* and *that* can only be translated as *bu*. The following two sentences were sent to 10 native speakers of Turkish. The participants were Professors, Associate Professors or Assistant Professors of linguistics or literature in Turkish universities. They were asked to rate the plausibility of the options to fill the

blanks. Some of the options offered were ungrammatical, but this was not made known to the participants.

Sentence 1

John, en sevdiği jazz CD'sini dinleyerek arabayla Edinburg'dan Birmingham'a gitti. Birmingham'a ulaştığı zaman depoya benzin doldurdu. _____ ve sonra kahve içecek zamani kalmasına sevindi.

1. Bu beş dakikasını aldı.
2. 5 dakikasını bu aldı
3. 5 dakikasını aldı bu
4. O beş dakikasını aldı
5. 5 dakikasını o aldı
6. 5 dakikasını aldı o

All the participants found items 4, 5, 6 and 2 equally ungrammatical. Item 3 was universally regarded as more appropriate than item 1. One of the participants found the item 1 as easy to read but not as grammatical as item 3.

Sentence 2

a) Bunun bir sinema filmiyle çocuklarımıza aktarılmasıyla hiç değilse vicdan borcumu ödeyeceğimi düşünüp senaryosunu yazdım. _____.

1. Bu, üç yıl kadar sürdü.
2. Üç yıl kadar bu sürdü.
3. Üç yıl kadar sürdü bu.
4. O üç yıl kadar sürdü.
5. Üç yıl kadar o sürdü.
6. Üç yıl kadar sürdü o.

All the options with *o* were regarded as ungrammatical by 8 participants. Only 2 of the participants found item 5 grammatical, and only if the rest of the sentence was completed in the following fashion: “İki yıl da yapımcılarla görüşmeler (“Reaching an agreement with the film makers took two years”). This shows that

for most participants, the references of *o* to a proposition in an explanation relation were unacceptable or inappropriate.

Items 1 and 3 were regarded as acceptable. More than one participant completed item 1 with “Senaryo bitince yapimcilarla temasa geçtim (“After finishing the screenplay, I contacted the film makers”). It seems that *bu* in the subject position indicates the continuation of the topic and the sentence following the sentence with *bu* introduces a new event – “contacting the film makers” – which is related to the event “writing up the screenplay”. The rhetorical relation between sentences (a) and (b) is a list relation, and item 1, “ Bu, üç yıl kadar sürdü,” is the explanation of unit (a) and thus a satellite of the nucleus.

In item 3, *bu* was used in the post-predicate position. The emphasis was on the verb “sürdü” (“took”) and the emphasis of the following sentence was on the feeling of the doer when the writing up of the screenplay was completed.

Item 2 was considered grammatical if the sentence following *bu* was in a contrast relation with the previous sentence. In other words, when the sentence was “3 yıl kadar bu sürdü ama 2 yıl da düzeltmeleri” (“It took 3 years, but 2 years more for its correction”), two sequential actions were compared in terms of the time spent on them. Here, the emphasis was on two actions and the time spent on them was not less. For the same item, one of the participants completed the sentence with “sonrasında araya başka işler girdi” (“Afterwards, other jobs popped up”). The completion suggests that the actions that are not topically related to the main discourse entity are listed.

All these completions and comments demonstrate that because of the intentional structures or semantic relations in Turkish, only *bu* is suitable when translating the sentences from Experiment 1. I propose that the intentional structure in Turkish is more dominant than in English. Sequence relation in English is more dominant than in Turkish. Two events can be given where one follows the other, and the deictic expression *this* or *that* can refer to one of these actions. The references of *this* or *that* to actions is grammatical. In Turkish, however, such sequential reference is very rare and only *bu* is acceptable.

The next step was to conduct a corpus analysis to explore whether *o* is used in Turkish narrative discourse, and, if so, in which rhetorical relations *bu* and *o* are preferred.

3.13.1 Turkish Corpus Analysis. The data for corpus analysis were retrieved from the METU Turkish Workbench. 7849 paragraphs featuring *bu* were retrieved, and 4567 featuring *o*. 68 extracts featuring *o* or *bu* were taken randomly from fiction writing: 34 for *bu* and 34 for *o*. Texts were selected from the narrative genre in order to mirror the genre of text used in Experiment 1. The number of words per text was between 22 and 115. Only samples featuring pronominal usages of *bu* and *o* were selected (see samples from the corpus). Examples are given in extracts 14 and 15, below.

Extract 14

Onu annemden daha iyi hatırlıyorum. Belki de onu annemden daha sık görüyorduk. Bize hikâyeler anlatırdı . Ancak bunlar, çocuklara anlatılan alışılmış hikâyelere benzemiyordu. İkizlerle ilgili tuhaf hikâyelerdi. Çoğu hâlâ aklımda. Geceleri kediye dönüşüp süt, yiyecek ve tavuk çalan ikizlerin hikâyesi. Babaları onları bir fırının içine koyuyor. Çünkü kediye dönüşmelerini önlemenin tek yolu *bu*.

*I remember it better than my mum. Maybe we saw that person more frequently than my mother. He told us stories. However, these were not like the usual stories told to children. These were weird stories about twins. Most of them were still in my memory. It was the story about twins who transformed into cats which stole milk, food and a chicken. Their father put them in the oven, because **this** was the only way to prevent their transformation into cats.*

Extract 15

Dolaylı olarak tanıdığı bir bayan mültecinin yardıma muhtaç olduğundan söz etmişti. Kadın ağır bir kaza geçirmiş. Kaza mı değil mi; *o* da belli değildi ya; kafasını çarptığı söyleniyormuş.

S/he mentioned a refugee woman a friend had told her/him about. The woman had a serious accident. Whether it was an accident or not; that/this was not certain. It was said that she had hit her head.

3.13.1.2. Method. The annotation categories for the Turkish corpus analysis were the types of antecedents *bu* and *o* referred to, the types of rhetorical relations between the sentence with either *bu* or *o* and the previous sentence, and the types of verbs (i.e. stative or action verb) to which they referred. All these categories were determined as in Experiment 1, according to the comments/completions in the grammatical judgemental survey and Schuster's hypothesis (1988). Schuster (1988) proposes that the type of antecedent (e.g. events or action) determines the selection of the anaphoric expression. Relying on this proposal, I also explored whether the type of antecedent (such as dynamic verbs or stative verbs) has a role in the selection of *bu* or *o*. In the corpus analysis, cases in which pronominal *bu* refers to a group of sentences were not included, in order to keep the number of uses of *bu* and *o* in the analysis the same.

In the analysis of the rhetorical relations, I used Marcu's (2000) rhetorical relations list; however, his list of rhetorical relations is not comprehensive when it comes to defining the semantic differences between *bu* and *o*, as it is necessary to specify rhetorical relations such as "positive comment or negative comment" or "negation of a previous proposition". The negation relation is very important for the analysis because both *bu* and *o* are used in this relation, but the semantic roles of these sentences differ. Where *bu* is used in simple negative statements *o* is used more specifically in refuting or criticising a given proposition. Marcu's list offers no distinction that would serve to highlight this difference in usage. A further class of rhetorical relation which Marcu does not include in his list, and which is not adequately covered by his categories of topic-shift and topic-drift, is that of

“the end of a topic”. This also proves indispensable for a proper understanding of the distinct functions between *bu* and *o*, and was therefore added.

3.13.1.3 Results and Discussion. From the corpus analysis, it was found that the antecedents of *bu* can be the nearest sentence or clause itself (i.e. the right frontier), or a sentence that is not adjacent to the sentence containing the discourse deixis (i.e. the left frontier). The antecedents of *o*, on the other hand, seemed to be the nearest sentence. The percentages of the antecedents to which *bu* and *o* referred are given in Figure 48.

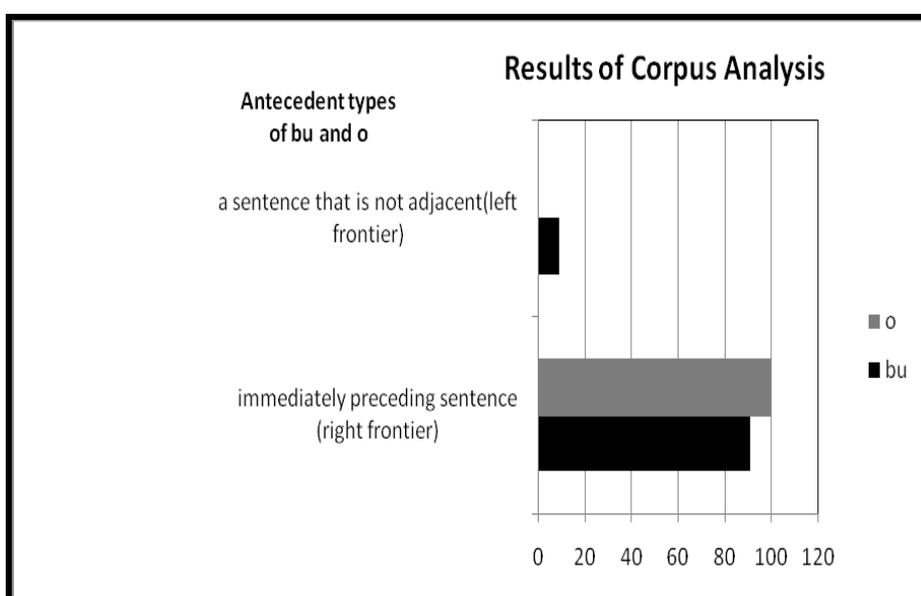


Figure 48. The percentages of the antecedents to which *bu* and *o* referred

In 91 % of the extracts featuring *bu*, the deictic marker refers to the immediately preceding sentence. Only 8.8% of *bu* occurrences refer to a sentence that is not adjacent. This compares with 4% of occurrences of *this* referring to a sentence that is not adjacent. Look at the examples below:

Extract 16

Hak veriyordu karısına; (b) çalışıyordu ve üstelik çok başarılıydı. (c) Zekiydi, (d) çalışma diyemezdi, (e) Cahide ' yi dört duvar arasına hapsetmek olurdu *bu* .

*He understands his wife; she studies and she is also very successful. She is intelligent; he has no right to tell her not to study. **This** would be to imprison Cahide [between walls].*

Extract 17

Kadın çıldırması gibi. (b) Belli ki bir yakınına yıldırım çarptı. (c) Kim olduğunu çıkaramıyoruz. (d) Kadına yardım etmek için gitmek istiyoruz (e) ama selden geçilecek gibi değil ki. (f) Olanaksız *bu*.

*The woman behaved as if she were mad. Maybe one of her relatives had been struck by lightning. We were not able to find out who she was. We wanted to go and help her, but it was impossible because of the flood. **This** was impossible.*

In Extract 16 *bu* refers to the mental representation of the immediately preceding sentence (d) “çalışma diyemezdi” (“he has no right to tell her not to study”). *Bu* refers to the representation of the speaker saying to his wife ‘not to work’ and of the results of his statement. In Extract 17, however, *bu* refers to sentence (d), “Kadına yardım etmek için gitmek istiyoruz” which is not adjacent to (f), the sentence with *bu*. Here, *bu* also opens an ontology of the speaker’s mental representation of being in the flood and trying to cross it to help her.

O was also used for references to the immediately preceding sentence. In contrast to *bu*, there were no occurrences in which *o* referred to a sentence that is not adjacent, nor did a survey of further examples from the corpus reveal any cases of such usage. For example, in Extract 18, *o* refers to the preceding sentence “Aynı ülkede yaşayanlar birbirine karşı küçük düşmemeli ” (people who

live in the same country shouldn't belittle each other) and signals topic processing.

Extract 18

Bir tek konuda onur meselesi var, (b) sanki başka konuda yok. (c) Hem kime karşı küçük düşeceğiz , düşmeyeceğiz ? (d) Aynı ülkede yaşayanlar birbirine karşı küçük düşmemeli . (e) Önemli olan o.

In matters of dignity and honour, there is only one issue, there is no other. Who are we going to put down or belittle? People who live in the same country shouldn't belittle each other. That is important.

To sum up, both *bu* and *o* prefer the immediately preceding sentence, but the mental representation they create seems to be different. While *bu* refers to a mental picture of references, *o* refers to a topic entity or topic itself. There are some occurrences in which *bu* refers to a proposition that is not close. However, the use of such cases is highly infrequent.

3.13.1.4 Rhetorical Relations *bu* and *o* used in METU Corpus. The next results relate to the rhetorical relations in which *bu* and *o* are used (see Figures 49 and 50).

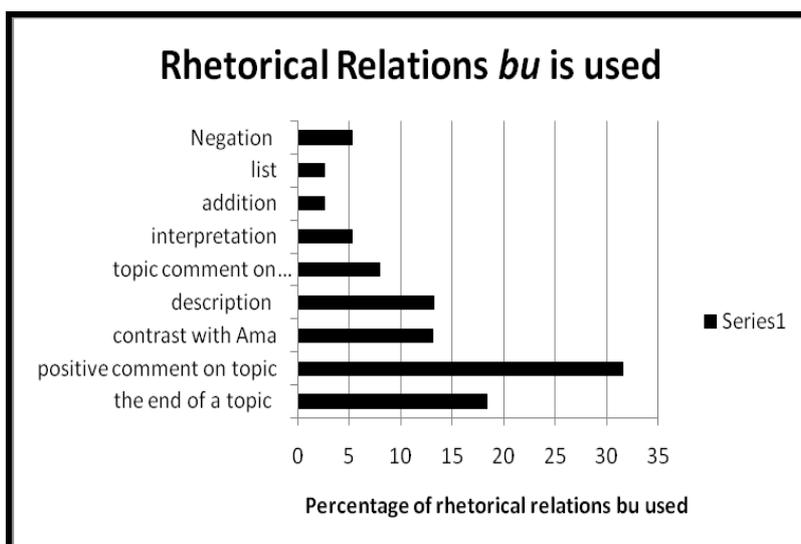


Figure 49. The percentage of rhetorical relations in which *bu* is used

Bu is used with a positive comment relation on the topic in 32.2% of occurrences, with a description relation in 14.7%; with a topic comment relation to inappropriate behaviour in 8.8% of occurrences; with a contrast relation in 13.1%. It is used to signal the end of a topic in 17.6% of occurrences. It is used with a list relation as well as an interpretation relation in 2.9% of cases, and with a negation relation in 5.9% of cases.

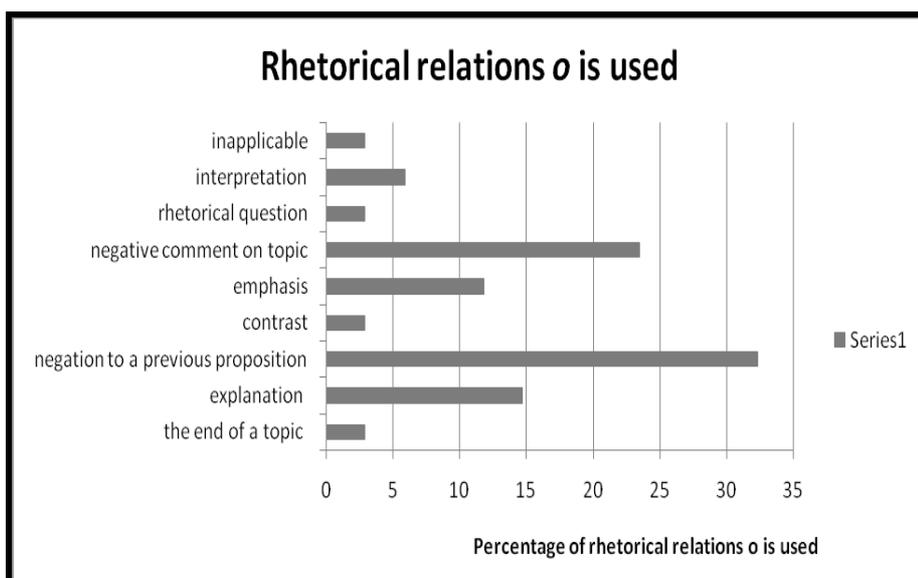


Figure 50. The percentage of rhetorical relations in which *o* is used

O is used with a negative comment relation in 23.5% of occurrences, with a negation relation to a previous proposition in 32.3%; with a contrast relation in 2.9 %; with an explanation relation in 14.7%; and with an interpretation relation in 5.9%. It is used to signal the end of the discourse topic in 2.9% of cases.

In Figures 49 and 50 (above), it can clearly be seen that both *bu* and *o* are used in interpretation, contradict and topic-end relations. However, these relations are less frequent than other relations which present significant semantic differences between *bu* and *o* in Turkish (i.e negative topic comment, positive topic comment and negation). Before moving to topic comment and negation relations, it is worth giving examples of a contrast relation. Though *bu* and *o* are used in this relation, the frequency of *bu* is higher than that of *o*: 13.1% of uses of *bu*, 2.9% of *o*. In Extract 19, the writer describes a “Havra”, or synagogue. *Bu* is used in a contrast relation with the discourse marker “Ama” to state that though the synagogue was surrounded by high walls and thus was very quiet, that did not affect the magical atmosphere visible on looking through the keyhole. In Extract 20, *o* is used in a contrast relation, in a manner similar to *bu*. The writer claims that two teams would tie at the end of the game because of the penalty given at the last minute. Another character in the story is contradicts that idea, saying “*o* eskidendi (‘That was in the past’).

Extract 19

Havra, ne de olsa , uzun upuzun duvarlarla çevriliydi . (b) Uçsuz duvarlar .
(c) Sessiz (d) Ama *bu*, biz o delikten baktığımızda , içeriden bize renkli ışılıtlar süzüldüğünde ortalığı sarıp sarmalayan o büyüü bozmadı hiç.

*The synagogue was surrounded by very high walls. Endless walls. Quiet. However, **that** did not spoil the magical atmosphere with coloured lights all around visible when we looked through the keyhole.*

Extract 20

Tutar bir penaltı verir maçın son dakikasında , adam da dengine getirir atar mı , haydi al bakalım sahadan berabere ayrıl . . . Yok artık abicim , berabere yok , o eskidendi , şimdi yeneceğiz , yeniyoruz , yeneriz.

*Now, what if the referee were to give a penalty in the last minute? The player would score a goal, then we would draw.... No mate, no draw, **that** was in the past, this time we will win, are winning, are going to win.*

Bu is mostly used in sentences in which a positive comment on a topic is given. In Extract 21, the writer describes the surroundings when the character leaves his/her flat. *Bu* in sentence (e) refers to the proposition in sentence (d), “Bakkal da kapamıştı”. The sentence with *bu* is a positive comment on the shop being closed.

Extract 21

Giyinip çıktı. (b) Merdivenleri hızla indi. (c) Sokak boştu. (d) Bakkal da kapamıştı , (e) *bu* iyiydi. (f) Ağır ağır yürüdü.

*S/he put on his/her clothes and went out. S/he went downstairs very quickly. The street was quiet. The shop was closed, **this** was good. He walked very slowly.*

On the other hand, *o* is used in sentences in which a negative comment is given on the previous proposition. In Extract 22, the writer explains that when a politician loses the trust and love of a society, it is difficult to regain them. With the sentence with *o*, the writer emphasizes the impossibility of winning back the trust and love of society.

Extract 22

Ama milletin itimadını, milletin güvenini, milletin sevgisini kaybettin mi (b) bir daha kazanamazsın. (c) **O** çok zor.

However, if you lose the trust and love of society, you will never regain it. **That/this** [regaining that trust and love] is very difficult.

Bu is used in cases where the writer comments on behaviour. However, in these cases, psychological closeness to or distance from this behaviour is not stated. The writer only explains the behaviour in a neutral way. In Extract 23 (below), the writer states that though s/he smiles at the people in Coburg, they do not smile at her. In clause (e), *bu* refers the proposition in clause (d). With the unit *bu*, the writer states that the people's not smiling at her is not her concern.

Extract 23

Benim yüzümden kimsenin yüzüne bakamaz olmuşlar koca Coburg kentinde. (b) İyi de, ben yine herkese selam verip , alışverişe gidiyordum. (c) Ben herkesin yüzüne yine gülererek bakıyordum. (d) Karşımdakiler bana gülümsemiyorlarsa, (e) *bu* onların sorunuydu.

Because of me, they couldn't look people in the face in the big city of Coburg. Fine, but I greeted people and went shopping. I looked at people's faces with a smile. If the people didn't smile at me, that was their problem.

Both *bu* and *o* are used in negative sentences. However, the occurrences of *o* in negative sentences were higher than those of *bu*: 17.6 % for *o*, 5.3% for *bu*. In Extract 24, the writer talks about the feelings of the other person. In sentence (d) with *o*, the writer does not accept the idea that the other person loves him/her. For the writer, that is not love.

Extract 24

Haydaa , nasıl yani aşk ? . . . (b) Huyumu bilmezsin suyumu bilmezsin . . .
(c) Sen başka bişiy hissediyosundur , (d) aşk filan diildir o . . .

*What do you mean, love?..... You don't know me. You feel something else.
That is not love.*

Like *o*, *bu* is used in a negative sentence in Extract 25. The writer declares his desire to help the woman. The unit with *bu* refers to the impossibility of doing so.

Extract 25

Kadına yardım etmek için gitmek istiyoruz ama selden geçilecek gibi değil ki. Olanaksız *bu*.

*We wanted to help her but because of the flood it was difficult to cross.
That was impossible.*

In contrast to *bu*, *o* is also used to emphasize the proposition in the previous sentence. In Extract 26, the writer states that people who live in the same country should not belittle each other. Sentence (d) gives emphasis to this proposition with “önemli olan **o**” (‘**that** is important’).

Extract 26

Bir tek konuda onur meselesi var , sanki başka konuda yok . (b) Hem kime karşı küçük düşeceğiz, düşmeyeceğiz. (c) Aynı ülkede yaşayanlar birbirine karşı küçük düşmemeli . (d) Önemli olan *o*.

*In matters of dignity and honour, there is only one issue, there is no other.
Who are we going to put down or belittle? People who live in the same country shouldn't belittle each other. That is important.*

In conclusion, in the METU corpus, *bu* is used more frequently than *o* (roughly twice as frequently), which indicates that if the writers do not want to give a negative meaning to their discourses, *bu* seems to be preferred over *o*.

3.13.1.5 Stative or Dynamic Verbs As Antecedents of *bu* and *o*. The next set of results demonstrate whether the selection of *bu* or *o* is governed by verb types: specifically, by the choice of either stative or dynamic verbs. Stative verbs indicate a state or idea, while dynamic verbs show continued or progressive actions on the part of the subject (see Schuster, 1988). Figure 51 shows the distribution of *bu* and *o* with respect to stative or dynamic verbs.

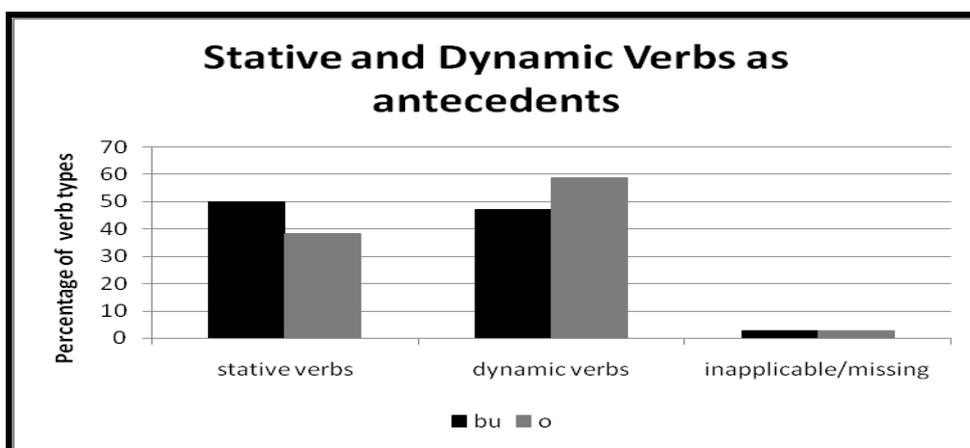


Figure 51 The distribution of *bu* and *o* with respect to stative or dynamic verbs

In 50% of occurrences, *bu* refers to clauses headed by stative verbs, while in 47.1 % of occurrences it refers to dynamic verbs. 58% of *o* occurrences refer to dynamic verbs while 38% of *o* occurrences refer to stative verbs. In Extract 27, the writer tells when the character is together with his wife, he starts to sing a song. His wife is annoyed with his singing the song. In sentence (c), *bu* refers the action of singing a song.

Extract 27

Yine de şahlaniyor aman kolbaşının kıratıı diye türküye asılıyorum.
Karım şaşkın şaşkın bakıyor yüzüme , Nereden çıktı *bu* ? der gibi

*Again I roar out and start to sing “kolbaşının kıratuu.” My wife looked at me with surprise, as if to say, how did you come up with **that**?*

Like *bu*, in Extract 28, the writer does not agree to do another person’s work. In sentence c, *o* refers to the action of writing a book.

Extract 28

Yok, artık. (b) Kitabı da ben mi yazacağım? (c) Senin görevin *o*. (d) Ben tamam dedi.

*No, that is enough. Will I write the book too? **That** is your job. I said OK.*

In the following extracts, however, both *bu* and *o* refer to stative verbs. In Extract 29, the writer mentions his/her feelings when s/he is together with a person. *Bu* refers to the state (the feelings) of the writer when s/he is together with his/her friend.

Extract 29

Parkta oldukça uzun bir zaman geçirdik.... (b) Onunla birlikte olmaktan hoşnuttum,
bu da yaşadığımız anın geçici oluşunun getirdiği hüznü az da olsa hafifletiyordu.

We spent a long time in the park. I was very pleased to be with him/her. This slightly lessened the sorrow caused by the brief nature of our meeting.

In Extract 30, the writer describes his/her garden and its beauty. *O* refers to the state of having 7 or 8 fig trees in the garden.

Extract 30

Biraz daha inildiğinde ufacık bir düzlük yerim var. Yedi- sekiz incir ağacım var orada. tek güzelliğimdir *o* . . . Çevremdeki karanlık sulara ve ufuktaki şehre ve de tüm dış dünyaya sunduğum tek güzellik

*If you went a bit further down, there was a open space. I had 7 or 8 fig trees there. **That** was the only beauty I bestowed on the outside world.*

In the light of the verb analysis, we can observe that *bu* is used to refer to both dynamic and stative verbs. On the other hand, *o* refers to dynamic verbs more frequently than to stative verbs. While the percentage of occurrences of *bu* referring to stative verbs is higher than it is for *o*, while the percentage of occurrences of *o* referring to dynamic verbs is higher than it is for *bu*.

CHAPTER 4

EXPERIMENTS WITH *THIS* AND *IT*

This chapter has nine sections. The first section presents the procedure and the results of experiments with *it* and *this* referring to a proposition or noun phrase with native speakers of English. The second section gives the details of the experiment with *it* and *this* referring to a proposition and noun phrase with a reduced context. The third section presents native speakers' referent preferences for *this* and *it* in the norming experiment. The next section details the results of equivalent experiments with non-native speakers of English. The fifth section presents the online processing of non-native speakers of English when *it* and *this* refer to a proposition and noun phrase. The sixth section discusses non-native speakers' antecedent preferences for *this* and *it* in a sentence completion task. The seventh section offers a comparison of the online processing of native and non-native speakers of English and of antecedent preferences for *this* and *it* in the sentence completion experiments. The next section outlines the post-hoc analyses of the experiments on *this* and *it* and compares the results of native and non-native speakers of English. Finally, the ninth section offers some overarching conclusions regarding the online processing of native speakers and non-native speakers and their offline referent preferences.

4.1 Experiment 1 with Native Speakers of English: *It* and *this* referring to a proposition or noun phrase within a context

Within a variety of theories and paradigms, some linguists have handled *it* and *this* as oppositional, saying that these expressions refer to different entities in discourse and thus function differently in written than in spoken discourse (Linde, 1979; Lyons, 1977; McCharty, 1995; Webber, 1988). In particular, these expressions have been treated differently because of their different antecedent selections. *It* is considered anaphoric since it signals the continuation of discourse by referring to the salient entities in subject or object roles, whereas *this* is

regarded as discourse deixis because it signals a change of focus by referring to less salient entities, such as a proposition. Bühler (1990) also made a distinction between anaphoric pronouns and deixis in terms of the references they make. While an anaphoric pronoun refers to an entity itself (Bühler calls this ‘material pointing’), deixis refers to an ontology of mental entities and representations of the mental phrases (Bühler calls this ‘reflexive pointing’). For instance, if a preceding text read ‘Alex wrote a poem’ and the writer goes on to say ‘this was difficult’, then s/he refers to a mental representation of the writing processes, such as having many drafts, spending days on a single word, checking rhymes, and so on. On the other hand, if the writer goes on to say ‘it was difficult’, s/he means the poem itself (i.e. the poem would be difficult for a reader to comprehend). With deixis, the readers and writers are inside the linguistic expressions, whereas with anaphoric pronouns, readers and writers are outside the linguistic expressions. On the basis of these theories, we hypothesized that *it* and *this* have different preferences for antecedents. We therefore tested two hypotheses:

- 1- *it* refers to an entity in the previous clause when the co-specification is between *it* and its antecedent;
- 2- *this* refers to a proposition in the previous clause when the co-specification is between *this* and its antecedent.

In order to test our hypotheses, we designed a 2×2 (variable 1 \times variable 2) within subject experiment. We had two levels of anaphor (*it* and *this*) and two levels of antecedent (proposition and noun phrase). We manipulated the antecedents of *it* and *this* by using referential expressions after *it* and *this*. Two forms of referent types were used: the noun phrase that refers to the proposition in the previous sentence (i.e.. **John drove his black Citroen from Glasgow to London. This/it was an expensive journey**) or a noun phrase that refers to the object in the previous sentence (John drove **his black Citroen** from Glasgow to London. This/it was an expensive **vehicle**).

The conditions in the experimental stimuli were as in the following examples:

Condition 1: *it* referring to the proposition

John had to be in London by 3 pm, and all the airports were closed owing to the volcanic ash, so he drove the black Citroen from Glasgow to South London. It was an expensive journey but he was happy to arrive on time.

Condition 2: *this* referring to the proposition

John had to be in London by 3 pm, and all the airports were closed owing to the volcanic ash, so he drove the black Citroen from Glasgow to South London. This was an expensive journey but he was happy to arrive on time.

Condition 3: *it* referring to the noun phrase

John had to be in London by 3 pm, and all the airports were closed owing to the volcanic ash, so he drove the black Citroen from Glasgow to South London. It was an expensive vehicle but he was happy to arrive on time.

Condition 4: *this* referring to the noun phrase

John had to be in London by 3 pm, and all the airports were closed owing to the volcanic ash, so he drove the black Citroen from Glasgow to South London. This was an expensive vehicle but he was happy to arrive on time.

We predicted that fixations would be longer when *this* referred to the NP and *it* referred to the proposition. If such longer fixations occurred, this would reinforce Webber's argument that *this* more easily refers to a proposition and *it* to a NP.

4.1.1 Method.

4.1.1.1 Participants. Forty paid native English-speaking volunteers aged 21-24 from the University of Edinburgh participated, and all were unaware of the purpose of the study.

4.1.1.2 Stimuli and Design. After *it* and *this*, adjectives (i.e. expensive, splendid, wonderful) were used because *it* and *this* are short and frequent function words, and therefore likely to be skipped. The number of characters in the adjectives was from 7 to 9. In order to resolve ambiguity, referential terms such as *journey* or *vehicle* were used immediately after the adjectives (e.g. *it/this was an expensive journey/vehicle*—referring to either *he drove the black Citroen from Glasgow to South London* Or *the black Citroen*). We were careful to select the referential expressions from commonly used words to avoid introducing extraneous processing difficulties. The lengths of the referential expressions between conditions were kept as similar as possible, in order to keep the regions of equal lengths and thus avoid extraneous differences in fixation times for the critical regions.

The experimental stimuli were introduced within suitable contexts: thus before each critical phrase (i.e. *she pruned the bonsai tree in her private office*), a contextualising phrase was given (i.e. *Alice had long, difficult meetings with prickly types from personnel and sales, so afterwards she pruned...*).

There were forty experimental sentences for each of the four experimental conditions illustrated above. Four files were constructed: in each file an item appeared in only one condition and each condition appeared an equal number of times. There were sixty filler items which were similar in length to the control sentences. In the filler items, consequent events that a character experienced were given. The texts were presented as three or four written lines. The number of characters in each line was between 68 and 77.

4.1.1.3 Procedure. One hundred and ten texts were presented in a fixed random order. Ten participants were assigned to each list. The experiment began with eight fillers to familiarize the participants with the experimental procedure. We used an Eyelink 1000 eye-tracker in a table-mounted mode and a chin rest was used to stabilize the participant's head. We tracked only the right eye but viewing was binocular. Items appeared on a monitor approximately 60 cm from the participant's eyes. To see each item, the participant looked at the blank square and in this way, before each item, the calibration of the eyes was checked by the experimenter. After reading each item, the participant pressed the X-button on the controller to see the question and then pressed the left button for the left answer and the right button for the answer on the right.

4.1.4.4 Data Analysis. Fixations of less than 80 ms and more than 1200 ms were excluded from the analysis. Texts were divided into 5 regions:

Region 1 (context & antecedent): John had to be in London by 3 pm, and all the airports were closed owing to the volcanic ash, so he drove the black Citroen from Glasgow to South London./

Region 2 (anaphora): It/This was/

Region 3 (disambiguating): an expensive journey/vehicle

Region 4 (conjunction): but he/

Region 5 (final region): was happy to arrive on time./

4.1.5 Results and Discussion. The condition-by-region means in critical regions are reported in Figures 52a and 52b, 53a and 53b and 56a and 56b. The means for each region were analyzed using repeated measures ANOVA treating anaphor and deixis (*It-This*) and types of referential expression (proposition-noun phrase) as within-participant and within-item factors. Analyses were performed on the means of each participant, collapsing over items (F1), and for each item, collapsing over participants (F2). Data for each region will be given using the following measures: First-pass reading times, second-pass reading times and regression path reading times.

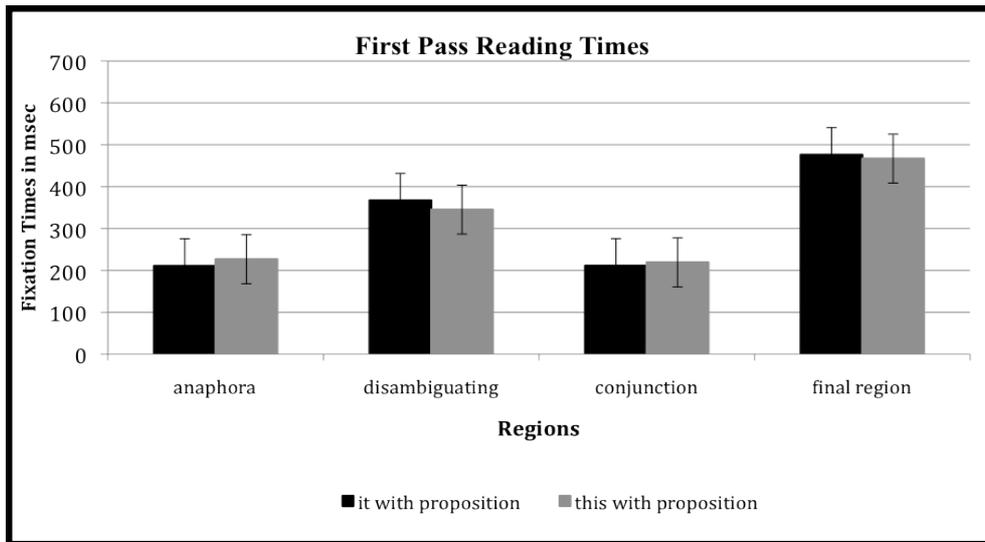


Figure 52a. First-pass reading times (in ms) across regions: proposition

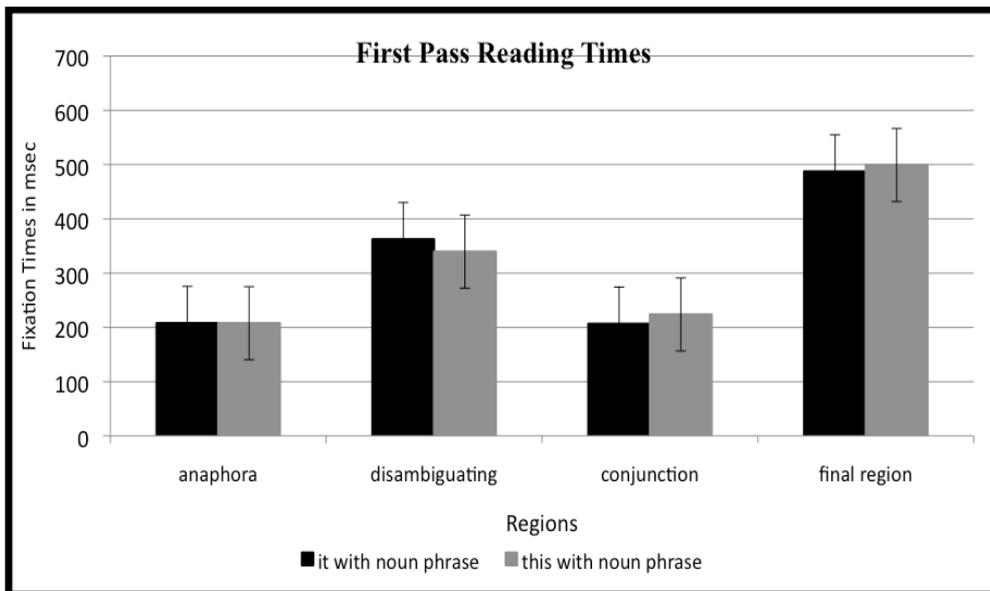


Figure 52b. First-pass reading times (in ms) across regions: noun phrase

In the first pass reading measures (see Figures 52a and 52b), in the anaphor region, there was a weak trend towards a main effect of anaphor, but this trend was approached in the analysis by participants but not by items, $F1(1,39) = 2.962$, $p = .093$; $F2(1,39) = .705$, $p > .05$. The fixations in the *this* condition were longer than in the *it* condition, $It = 209$ ms, $SE = 8.692$, $This = 264$ ms, $SE = 8.305$. In the ambiguous resolution region (i.e., an expensive journey/vehicle), a main effect of anaphor was seen, $F1(1,39) = 4.878$, $p < .05$; $F2(1,39) = 7.294$, $p < .05$; $It = 365$

ms, $SE = 12.602$, *This* = 342 ms, $SE=9.323$, but no effect of referential expression, or interaction between the two factors (both F 's <1). In the conjunction region which is immediately after the critical region, main effects of anaphor or antecedents were not seen (all F 's <1) but there was a trend towards an interaction between the two factors in the item analysis but not in the participant analysis (see Figure 2 below), $F1(1,39) = .700, p > .05$; $F2(1,39) = 3.123, p > .05$; *It* referring to the proposition = 206 ms, $SE = 8.612$; *This* referring to the proposition = 223 ms, $SE = 11.782$; *it* referring to the noun phrase = 217 ms, $SE = 8.240$; *This* referring to the noun phrase = 206 ms, $SE = 10.087$. The fixations were longer in the *it* condition referring to the noun phrase than in the *this* condition. The condition of *this* referring to the proposition took longer to read than that of *it* in the noun phrase.

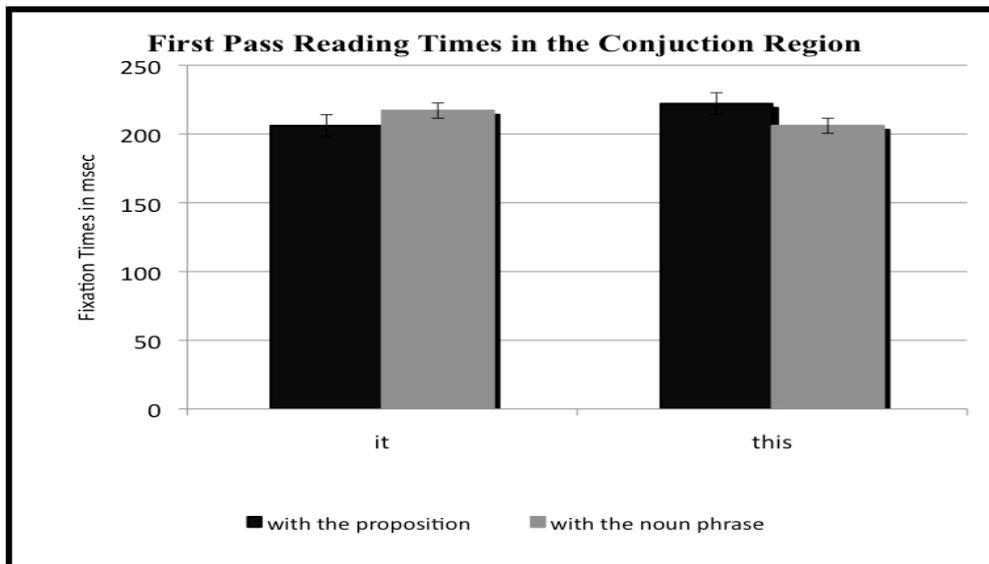


Figure 53. Mean first-pass reading times in the conjunction region

In the final region of first pass reading measures, there was an effect of antecedent, with longer fixations for the NP condition irrespective of whether *this* or *it* was used, $F1(1,39) = 3.079, p < .05$; $F2(1,39) = .081, p < .05$; *Proposition* = 472 ms, $SE = 18.193$, *Noun phrase* = 493 ms, $SE = 18.037$.

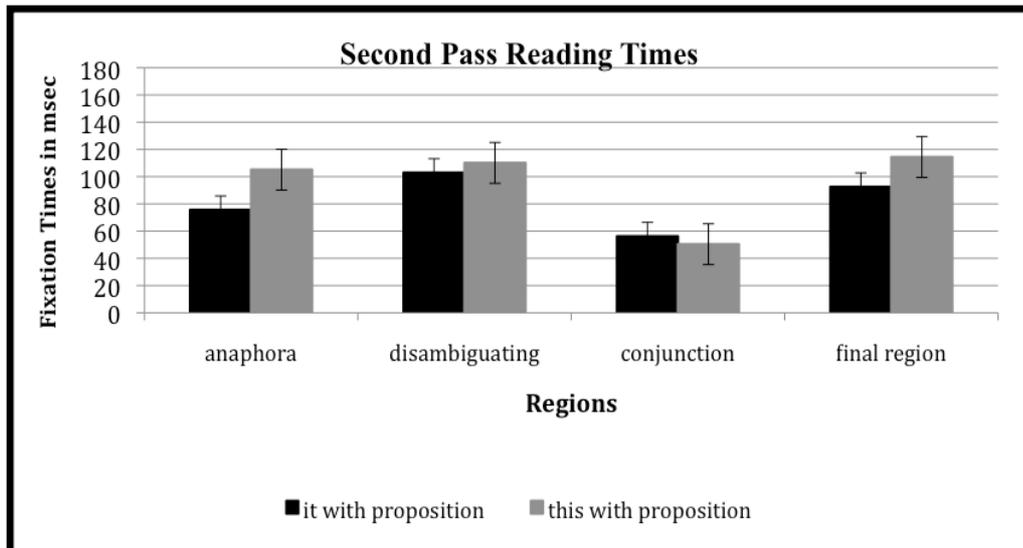


Figure 54a. Second-pass reading times (in ms) across regions: proposition

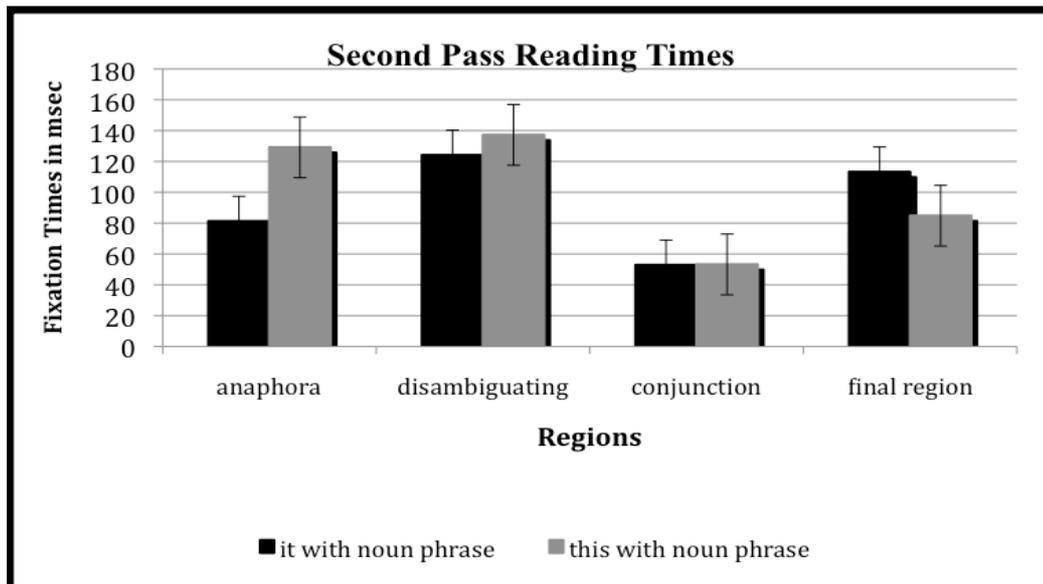


Figure 54b. Second-pass reading times (in ms) across regions: noun phrase

In the second-pass reading measures (see Figures 54a and 54b), in the context and antecedent region, a main effect of anaphor was seen in the analysis

of participants but a trend towards the main effect of anaphor in the item analysis, $F1(1,39) = 4.600, p < .05$; $F2(1,39) = 3.342, p > .05$; $It = 964\text{ ms}, SE = 143.617$, $This = 845\text{ ms}, SE = 1.500$. Re-reading times in this region were longer for the *it* conditions than for the *this* conditions. In the anaphor region, there was a main effect of anaphor with longer fixations in the *this* condition than the *it* condition, $F1(1,39) = 15.06, p < .05$; $F2(1,39) = 3.342, p < .05$; $It = 78.438\text{ ms}, SE = 12.844$, $This = 117.150\text{ ms}, SE = 15.995$. In the same region, the main effect of antecedent was seen with longer fixations in the proposition condition regardless of *it* and *this*, $F1(1,39) = 15.006, p < .05$; $F2(1,39) = 1.566, p > .05$; $Proposition = 90.363\text{ ms}, SE = 12.836$, $Noun phrase = 105.225\text{ ms}, SE = 15.108$, but no interaction was seen between the two factors (both F 's < 1). Similarly, in the ambiguous resolution region the marginal effect of antecedent was seen in the participant analysis but not in the item analysis, $F1(1,39) = 3.794, p < .05$; $F2(1,39) = 1.426, p > .05$; $Proposition = 107\text{ ms}, SE = 19.537$, $Noun phrase = 131\text{ ms}, SE = 19.955$. In the conjunction region, any main effects or interaction between the two factors were not seen (all F 's $> .05$). The second-pass reading times for the final region showed a significant interaction between anaphors and referential expressions in the participant analysis (see Figure 55 below), $F1(1,39) = 6.754, p < .05$; $F2(1,39) = 4.716, p > .05$. The fixations were longer when *this* referred to the proposition than *it* referring to the proposition. The fixations were shorter when *this* referred to a noun phrase than when *it* was referring to the noun phrase, $It\ referring\ to\ the\ proposition = 93\text{ ms}, SE = 12.635$; $This\ referring\ to\ the\ proposition = 114\text{ ms}, SE = 15.730$; $It\ referring\ to\ the\ noun\ phrase = 114\text{ ms}, SE = 17.192$; $This\ referring\ to\ the\ noun\ phrase = 85\text{ ms}, SE = 13.167$. The analysis of regression-out was carried out for this region and a trend towards an interaction between two factors was approached in the analysis by items but not by the participants, $F1(1,39) = 1.963, p > .05$; $F2(1,39) = 3.442, p = .075$. However, the trend pattern was in contrast to the pattern in the second-pass reading times, $It\ referring\ to\ the\ proposition = 26.82\%$; $This\ referring\ to\ the\ proposition = 24.49\%$; $It\ referring\ to\ the\ noun\ phrase = 22.16\%$; $This\ referring\ to\ the\ noun\ phrase = 26.53\%$ (see Figure 56 below). Total reading time measures for this region did not show any main effects (all F 's $> .05$).

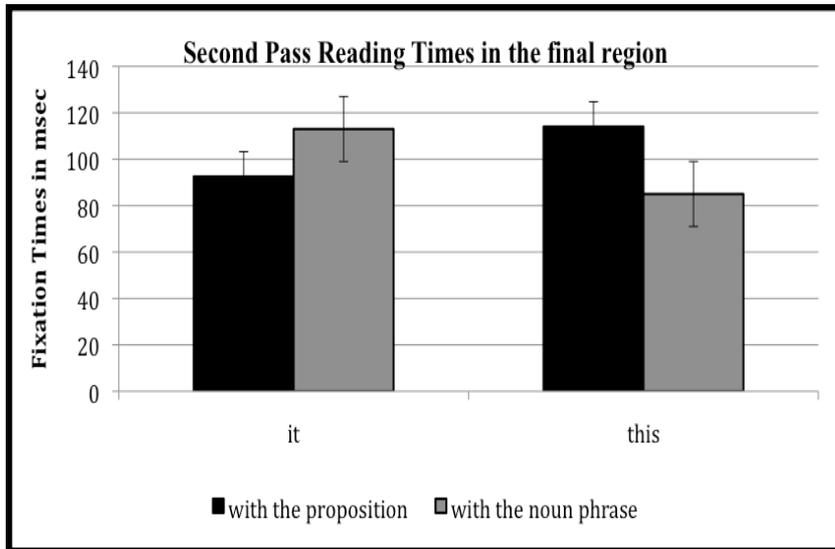


Figure 55. Mean second-pass reading times in the final region

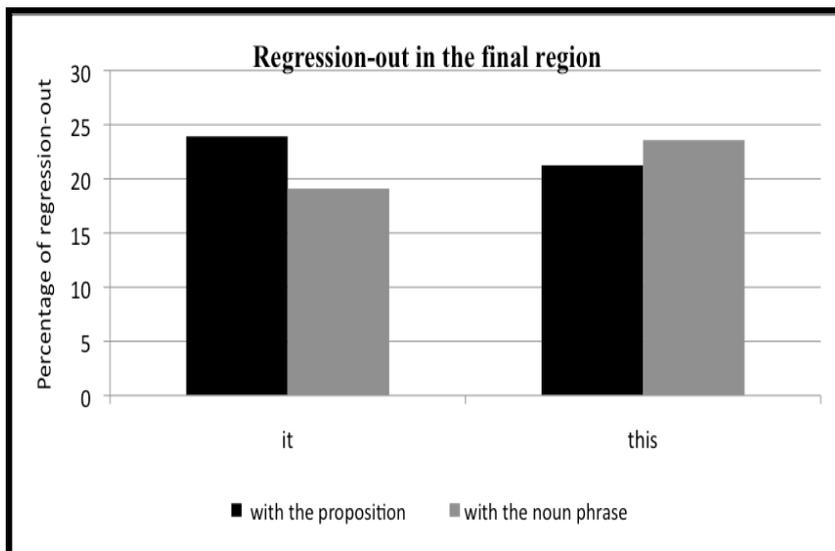


Figure 56. Percentage of regression-out in the final region

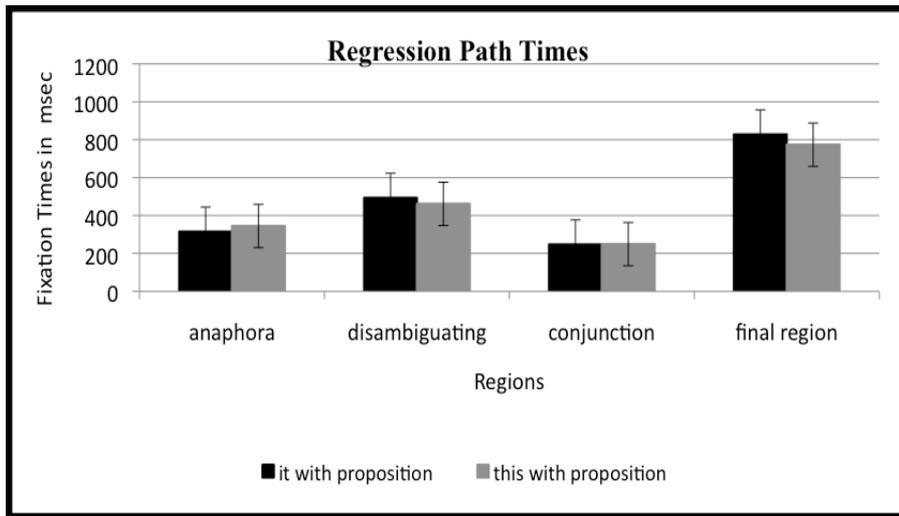


Figure 57a. Regression-path times (in ms) across regions: proposition

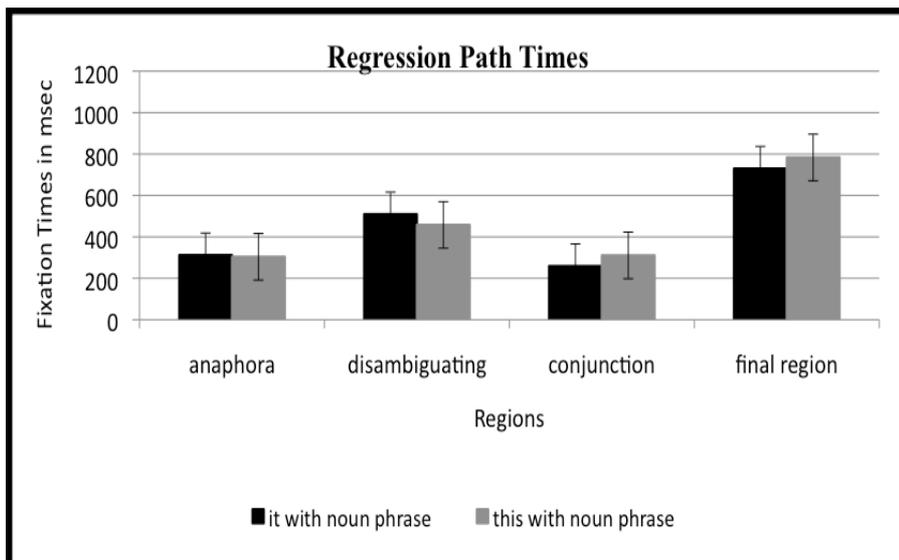


Figure 57b. Regression-path times (in ms) across regions: noun phrase

There were no significant effects in the measures of regression-path time measures (see Figures 57a and 57b) for all regions (all p 's > .05). Only in the item analysis, the ambiguous resolution region showed a marginal effect of anaphor, with longer fixations in the *it* conditions rather than the *this* conditions, $F1(1,39) = 2.212, p > .05$; $F2(1,39) = 3.033, p = .089$; $It = 501\text{ ms}, SE = 21.057$; $This = 462, SE = 18.751$. Again, in the item analysis, the same marginal effect of anaphor was

replicated in the final region, ($F1(1,39) = 1.183, p > .05; F2(1,39) = 3.124, p = .085; It = 799\text{ ms}, SE = 73.387; This = 752\text{ ms}, SE = 62.330$).

To summarize the results of Experiment 1: the fixations were longer in the *it* conditions in the first pass reading time measures of ambiguous resolution region than in the *this* conditions. The same difficulty in processing *it* was seen in the second-pass reading time measures of context and antecedent region. The participants immediately tried to resolve the antecedents of *it* as soon as they recognized that the following sentence started with the pronoun *it*. In the context and antecedent region, there was more than one noun phrase which might be the antecedents of *it* and thus the fixations were longer for *it* in this region.

Reference to the noun phrase condition led to longer fixations than reference to the proposition condition in the ambiguous resolution region of second pass reading times. One possible explanation for the difficulty in processing the noun phrase conditions might be that the participants processed the sentence as a chunk and ignored the noun phrases or minor entities in the chunk. In other words, they kept the whole event (such as pruning, or driving to London) in their short-term memory, but they did not pay much attention to minor entities that were parts of a main chunk. They kept the theme in their short-term memory, but not subcomponents of the theme. Another possible explanation might be the saliency difference between a proposition and a noun phrase. The proposition might be more salient than the entity ‘ Citroen ’ inside of a preposition.

The first pass reading times and second pass reading times revealed the interaction between anaphors and referential expressions in the final region. However, this interaction was not what we expected regarding the hypotheses in the literature presented above. Since we do not see the same pattern in the regression-out analysis and total reading time measures, we thought that the interaction was spurious. We thought that the preceding text giving the context might affect the participants’ processing since it results in a series of noun phrases that are competing with each other as potential candidates to be antecedent of the anaphora. As a result of the preceding text setting the context, the participants may read what follows simply for gist, without paying attention to the details. For all these reasons, we decided to simplify the controlled stimuli used in Experiment

1 and rerun the online reading experiment, eliminating where possible the superfluous preceding contextualising phrases. We therefore decided to run Experiment 2 in which the context was reduced.

4.2 Experiment 2 with Native speakers of English: *it* and *this* referring to a proposition and a noun phrase

The purpose of Experiment 2 was to investigate the antecedent preferences of *it* and *this* when the context given by the preceding text was reduced. We therefore kept the same design as that for Experiment 1, but context in the initial sentence was reduced. We set up four conditions:

Condition 1: *it* referring to the proposition

Charlotte wrote a book. It was a difficult job but the sales were spectacular.

Condition 2: *this* referring to the proposition

Charlotte wrote a book. This was a difficult job but the sales were spectacular.

Condition 3: *it* referring to the noun phrase

Charlotte wrote a book. It was a difficult read but the sales were spectacular.

Condition 4: *this* referring to the noun phrase

Charlotte wrote a book. This was a difficult read but the sales were spectacular

4.2.1 Method.

4.2.1.1 Participants. Forty paid native English-speaking volunteers aged 21-24 from the University of Edinburgh participated, and all were unaware of the purpose of the study.

4.2.1.2 Stimuli and Design. Unlike Experiment 1, we only shortened the contextual information at the beginning of the paragraph in order to avoid the possibility of another noun phrase or proposition as an antecedent, as in the

following stimuli used in Experiment 1:

John had to be in London by 3 pm, and all the airports were closed owing to the volcanic ash, so he drove the black Citroen from Glasgow to South London. / It/This was....

The antecedents of *it* and *this* were controlled as the proposition in the previous sentence (e.g. “driving the car from Glasgow to South London”) or the noun phrase (e.g. “black Citroen”). However, in the initial sentences used in Experiment 1 there were other noun phrases or a proposition that might be antecedents of *it* or *this*, such as:

- a) to be in London by 3 pm
- b) volcanic ash
- c) London
- d) South London or Glasgow.

Therefore, in Experiment 2, the initial sentence was shortened and introduced only a proposition, including a noun phrase. Similar to Experiment 1, the antecedents of *it* and *this* were manipulated by the co-referential expressions, which were either propositions or noun phrases. Again, as in Experiment 1 we used adjectives after anaphora because of the fact that they might be skipped. After the ambiguous resolution region, another clause with a conjunction was given in case of late ambiguous resolution.

There were 40 experimental sentences, each with the four conditions. Four files were constructed: in each file an item appeared in only one condition and each condition appeared an equal number of times. There were 60 filler items which were similar in length to the experimental stimuli. In the filler items, events that a character experienced were given. The texts were presented as one or two written lines. The number of characters in each line was between 75 and 90. *It* and *this* in the second sentence always appeared towards the middle of the line. Each participant also saw all the fillers.

4.2.1.3 Procedure. As in Experiment 1, one hundred and ten texts were given in a fixed random order, with no two experimental items appearing adjacent

to each other. Ten participants were assigned to each list. The experiment began with eight fillers, in order to familiarize the participants with the experimental procedure. We used an Eyelink 1000 eye-tracker in a table-mounted mode and a chin rest was used to stabilize the participant's head.

4.2.1.4 Data Analysis. Regions in Experiment 1 were kept the same in Experiment 2 and they were divided as follows:

Region 1 (context & antecedent): Charlotte wrote a book./

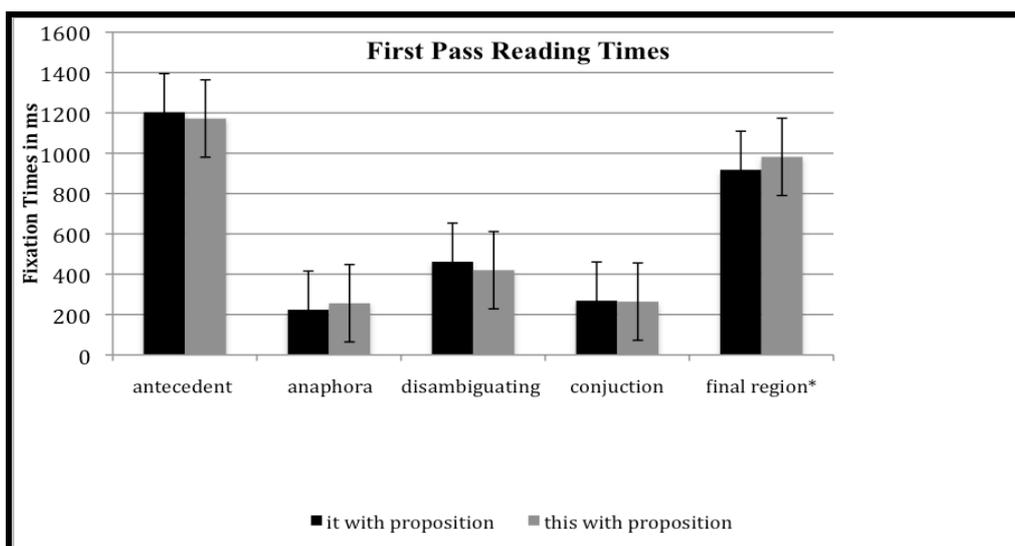
Region 2 (anaphora): It/This was./

Region 3 (disambiguating): a difficult job/read

Region 4 (conjunction): but the/

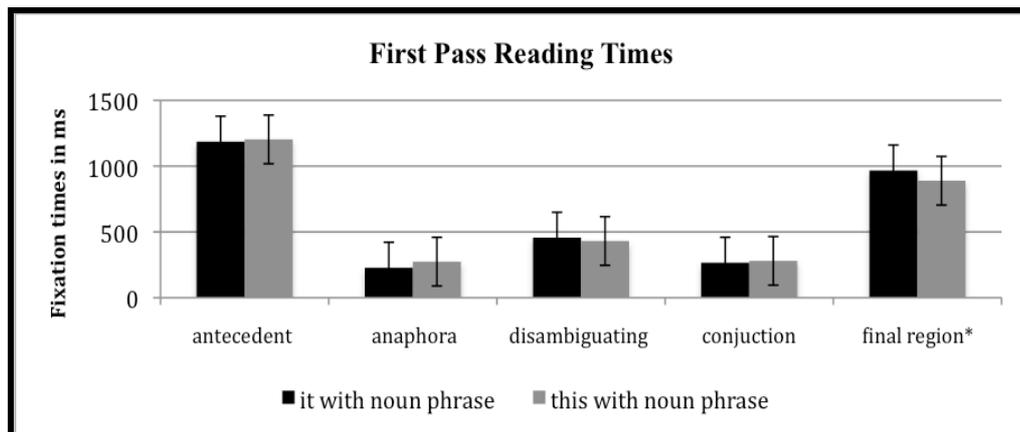
Region 5 (final region): sales were spectacular

4.2.2 Discussion and Results. As in Experiment 1 (see section 8.1), the means for each region were analyzed using repeated measures ANOVA treating anaphors (*it-this*) and types of antecedents (proposition-noun phrase). We begin with the first-pass reading time results.



* $p < .05$

Figure 58a: First-pass reading times (in ms) across regions: proposition



* $p < .05$

Figure 58b: First-pass reading times (in ms) across regions: noun phrase

First pass reading time measures (see Figures 58a and 58b) revealed a significant interaction between anaphora and antecedent in the final region in the item analysis and a trend in the participant analysis (see Figure 59 below), $F1(1,39) = 2.930$, $p = .095$; $F2(1,39) = 8.042$, $p = .007$, *It referring to the proposition* = 918 ms, $SE = 31.395$, *It referring to the noun phrase* = 967ms, $SE = 41.826$, *This referring to the proposition* = 982 ms, $SE = 46.615$, *This referring to the noun phrase* = 889 ms, $SE = 34.890$. T-test results showed only a marginal difference between *this* referring to a proposition and the noun phrase in t1 and in t2 results this difference reached a significance, *Thispro/thisnp t1 (39) = 1.783*, $p = .083$; *Itpro/itnp t1(39) = -837*, $p = .386$; *Thispro/thisnp t2 (39) = 2.312*, $p = .026$, *Itpro/itnp t2(39) = -1.222*, $p = .229$. The trend pattern in the final region was in the same direction in the first pass reading times and second pass reading times of Experiment 1. Fixations were longer in the *this* condition when *this* referred to the proposition. This finding was also supported in the t2 results. Participants preferred *it* referring to the proposition. These results were significant only in F2 and t2 analyses and they were not what the literature assumed.

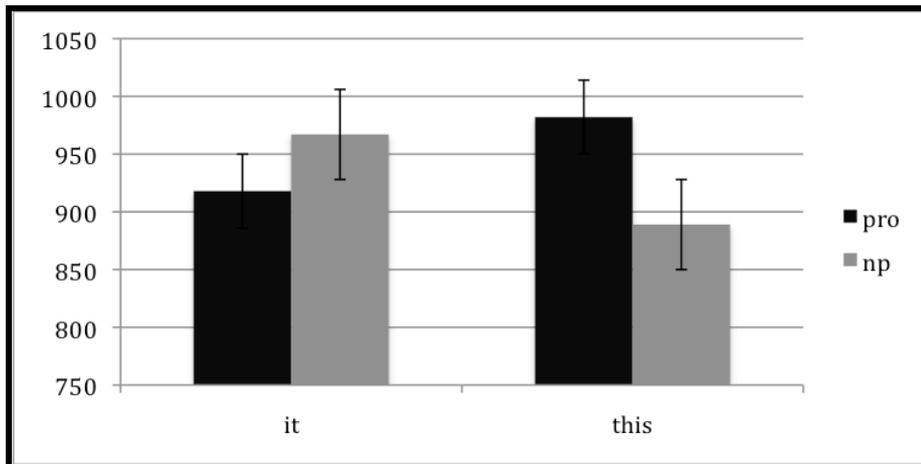


Figure 59. Means of first-pass reading times in the final region

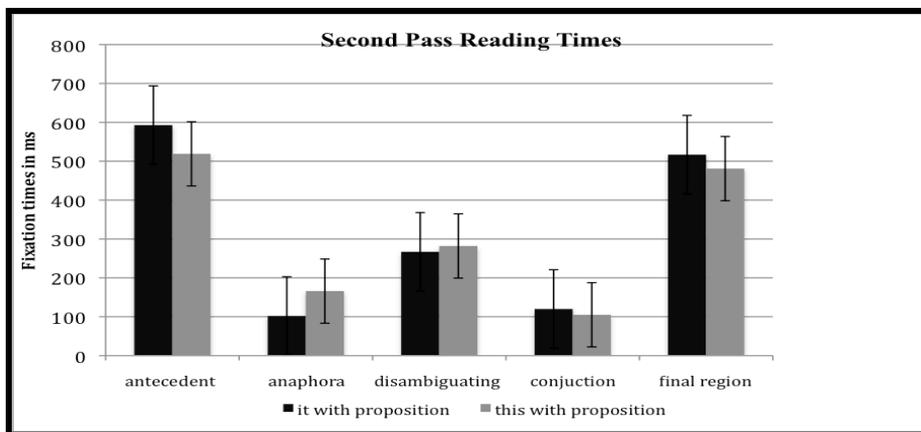


Figure 60a: Second-pass reading times (in ms) across regions: proposition

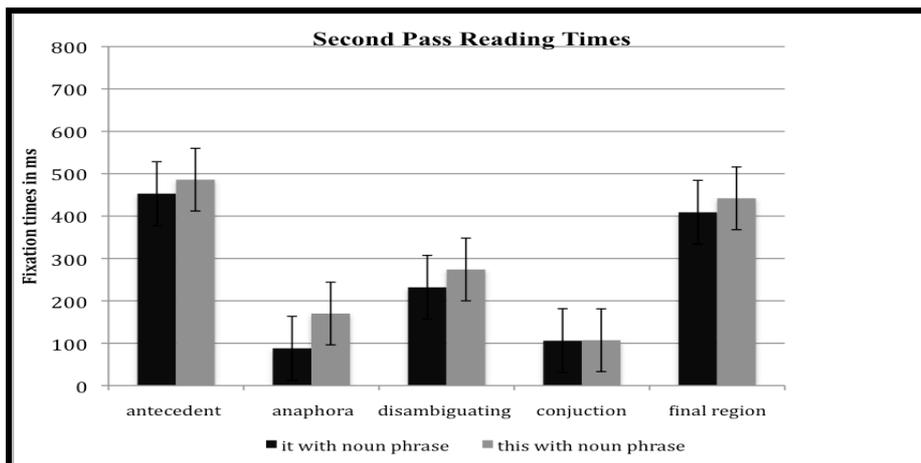
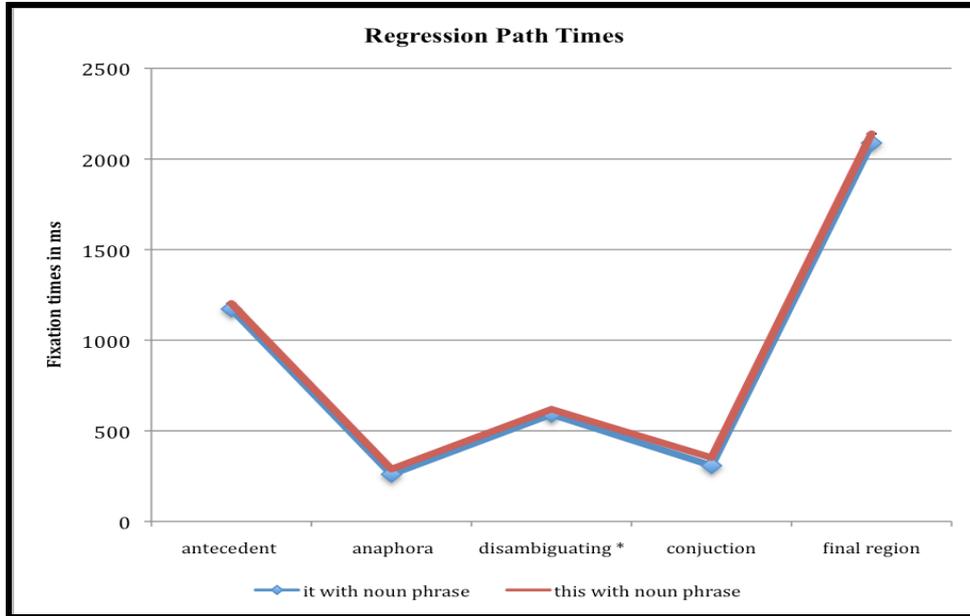


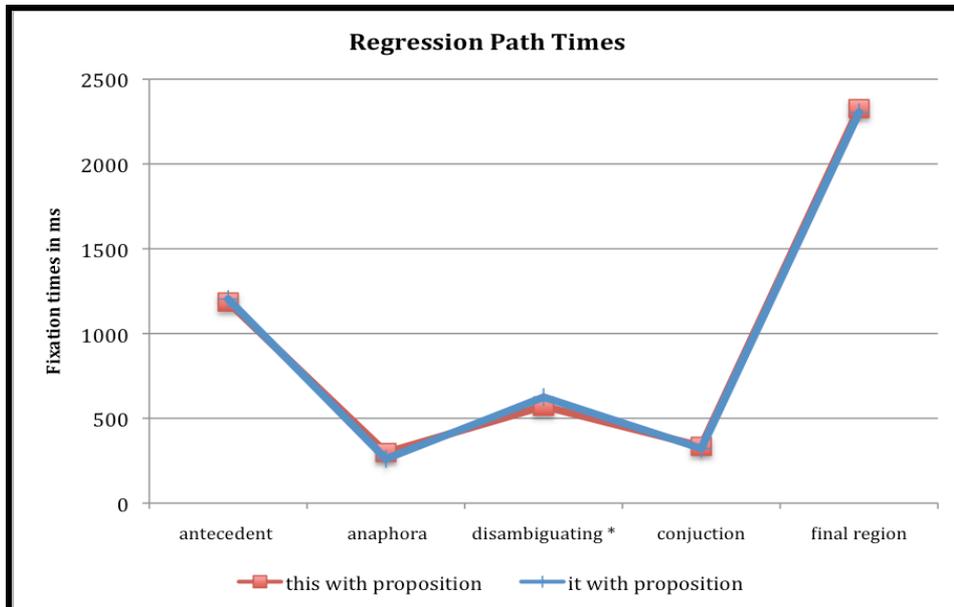
Figure 60b: Second-pass reading times (in ms) across regions: noun phrase

In second pass reading times (see Figures 60a and 60b), the main effects and the interaction between anaphora and antecedent types did not reach significance (all F 's < 2.1, all p 's > .05).



* $p < .05$

Figure 61a: Regression-path times (in ms) across regions: noun phrase



* $p < .05$

Figure 61b: Regression-path times (in ms) across regions: proposition

In regression-path time measures (see Figure 61a and 61b), the main effects and interaction between the factors were not seen in the antecedent, anaphora, conjunction and final regions (all F 's < 2.1, all p 's > .05). However, the regression-path times of the disambiguating region revealed a significant interaction between the two experimental factors in the analysis of participants but not in the item analysis (see Figure 62), $F1(1,39)=4.380, p=.043$; $F2(1,39) = 2.333, p=.135$; *It referring to the proposition* = 625 ms, $SE=30.828$, *It referring to the noun phrase* = 591.925ms, $SE=27.386$, *This referring to the proposition* = 571ms, $SE=31.570$, *This referring to the noun phrase* = 619.25 ms, $SE=34.759$. T1-test result also showed a significant difference between *it* referring to a noun phrase and a proposition, $Itpro/itnp\ t1(39) = 2.477, p= .018$; $Itpro/itnp\ t2(39)= 1.650, p= .106$; $Thispro/thisnp\ t1(39)= -956, p= .345$; $Thispro/thisnp\ t2(39)= -815, p= .420$. The participant analysis of regression path times in the disambiguating region demonstrated that the references of *this* to the proposition condition were preferred over those of *it* and the references of *it* in the noun phrase condition were much more preferred than those of *this*. The pattern in the region is not the same in the first pass reading measures.

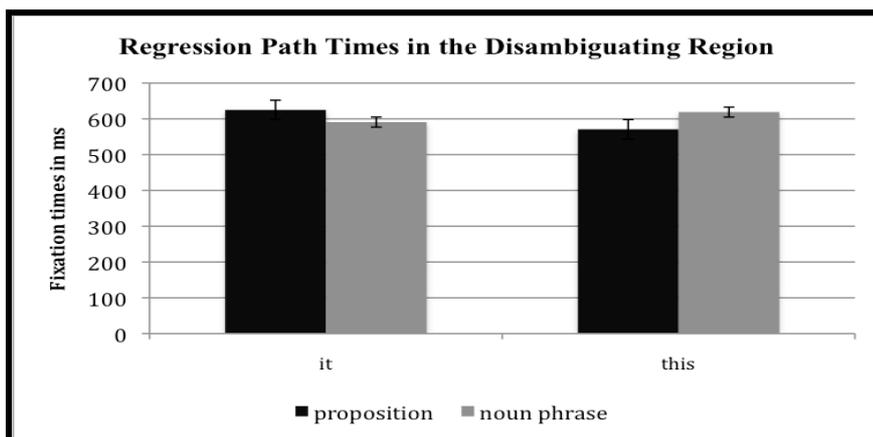


Figure 62. Means of regression-path times in the disambiguating region

To summarize the results of Experiment 2: we saw different patterns in different regions of eye measures. In the final region of the first pass reading

times, the fixations were longer when *this* referred to the proposition and *it* referred to the noun phrase. Though the t-test results and item analyses did not reach significance, the reason why we had a different findings from the literature in this measures the nature of first pass reading time.

The participant analysis of the regression-path times in the disambiguating region showed that the fixations where the *this* condition referred to the noun phrase were longer than those where the *it* condition did so. However, this result is only significant in the participant analysis but not in the item analysis or t2 results. Therefore, all our interpretations below are still hypothetical.

The asymmetrical antecedent preferences of *this* and *it* we saw match the predictions based on Webber's findings from the corpus study and the results of the experimental studies (Brown-Schmidt et.al. 2008; Kaiser et.al 2008 and Fossard et al. 2011). *This* did not prefer the second noun phrase as an antecedent, although it is a non-focused entity, which was contradictory to McCarthy's assumptions but supports Passoneous's claim that referential deictic expressions prefer a non-subject entity as an antecedent. This indicates that the antecedent preferences of the anaphoric expressions may be hierarchical, as proposed in Centering theory (CT), and the weight of referent choices changes from one anaphoric expression to another, as in Kaiser et al.'s multi-funtional factor. However, it is worth noting that the grammatical hierarchy in CT only includes noun phrases. We can also propose that proposition references for *this* are more marked than second noun phrase references in terms of multi-functional approaches. This supports the predictions of Sag and Hankamer about the proposition or interpretation's being more prominent than the linguistic entity as an antecedent. Gundel et.al (2003) also proposed that *it* prefers the proposition as antecedent only if *it* refers to an event or situation. In our experiment, we saw that its references to noun phrases are much more prominent than its references to propositions.

We then decided to conduct a production experiment to explore which parts of the text the participants would refer to with *this* and with *it* when the stimuli in Experiment 2 were given to them. In order to test this, we conducted the following follow-up experiment.

4.3 Experiment 3 with Native Speakers of English: Norming Experiment

Participants were given the same controlled sentences used in Experiment 2, (see section 8.1) but, unlike in Experiment 2, the second part of the sentences, after *it* or *this*, left blank (see sample stimuli below). The participants were asked to complete the sentences in a manner consistent with the first part of the text.

Sample Stimuli

- 1- Alice pruned the bonsai tree. It/this.....
- 2- The Duchess auctioned a piece of her lingerie. It/this.....

4.3.1 Method.

4.3.1.1 Participants. Sixteen paid native English-speaking volunteers aged 21-24 from the University of Edinburgh participated, without being informed of the purpose of the study. They had not participated in the previous experiments.

4.3.1.2 Materials and design. There were 40 experimental and 60 filler sentences. Two versions of each sentence and two files were constructed. In each file, each condition appeared only once.

4.3.1.3 Procedure. The experiment was run in two sessions. Eight participants were accepted for each session and asked to complete the rest of the given sentences in 60 minutes.

4.3.1.4 Data Analysis. Continuations were categorized in accordance with the types of antecedents defined in the first and second experiment (see the categories for coding below). Ambiguous sentence completions and cases of illegible handwriting were referred to a native speaker of English. After the

discussion of these completions with the native speaker, if the antecedents of *it* and *this* were not clear, they were handled under the category of ‘others’.

The categories for coding the antecedents of it and this

1. If *it* or *this* referred to the proposition, then its antecedent was coded as the proposition.

- Daniel climbed Mount Ventoux. It didn't take him as long as he expected.
- Bernadette hurled her computer. *This* caused a few people to stare at her in the office.

2. If *it* or *this* referred to the noun phrase, then its antecedent was coded as the noun phrase.

- Alice rented an allotment. *It* was a place where she could gather her thoughts.
- Bernadette hurled her computer. *This* was the second one she had smashed against the wall in her frustration.

3. Other categories:

- If the antecedents of *it* or *this* were not clear, if the new discourse focus was introduced by the use of *it* or *this*, if *this* was used as a pronominal (i.e.. this book), if *it* or *this* referred to the entity in the following part of the text (i.e.. as a cataphoric function), or if incoherent or ungrammatical sentences resulted, the sentences was coded as ‘other categories’.

4.3.2 Results and Discussion. A linear mixed model was created to model the relative proportion of references to the proposition (writing a book) and the noun phrase (a book). We set up the model to treat references to the proposition and noun phrase as response variables. This analysis was based on 2 (responses: proposition × noun phrase) × 2 (types of anaphora: it × this). The lmer analysis showed that there were more references to the proposition for *this* than for *it*, $Z = -$

9.679, $p < .05$; *It* = 15.63 %, *This* = 30.10 %, while the cases of *it* referring to the noun phrase were higher than those of *this*, *It* = 31.88%; *This* = 12.66%. The difference between *it* referring to a proposition and its referring to a noun phrase was significant, $It_{pro}/it_{np} t(16) = 5.133, p = .000$; $This_{pro}/this_{np} t(16) = -6.006, p = .000$. The pattern is the same as the interaction pattern in the participant analysis of regression-path times in Experiment 2 and the integration pattern shown by the regression-out in Experiment 1. Therefore, we propose that *this* was preferred over *it* in referring to the proposition, whereas *it* was preferred over *this* when referring to the noun phrase.

The following figure (Figure 63) demonstrates which parts of the previous sentence were selected as antecedents of *it* and *this* by the participants in the experiment. We handled 9.69 % of *it* and *this* uses under the other category and excluded the other category in the analysis (see Figure 64).

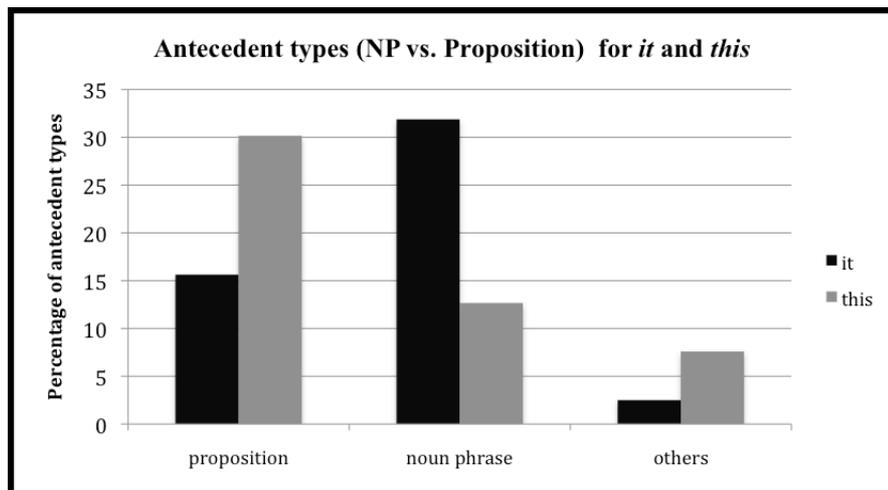


Figure 63. Percentage of antecedent types used with *it* and *this*

4.3.2.1 Other Categories in the norming experiment. In the some continuations the referents of *it* and *this* were ambiguous or not given in the previous parts of the text. It is worth mentioning that such usages suggest an overall view about the usage of *it and this*. The following Figure 64 gives the percentages of other categories in the production experiment. The percentage for *it* and *this* were calculated according to their distribution in their own category.

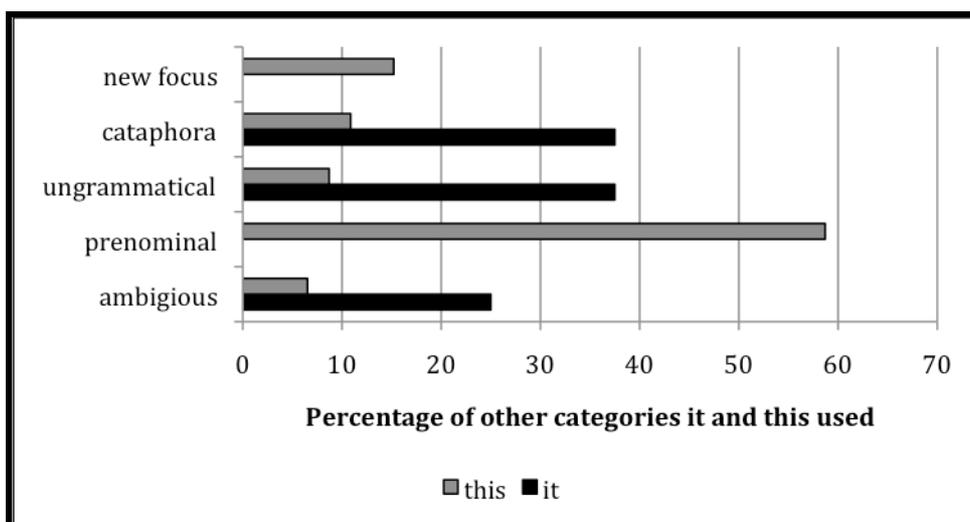


Figure 64. Percentage of other categories *it* and *this* used

Ambiguous cases in which *it* might be taken to refer to either the proposition or the noun phrase were more common than such cases with *this*, $It=25\%$, $This=6.52$. The higher number of ambiguous uses of *it* was unexpected for us. In 58.2 % of uses of *this*, *this* was used as a prenominal before the noun phrase in order to point to the noun phrase in the previous sentence (i.e. this book). 37.5 % of uses of *it* were ungrammatical, as opposed to only 8.7% of uses of *this*. 37.5 % of the uses of *it* were cataphoric, while in 10.87% of cases, *this* was used cataphorically. 15.22% of the uses of *this* introduced a new entity which had not been mentioned in the previous part of the text, but *it* was not used in such a way.

To summarize, in the norming experiment, *this* was mostly used to refer to the proposition in the previous sentence, whereas *it* was used to refer to the noun phrase. The native speakers' preferences are very clear in the offline experiment, whereas those in online Experiments 1 and 2 (see section 8) are not consistent across eye-measurements, nor are they consistently significant in both F1 and F2 analyses. Therefore, we decided to run a post-hoc analysis and compare the results of the native speakers' offline task with the online results to see whether a trend would emerge that might show us native speakers' preferences. Before moving to the post-hoc analysis, however, the following part will present the results of non-native speakers in the same experiments.

4.4 Experiment 4 with Turkish Non-Native Speakers of English: *it* and *this* referring to a proposition or noun phrase within a small context

In Experiment 1, we hypothesized that Turkish non-native speakers might have different antecedent preferences for *this* and *it* from those of native speakers of English, since the Turkish language has a different deictic system from English. To test our hypothesis, we used the same stimuli used in Experiment 2 in section 8.1. The conditions we used with non-native speakers of English were as follows:

Condition 1: *it* referring to a proposition

Semiramis wrote a book. It was a difficult job but the sales were spectacular.

Condition 2: *this* referring to a proposition

Semiramis wrote a book. This was a difficult job but the sales were spectacular.

Condition 3: *it* referring to a noun phrase

Semiramis wrote a book. It was a difficult read but the sales were spectacular.

Condition 3: *this* referring to a noun phrase

Semiramis wrote a book. This was a difficult read but the sales were spectacular.

In contrast to Experiment 2 with native speakers of English, instead of foreigner proper names (i.e Charlotte) we used Turkish names (i.e Semiramis). Some vocabulary with which Turkish students might not be familiar was simplified (e.g. ‘scaled the crag’ became ‘climbed the rock’).

4.4.1 Method.

4.4.1.1 Participants. Forty paid Turkish non-native speakers of English participated in the experiment. They started to learn English at 12 and were all third or fourth year students in the Foreign Language Teaching Department at METU. All of them took the METU proficiency exam at the start of their university education and the mean of their scores from the exam was 80, which is equal to 102 TOEFL and 7.5 IELTS. Nearly all of them were not proficient in any other languages, while a few of them defined themselves as pre-intermediate

or beginner level in another language. Those students were asked in which non-native language they felt most proficient ('English', or 'any other language?'). Their answer was in every case 'English': they all also said that they use 'English' more often than any other language apart from Turkish for chatting, language classes, watching films, etc. Therefore, we also included those students' data in the analysis. The data from students who had been abroad at any time in their life for more than three months were excluded in the data analysis.

4.4.1.2. Procedure. We used an identical procedure to that described for Experiment 2 in section 4.2.

4.4.2 Results and Discussion. The condition-by-region means in the critical regions are reported in Figures 65a and 65b, and 66a and 66b. The means for each region were analyzed using repeated measures ANOVA treating anaphor and deixis (*It-This*) and types of referential expression (proposition-noun phrase) as within-participant and within-item factors. Data for each region will be given using the following measures: first-pass reading times, second-pass reading times and total reading times. First pass reading time measures (see Figures 65a and 65b), showed a main effect of antecedent, $F1(1,39)= 7.288, p<.05; F2(1,39) = 4.638, p<.05; Proposition = 343ms, SE =12.246, Noun phrase = 363ms, SE=15.225$. The fixations were longer in the conditions where *this* and *it* referred to a noun phrase. In this region, we see the main effect of anaphora but this is because of the length difference between *this* and *it*, $F1(1,39)= 27.243, p<.05; F2(1,39) = 57.920, p<.05; It = 316 ms, SE =11.855, This =390 ms, SE=17.699$. In the final region, the main effect of antecedent was seen again and the fixations were longer when the deictic expressions referred to a noun phrase, $F1(1,39)=5.574, p<.05; F2(1,39) =4.638, p<.05; Proposition = 1510 ms, SE =59.597, Noun phrase =1633 ms, SE= 59.462$. We did not see any interaction between the factors in the first-pass reading times (all p 's $>.05$).

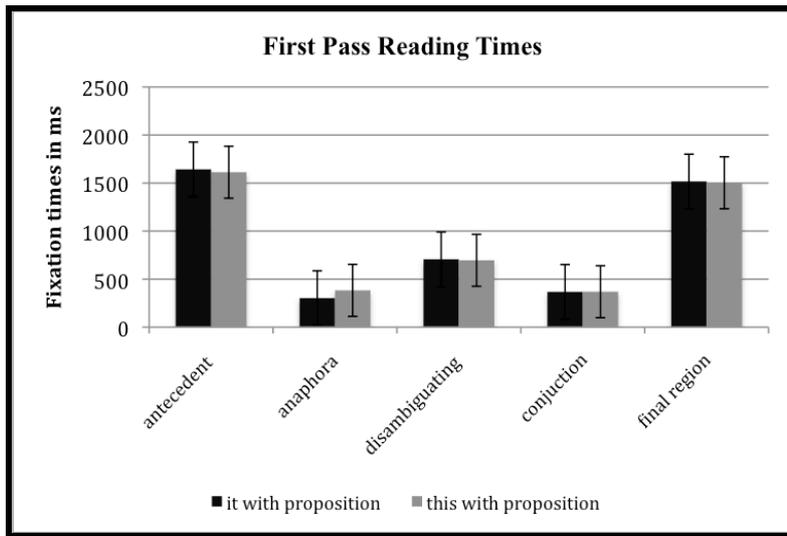


Figure 65a. First-pass reading times (in ms) across regions: proposition / .jnu

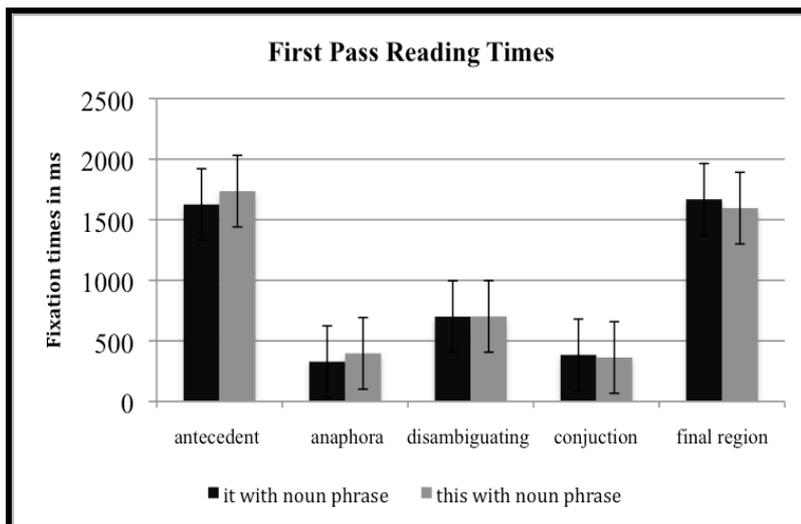
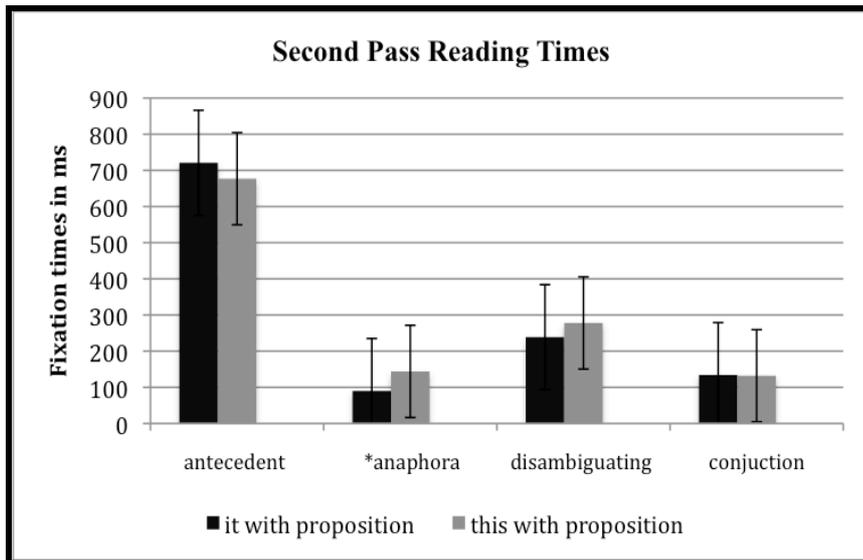
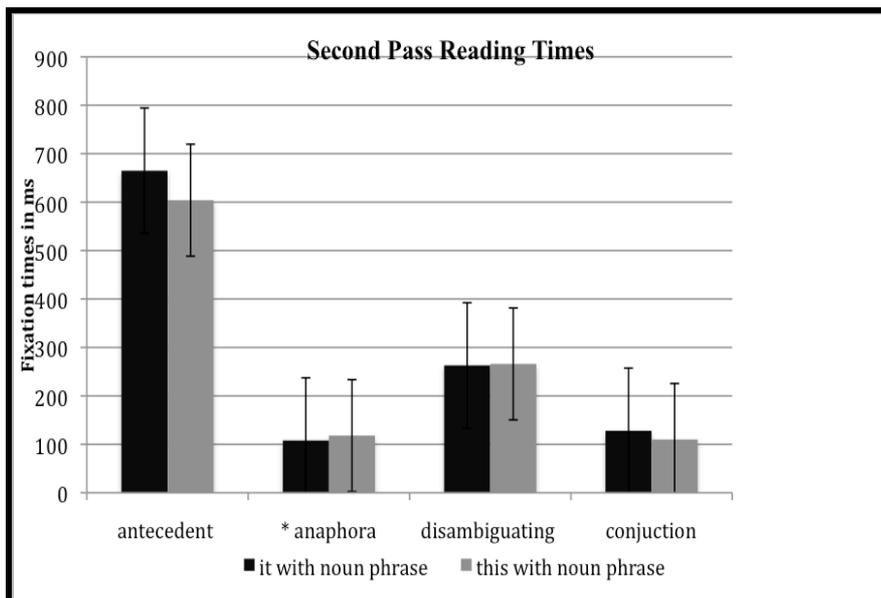


Figure 65b. First-pass reading times (in ms) across regions: noun phrase



*p<.05

Figure 66a. Second-pass reading times (in ms) across regions: proposition



*p<.05

Figure 66b. Second-pass reading times (in ms) across regions: noun phrase

The second-pass reading measures (see Figures 66a and 66b) revealed a significant interaction between anaphora and antecedent types in anaphora region, $F(1,39) = 5.211, p=.028$; $F(1;39)= 4.674, p=.037$; *It referring to proposition =*

90.825 ms, SE= 14.834; *It* referring to a noun phrase 108.750 ms, SE= 17.803; *This* referring to proposition= 144.100ms, SE= 18.701; *This* referring to a noun phrase = 118. 850, SE= 16.114. Fixations were longer when *it* referred to a noun phrase than when it referred to a proposition. Fixations were longer when *this* referred to a proposition. We also checked the difference between *it* referring to a proposition and a noun phrase but in t1 and t2 results, a significant difference was not apparent, *Itpro/np t1* (40)= -1.381, $p=.175$; *Itpro/np t2*(40)=-.849, $p=.401$. A significant difference between *this* referring to a proposition and a noun phrase was seen in t1 and was marginally present in t2 results, *Thispro/np* = 2.092, $p=.043$; *Thispro/np* 1.908, $p=.064$.

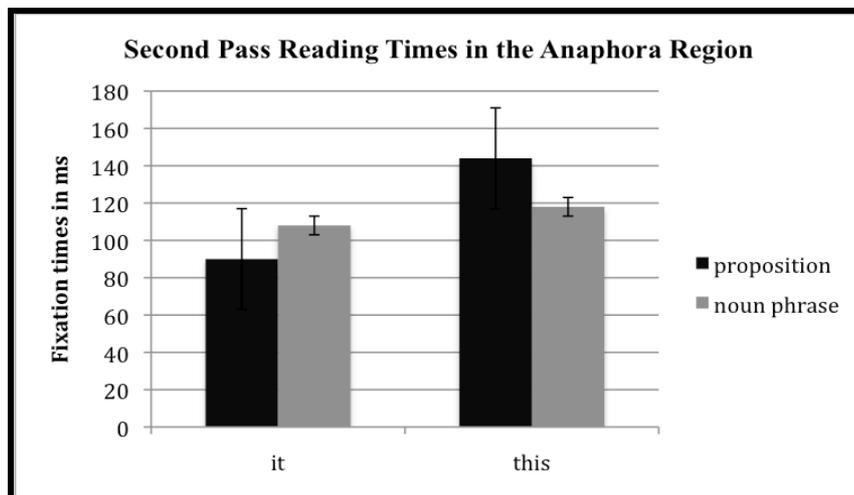
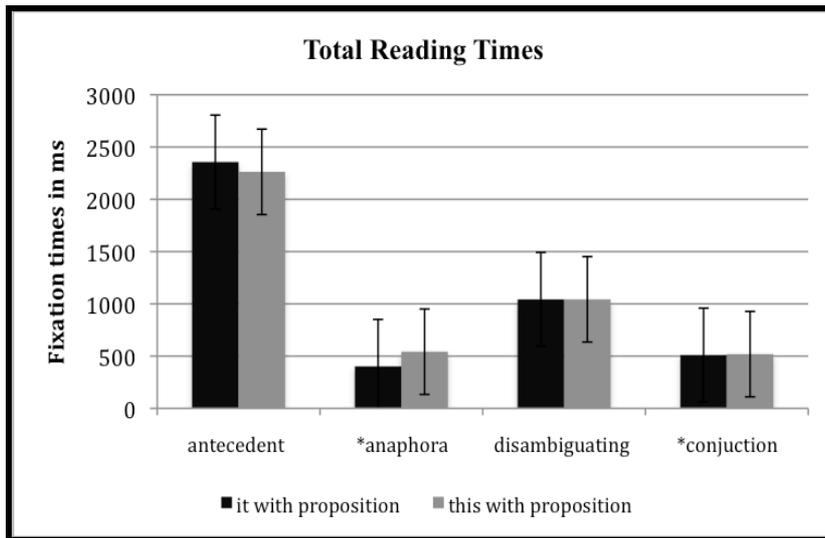
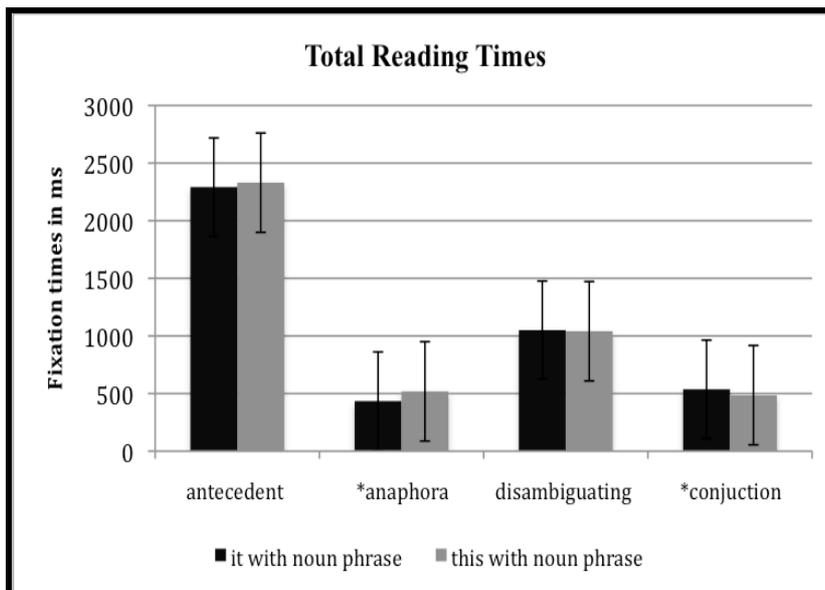


Figure 67. Means of second pass reading times in the anaphora region



*p<.05

Figure 68a. Total reading times (in ms) across regions: proposition



*p<.05

Figure 68b. Total reading times (in ms) across regions: noun phrase

In total reading time measures (see Figure 68a and 68b) main effects were not seen, but a significant interaction between anaphora and antecedent was evident in the anaphora and conjunction region. In the anaphora and conjunction regions, the interaction between the two factors was significant in the participant analyses and

nearly significant in the item analyses (see Figure 69 below). *Anaphora region*: $F1(1,39) = 5.646, p=.023$; $F2(1;39)= 3.727, p=.061$; *Conjunction region*: $F1(1,39) = 6.136, p=.018$; $F2(1;39)= 3.892, p=.056$. In both regions, fixations were longer when *it* referred to a noun phrase and *this* referred to a proposition. References of *it* to a proposition were preferred by the non-native speakers, which is also supported by the t1 result of anaphora region, $Itpro/np t1 (39)= -2.146, p=.038$; $Itpro/np (t2)= -2.016, p=.051$. The same preferences of *it* were also seen in the conjunction region of total reading times but t-tests results were not significant.

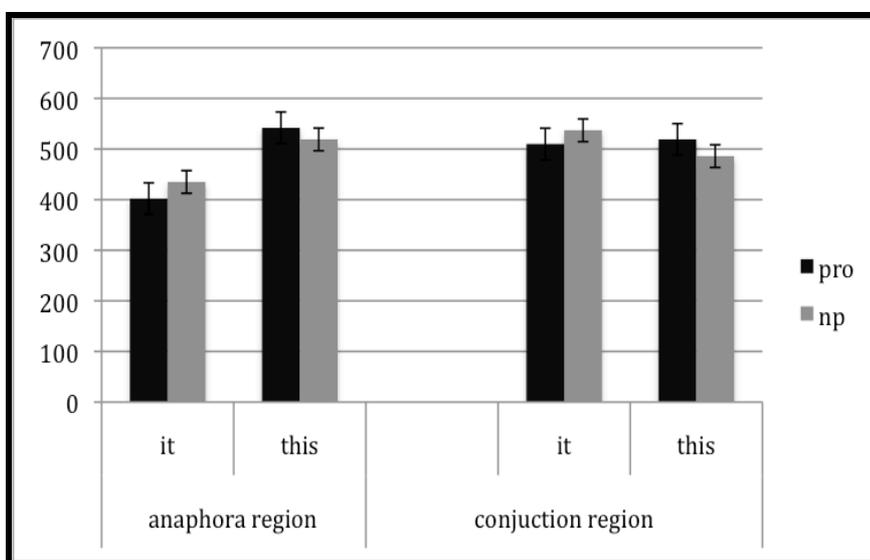


Figure 69. Mean of total reading times in the anaphora and conjunction regions

References of *this* to a noun phrase were preferred by the non-native speakers of English but the difference between *this* referring to a noun phrase and proposition was only significant in the t1 of conjunction region and marginal in t2 of the same region, $Thispro/np t1(39) = 2.049, p=.047$; $Thispro/np (t2) 1.794, p=.081$. We also saw the pattern in the anaphora region but t-test results were not significant, t-tests in anaphora region, $Thispro/np t1(39) = 1.429, p=.161$; $Thispro/np t2(39) 925, p=.361$.

Briefly, the interaction pattern in the anaphora region of second pass and total reading times and the conjunction region of total reading times showed that the non-native speakers have different antecedent preferences for *this* and *it*. Their

preferences were the opposite of those predicted by the literature. Though the theories conflict in themselves, the common assumption in the corpus studies is that the use of *it* with a noun phrase and the use of *this* with a proposition are preferred (McCarthy, 1995; Passonneau, 1989; Webber, 1988). However, the online reading experiment with non-natives showed that the non-native speakers of English have a tendency to prefer *it* with a proposition and *this* with a noun phrase. Possible reasons might be their interlanguage grammar, and the different deictic system in their mother tongue. When we translated the experimental item into Turkish (see below for Turkish translations of each condition), ‘*it*’ could be translated as pro-drop, or ‘*bu*’ was used instead of *it* at the end of the sentence (see the translation of conditions 1 and 3). *Bu* at the end of the sentence behaves like a focalizer. On the other hand, when *this* was translated into Turkish, it became ‘*bu*’ at the beginning of a sentence which functioned differently from *pro-drop* and *bu* which corresponded to ‘*it*’. In English, we have two different anaphoric expressions which are assumed to function differently, whereas their Turkish equivalent is only one anaphoric expression (‘*bu*’) which functions slightly differently.

Condition 1

Charlotte wrote a book. **It** was a difficult job but the sales were spectacular.

Charlotte yazdı bir kitap. Ø ti bir zor iş ama Ø satış-lar di harikulade(y). (literal translation)

a- Charlotte bir kitap yazdı. Ø Zor bir işti ama satışlar harikuladeydi. (actual translation)

b- Charlotte bir kitap yazdı. Zor bir işti **bu** ama satışlar harikuladeydi. (actual translation)

Condition 2

Charlotte wrote a book. **This** was a difficult job but the sales were spectacular.

Charlotte yazdı bir kitap . **Bu** ti bir zor iş ama Ø satışlar di harikulade(y). (literal translation)

Charlotte bir kitap yazdı. **Bu** zor bir işti ama Ø satışlar harikuladeydi. (actual translation)

Condition 3

Charlotte wrote a book. **It** was a difficult read but the sale-s were spectacular.

Charlotte yazdı bir kitap Ø -ti- bir zor okunması ama Ø satış-lar di harikulade(y). (literal translation)

a- Charlotte yazdı bir kitap. Ø Okunması zor bir kitaptı ama satışlar harikuladeydi. (actual translation)

b- Charlotte yazdı bir kitap. Okunması zor bir kitaptı **bu** ama satışlar harikuladeydi. (actual translation)

Condition 4

Charlotte wrote a book. **This** was a difficult read but the sales were spectacular.

a- Charlotte yazdı bir kitap. **Bu** ti bir zor okunması **kitap** ama Ø satış-lar di harikulade(y). (literal translation)

b- Charlotte yazdı bir kitap. **Bu** okunması zor bir **kitaptı** ama satışlar harikuladeydi. (actual translation)

4.5 Experiment 5 with Non-Native Speakers: Sentence Completion Experiment

In the online reading experiment, we found that Turkish non-native speakers had a tendency to prefer *it* when referring to a proposition and *this* when referring to a noun phrase. A norming experiment was therefore run to investigate whether the non-native speakers would show the same antecedent preferences in the offline experiment, too. In order to explore their preferences, we used the same stimuli as in Experiment 4 in section 4.4 (see sample stimuli below)

Sample stimuli

- 1- The Duchess auctioned a piece of her lingerie. It/this.....
- 2- Aylin pruned the bonsai tree. It/this.....

4.5.1 Method.

4.5.1.1 Participants. Sixteen paid Turkish non-native English speaking volunteers aged 21-24 from Middle East Technical University participated, without being informed of the purpose of the study. They had not participated in the first Experiment.

4.5.1.2 Materials and Design. There were 40 experimental and 60 filler sentences. Two versions of each sentence and two files were constructed. In each file, each condition appeared only once.

4.5.1.3 Procedure. The experiment was run in four sessions. Eight participants were accepted for each session and asked to finish the task in 120 minutes. The participants were allowed to use a dictionary but none of them needed to use it.

4.5.1.4 Data Analysis. Continuations were categorized in accordance with the types of antecedents defined in Experiment 1 (i.e. proposition or noun phrase). Ambiguous sentence completions and cases of illegible handwriting were referred to another colleague. If the antecedents of *it* and *this* were not clear after discussions with a colleague, they were handled under the category of ‘others’.

4.5.2 Results and Discussion. A linear mixed model fit by LMER was performed to model the relative proportion of references to the proposition (writing a book) and the noun phrase (a book). We set up a model to treat references to the proposition and noun phrase as response variables. This analysis was based on 2 (responses: proposition × noun phrase) × 2 (types of anaphora: it ×this). The linear mixed effects regression analysis showed that there were more references to the noun phrase for *it* than for *this*, $Z = -3.538$ $p < .05$; $It = 59.375\%$, $This = 42.81\%$; $Itpro/np$ $t(16) = -2.986$ $p = .009$, and the difference between *it* referring to a proposition and a noun phrase was also significant, $Itpro/np$ $t(16) = 7.741$, $p = .000$. The cases of *this* referring to the proposition were higher than those of *it* doing so, $It = 35.93\%$; $This = 44.375\%$, $Thispro/itpro$ $t(16) = 4.211$, $p = .001$. The non-native speakers’ preferences for *this* referring to a proposition and *this* referring to a noun phrase were very close to each other and the difference between them is not significant, $Thispro/np$ $t(16) = -.420$, $p = .681$.

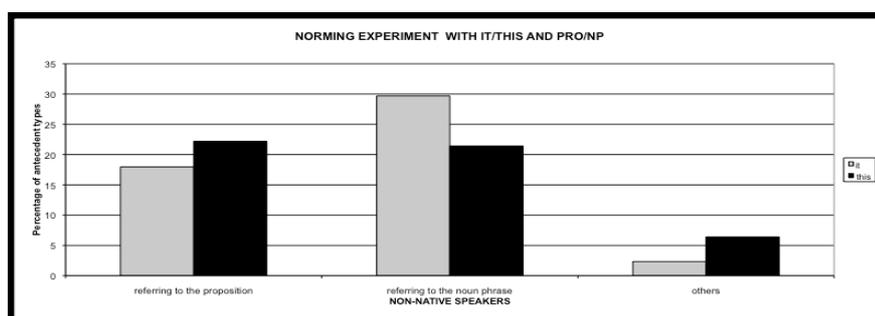


Figure 70. Percentage of antecedent types used with *it* and *this* in Non-native speakers’ completions

In the offline experiment, the non-native speakers of English showed different antecedent preferences for *this* and *it* and their preferences were also significant in lmer results. They used *it* to refer to a noun phrase and *this* to refer to a proposition. However, they did not show a clear antecedent preference for *this*. In other words, the proportion of uses of *this* referring to a noun phrase and proposition are very similar, and pairwise comparison between these items was not significant either. This indicates that the non-native speakers may not have a distinct and clear antecedent choice for *this* and therefore they used *this* to refer to both noun phrase and proposition.

The non-native speakers in the online experiment liked *it* to refer to a proposition and *this* to refer to a noun phrase, whereas in the offline task they used *it* to refer to a noun phrase and *this* to refer to a proposition. Clahsen and Felser (2006) put forward one reason this might be so in their studies, where they had different performances across online and offline experiments. They suggest that the degree of accessibility to explicit grammar knowledge changes from online experiment to offline experiment. While dealing with the online structures, L2 learners' ability to tap their grammar knowledge is lower than when they deal with the same structure in the offline experiments. Therefore, Clahsen and Felser argue that 'L2 learners' being able to provide native-like off-line judgments on the structures under investigation does not imply that the nature and extent of their grammatical knowledge is native-like.... which is why we think it important to supplement off-line data with corresponding on-line data (p. 19)'.

Both our online and offline experiments demonstrated that at least the use of *this* and its antecedent preferences were not quite clear and the antecedent rules were still not established. *This* might still be problematic for the non-native speakers and the possible role of Turkish and language transfer should not be ignored here. On the other hand, bearing in mind Clahsen and Felser's approach to offline and online performances, we can still say that in the online experiments non-native speakers have different preferences from those the literature appears to anticipate.

4.6 Experiments 2 and 4: Comparison of Online Tracking by Native and Non-Native speakers of English

In this part of the thesis, we aimed to compare native and non-native speakers of English in terms of the antecedent preferences of *this* and *it* referring to a proposition and noun phrase. We hypothesized that Turkish non-native speakers of English would have different antecedent preferences for *this* and *it* in their interlanguage. In order to investigate the anaphora processing of native and non-native speakers of English, we used the same stimuli as in Experiment 2 in section 4.2.1 and Experiment 4 in section 4.4.2

4.6.1 Method.

4.6.1.1 Participants. Forty paid native English-speaking volunteers aged 21-24 from the University of Edinburgh and forty paid Turkish non-native speakers of English from Middle East Technical University participated, and all were unaware of the purpose of the study. They were not the same participants as took part in Experiment 1 in section 4.2 and Experiment 4 in section 4.4.

4.6.2 Results and Discussion. Independent analyses were performed on the data for each group. Also, three-way ANOVAs were conducted for the fixation times for each region, with repeated measures for Anaphora (*this* vs. *it*), Antecedent types (proposition vs. noun phrase) and Language Groups (English vs. Turkish) as a between-participant factor (F1) and as a within-subject (F2). In the following, the means for the first pass reading times, regression path times, second pass reading times and total reading times are given in Table 7 and 8. Only anaphora and disambiguating regions revealed significant interactions between the factors and the results of these regions are discussed.

Table 7. Means and standard deviations for first pass reading time and regression path times of all regions as a function of Group (English speakers vs. Turkish speakers), Anaphora (it vs. this) and antecedent types (propositions vs. noun phrase)

	FIRST PASS READING TIMES				REGRESSION PATH TIMES			
	itpro	thispro	itnp	thisnp	itpro	thispro	itnp	thisnp
Antecedent (R1)								
ENGLISH	1,203	1,172	1,186	1,203	1,203	1,172	1,186	1,204
SD	477	414	367	428	467	414	367	428
TURKISH	1,643	1,613	1,626	1,736	1,643	1,613	1,626	1,736
SD	473	436	514	491	473	436	515	491
Anaphora(R2)								
English	224	256	228	274	261	298	260	289
SD	117	98	64	100	130	147	85	112
Turkish	303	383	329	397	368	442	396	444
SD	79	110	87	125	178	142	128	147
Disambiguating (R3)								
English	462	420	456	431	625	591	571	619
SD	114	106	119	131	195	200	173	220
Turkish	707	696	701	702	915	815	845	816
SD	198	202	190	175	360	216	261	207
Conjunction (R4)								
English	269	266	264	280	322	308	335	352
SD	864	71	70	93	154	122	145	144
Turkish	368	369	385	363	439	447	438	419
SD	92	103	114	90	164	185	149	123
Final (R5)								
English	918	982	967	889	2,304	2,326	2,088	2,139
SD	199	295	265	221	1,166	1,130	799	1,021
Turkish	1,517	1,503	1,669	1,596	3,227	3,346	3,340	3,234
SD	374	496	503	496	1,160	1,411	1,298	1,239

First pass reading times revealed no main effects or interaction between the regions, *GroupXAnaphoraXAntecedent* all F_1 and $F_2 < 1$. Regression path times showed a two-way interaction between anaphora and antecedent types, $F_1(1,39) = 7.201, p = .009$; $F_2(1,39) = 4.664, p = .037$, but a three-way interaction between anaphora, antecedent types and language was not found, *Group X Anaphora X Antecedent types*: all F 's < 1 . Separate ANOVA's showed a significant interaction between anaphora and antecedent in the native speakers' F_1 results, but not F_2 (see Figure 71 below), $F_1(1,39) = 4.330, p = .009$; $F_2(1,39) = 4.664, p = .037$. Regressions occurred when *it* referred to a proposition but the difference between *it* referring to a noun phrase and proposition was only significant in t_1 results, *English Participants: Itpro/np t1* (39) = 2.247, $p = .018$; *Itpro/np t2* (39) = 1.657, $p = .106$. Also, regressions were longer when *this* referred to a noun phrase, but that was not significant in t_1 and t_2 results, *English*

Participants: *Thispro/np t1* (39) = -956, $p = .345$; *Thispro/np t2* (39) = -815, $p = .420$.

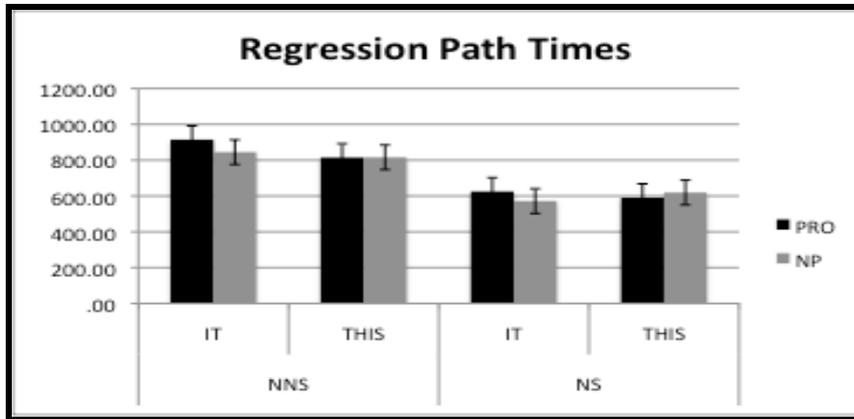


Figure 71. Means of regression path times in disambiguating as a function of Group (English speakers vs. Turkish speakers), Anaphora (it vs. this) and antecedent types (propositions vs. noun phrase)

Analysis of the data for non-native speakers did not reveal a significant interaction but a trend was seen in F_2 , $F_1(1,39) = 2.945$, $p = .094$; $F_2(1,39) = 1.475$, $p = .232$. While they did not show any antecedent preference for *this*, the regressions were longer when *it* referred to a proposition in t_1 results, *Turkish participants: Thispro/np t1* (39) = -049, $p = .961$; *Thispro/np t2* (39) = -029, $p = .977$; *Itpro/np t1* (39) = 2.033, $p = .049$; *Itpro/np t2* (39) = 1.429, $p = .161$.

Table 8. Means and standard deviations for second and total reading times of all regions as a function of Group (English speakers vs. Turkish speakers), Anaphora (it vs. this) and antecedent types (propositions vs. noun phrase)

	SECOND PASS READING TIMES				TOTAL READING TIMES			
	itpro	thispro	itnp	thisnp	itpro	thispro	itnp	thisnp
Antecedent (R1)								
ENGLISH	593	519	453	486	2	2	2	2
SD	457	375	360	452	709	562	493	626
TURKISH	721	677	665	604	2,358	2,264	2,292	2,331
SD	518	538	427	397	805	723	765	693
Anaphora(R2)								
English	102	166	88	169	310	399	298	411
SD	102	82	113	126	130	160	93	148
Turkish	110	169	130	134	403	543	436	520
SD	94	118	113	102	118	170	133	159
Disambiguating(R3)								
English	267	282	232	274	731	703	691	705
SD	224	235	182	217	241	252	186	218
Turkish	337	348	348	344	1	1	1	1
SD	217	227	233	261	304	333	349	336
Conjunction(R4)								
English	120	106	105	107	354	357	354	370
SD	97	81	84	85	135	108	104	117
Turkish	159	160	147	129	511	520	538	486
SD	106	96	110	100	157	166	171	150
Final (R5)								
English	517	481	409	442	1	1	1	1
SD	423	428	355	415	560	553	348	1,341
Turkish	673	712	613	629	2	2	2	2
SD	528	463	498	512	565	677	706	590

Second Pass Reading times revealed a significant three way interaction in the anaphora region, *Group x Anaphora x Antecedent types*, $F1 (1,78)= 5.621$, $p=.020$; $F2 (1,39)= 5.048$, $p=.030$) but in the other regions no significant interaction or main effect was seen (see Table 8 for all means of second and total reading times). Natives speakers did not show any preferences for *this*, whereas they preferred *it* referring to a noun phrase. However, the difference between *it* referring to a noun phrase and to a proposition was not significant in t-test results, *English participants*, $Itpro/np t1 (39)= 1.375$, $p= .177$; $Thispro/np t1 (39)= -208$, $p= .836$; $Itpro/np t1 (39)= .946$, $p= .350$; $Thispro/np t2 (39)= -155$, $p= .878$. On the other hand, non-native speakers of English preferred *this* referring to a noun phrase and *it* referring to a proposition. T-test results also supported the difference between *this* referring to a proposition and noun phrase but the difference between *it* referring to a noun phrase and proposition was not significant, $Itpro/np t1 (39)= -997$, $p= .325$; $Thispro/np T1 (39)= 2.540$, $p= .015$; $Itpro/np t2 (39)= -849$, $p= .401$; $Thispro/np T1 (39)= 1.908$, $p= .064$.

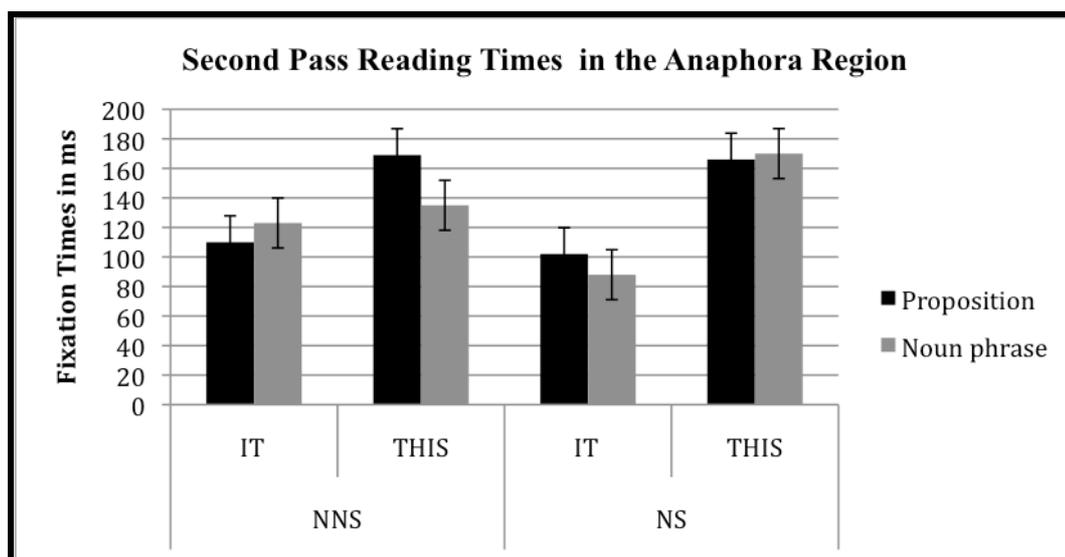


Figure 72. Means of second pass reading times in anaphora region as a function of Group (English speakers vs. Turkish speakers), Anaphora (it vs. this) and antecedent types (propositions vs. noun phrase)

Total reading times in the anaphora region demonstrated the same three way interaction pattern in the F1 analysis, but not F2 analysis (see Figure 73 below), $F1(1,78) = 5.599, p = .020$; $F2(1,39) = 2.630, p = .113$. T-test results of non-native speakers: $Itpro/np t1(39) = 2.146, p = .038$; $Thispro/np t1(39) = 1.429, p = .161$; $Itpro/np t2(39) = -2.016, p = .051$; $Thispro/np t2(39) = .925, p = .361$ and t-test results of native speakers, $Itpro/np t1(39) = .620, p = .539$; $Thispro/np t1(39) = -.698, p = .489$; $Itpro/np t2(39) = .180, p = .858$; $Thispro/np t2(39) = -.322, p = .749$. The difference between *it* referring to a proposition and to a noun phrase was significant in non-natives' t1 and t2 results. Similar to previous patterns in the second pass reading times, non-natives preferred when *it* referred to a proposition. *This* referring to a noun phrase was also preferred but was not significant in t1 and t2 results. Native speakers did not show any preference for *it* or *this*. We also saw the same three way interaction pattern in the conjunction region of total reading times, $Group \times Anaphora \times Antecedent\ types, F1(1,78) = 3.759, p = .056$; $F2(1,39) = 3.097, p = .086$.

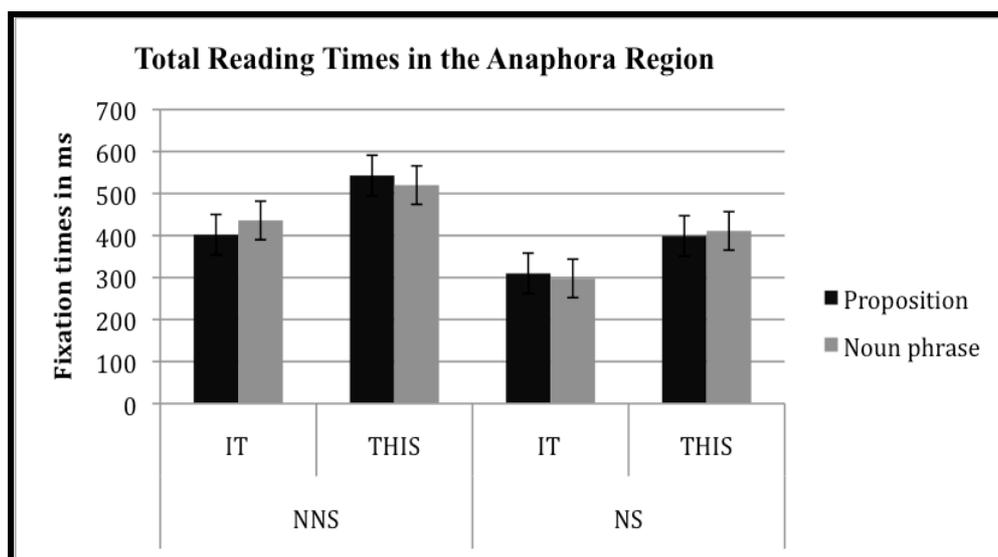


Figure 73. Means of Total reading times in anaphora region as a function of Group (English speakers vs. Turkish speakers), Anaphora (it vs. this) and antecedent types (propositions vs. noun phrase)

As can be seen, native speakers did not show any online antecedent preference for *this* in the anaphora region of second pass and total reading times, whereas non-native speakers had a tendency to prefer *this* referring to a noun phrase. While native speakers had a preference for *it* referring to a noun phrase, non-native speakers had a tendency to prefer *it* referring to a proposition. We claimed that non-native speakers tried to do form-function mapping to resolve the ambiguity in the online task but they may have started with a default option for *this* and *it*. Their default options indicate their interlanguage level and antecedent preferences for *this* and *it* and it seem that this is problematic for them. On the other hand, native speakers did not show any antecedent preference, perhaps because native speakers used their pragmatic knowledge and were flexible with all options. Or there might also be other factors that govern antecedent preferences for native speakers that we need to take into consideration. In order to explore these factors, we did post-hoc analyses, which are handled in other sections.

4.7 Sentence Completion Experiments 3 and 5: Comparison of Native Speakers and Non-Native Speakers

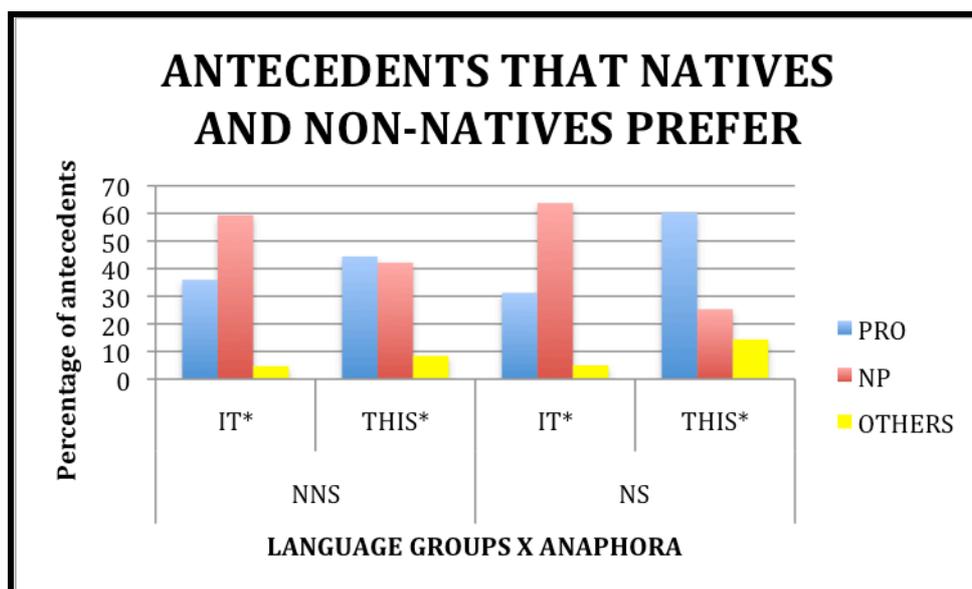
We explored which antecedents native and non-native speakers would select if they were asked to complete sentences starting with *this* and *it*. We hypothesized that native speakers' preferences would be much stronger in the production experiment than in the online experiments because they would have time to tap their explicit knowledge and would perform with native-like proficiency.

4.7.1 Method. Identical stimuli were used to those in Experiment 2 (section 4.2) and Experiment 5 (section 4.5). The parts after *this* and *it* were left blank to be completed.

1.

4.7.1.1 Participants. Sixteen paid non-native speakers from Middle East Technical University and sixteen paid native speakers from the University of Edinburgh participated.

4.7.1.2 Data Analysis. A linear mixed effect regression analysis (LMER) was conducted, treating the relative proportion of references to Antecedents (proposition vs. noun phrase) and Anaphora (*this* vs. *it*) between Groups (English vs Turkish). The lmer analysis showed the differences between groups and their antecedent preferences for *this* to be significant, $z = 4.711$ (see Figure 22 below)
English participants: Condition $z = -9.679$ *It* pro/np $t(16) = 5.133$, $p = .000$;
This pro/np $t(16) = -6.606$, $p = .000$; *Turkish participants: z = -3.538*, *It* pro/np $t(16) = 7.741$, $p = .000$; *This* pro/np $t(16) = -4.20$, $p = .681$.



*p<.05

Figure 74. Percentage of antecedents that natives and non-natives prefer for *this* and *it*

Contrary to the results of the online Experiment in section 4.1, native speakers of English used *this* to refer to a proposition and *it* to refer to a noun phrase. On the other hand, non-native speakers of English used *this* to refer to a noun phrase and to a proposition. This may indicate that they did not have any formulaic rules for the use of *this* and thus the use of *this* in their interlanguage is not like that of natives speakers. Contrary to the online experiment, non-natives used *it* to refer to a noun phrase and their antecedent preference of *it* was similar to that of natives. Then, a question arises here concerning the reasons why two different preferences for *it* were present in the non-native speakers' online and offline tasks. Possible answers might lie in the nature of online and offline experiments. While doing online experiments, the non-native speakers did not have a long time to think about their preferences and thus online experiments revealed their implicit knowledge and grammar level. On the other hand, while doing the offline task, they had enough time to think about their preferences and they had the chance to check their answers. They tended to use explicit rules regarding the items. Though

they had time to think about *this*, they did not have a clear antecedent preference for *this* compared to *it*.

Since our online results were not strong, we decided to perform a post-hoc analysis and check whether there was a match between the participants' completions and their reading times in the online experiments. To accomplish this, we performed a post-hoc analysis of Experiments 1 and 2.

4.8 Post-hoc Analyses of Native Speakers' Online Experiment 2 in section 4.2

4.8.1 Method. To perform the post-hoc analysis, we checked the pattern in the participants' completions in the offline experiment and then compared the pattern in the offline task with their fixation times. Firstly, we grouped the sentence completions under the antecedent types and anaphora used. Group 1 was where in some sentences the participants always referred to the NP (name Group 1) and the noun phrases seemed to be more salient than the propositions or (VP) because of the information structure. Here, the verbs indicated a new entity just produced: therefore the foci was shifted from the VP to the noun (i.e. Jack wrote a book. The Emperor built a castle.). Group 2 was where the participants highly preferred the proposition with *it* and *this* and again, the semantics of verbs seemed to have a role in the establishment of foci and making the NP less salient (i.e. Catherine crossed the Atlantic; Jean criticised Prof. Hart's work). Therefore, *this* and *it* selected the proposition as antecedents. Group 3 was made up of the sentences which revealed the patterns we had predicted: the VP and NP seemed to be equally salient and therefore *this* referred to a proposition and *it* referred to a noun phrase (i.e. Bernadette hurled her computer; Benjamin showed his passport.)

Secondly, we checked the online task and we noticed we had some items in which the participants preferred both noun phrases and propositions as antecedents of both *this* and *it*. Some of these items matched with the sentences in the offline task (Groups 1, 2, 3).

Regarding online and offline patterns, we grouped the sentences into two groups: those in which a noun phrase was used with an indefinite article and those

in which a noun phrase was used with definite article/possessive pronoun. The groups used in the post-hoc analysis were as follows:

Group 1: Sentences with an indefinite article **Group 2: Sentences with personal pronouns or definite article**

The Emperor built a huge castle.

Jenny felled the sapling

Lynn published a local newsletter.

Bernadette hurled her computer.

James downloaded a new ringtone

Alfred's friends all sang Elvis's 'Hound dog'.

Alice rented an allotment.

Julie broke her grandmother's china swan.

Bob rented a luxury duplex flat.

Jean criticised Prof. Hart's work.

Jack wrote a poem

Kai cooked his favourite spicy Tai curry

Jamie played a vuvuzela

Benjamin showed his passport.

Abbigail drew a coded picture.

Gavin adjusted the projector.

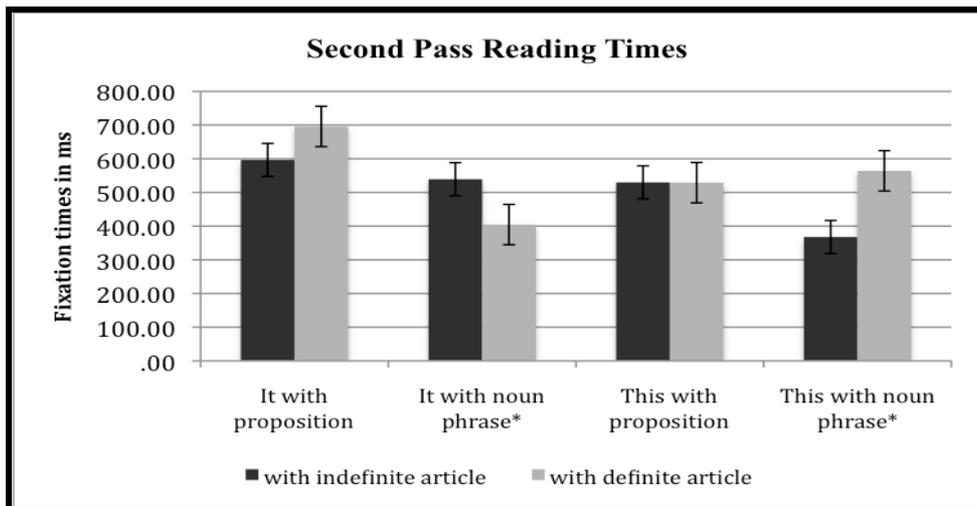
Sentences with proper names (i.e. the Atlantic) were excluded from the analysis since proper names are quite salient and the propositions in these sentences could not have equal chances to be taken as antecedent. We had 10 sentences for each group.

4.8.1.1 Participants. These were identical to those in Experiment 2 in section 4.2.

4.8.1.2 Data Analysis. We divided the items into various groups, based on their preferences for *it* (np vs. proposition), and for *this* (np vs. proposition). Then, we tested whether the reading times differed for these groups. We had identical regions to those in Experiment 2 (see section 8).

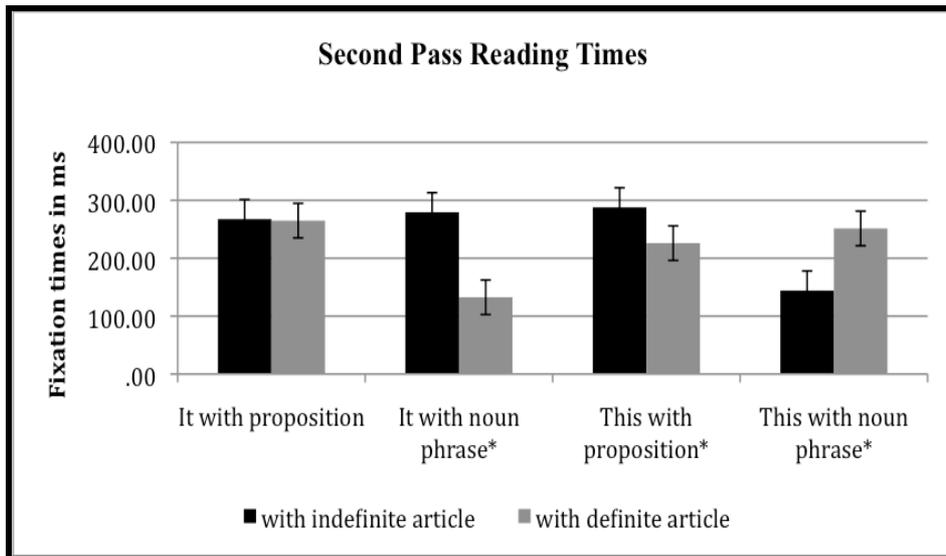
4.8.2 Results. A three-way ANOVA was employed, treating Level of Definiteness (Group 1 vs Group 2) X Anaphora (this vs. it) and Antecedent types (proposition vs. noun phrase). Only regions and eye measures that demonstrated significant interaction among Groups X Anaphora X Antecedent types would be given.

The context region of second pass reading times showed a significant three way interaction (see Figure 75a below), *Level of definitines X Anaphora X Antecedents*: $F1(1,39) = 4.390, p = .043$; $F2(1,18) = 7.234, p = .015$. Again, the disambiguating region of second pass reading times showed the same significant three way interaction (see Figure 75b below), *Level of definitines X Anaphora X Antecedents*: $F1(1,39) = 6.731, p = .013$; $F2(1,18) = 14.238, p = .001$.



* $p < .05$

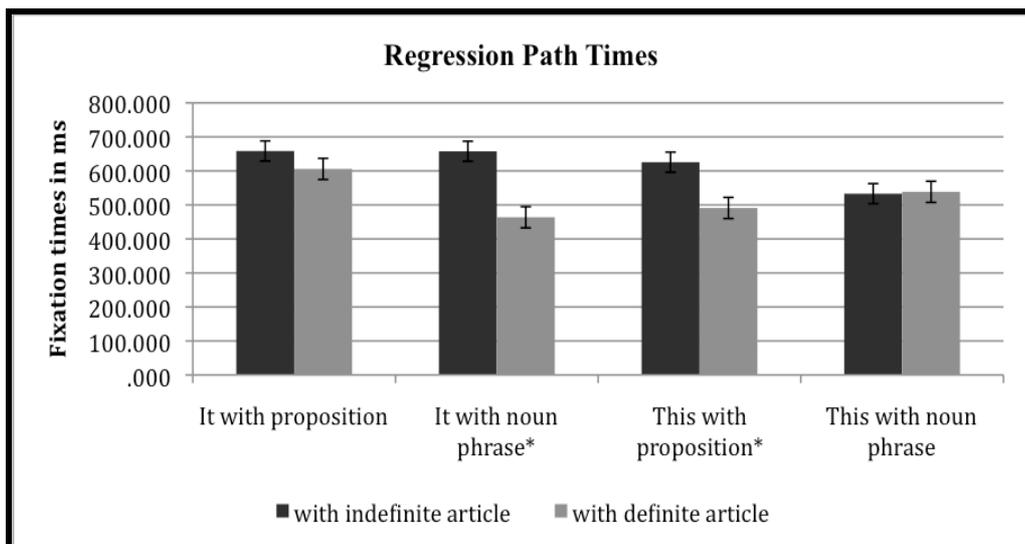
Figure 75a. Means of second pass reading times in the context region



* $p < .05$

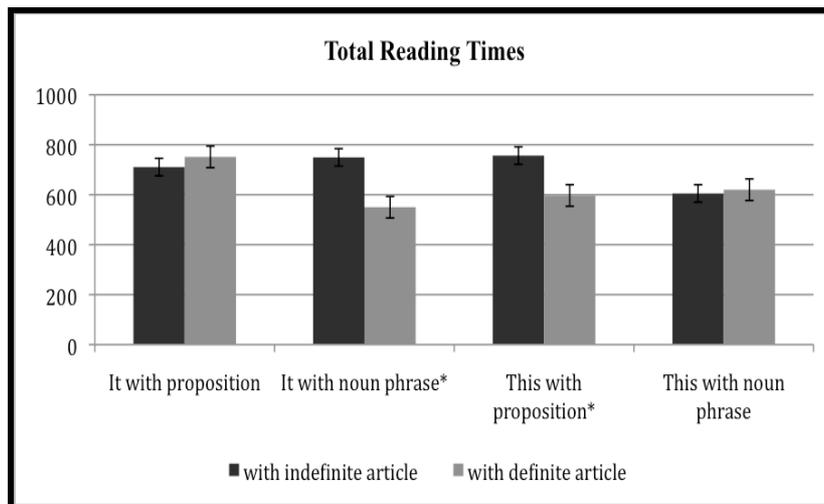
Figure 75b. Means of second pass reading times in the disambiguating region

Similar to the pattern in second pass reading times, regression path times and total reading times demonstrated a three way significant interaction in the disambiguating region (see Figures 24 and 25 below), regression path times: $F1(1,39) = 8.790, p = .005$; $F2(1,18) = 9.086, p = .007$ and Total reading times: $F1(1,39) = 10.238, p = .013$; $F2(1,18) = 20.207, p = .001$.



* $p < .05$

Figure 76. Means of regression path times in the disambiguating region



* $p < .05$

Figure 77. Means of total reading times in the disambiguating region

The regression path times, second pass and total reading times show the same pattern in the context and disambiguating regions. In the second pass reading times of the context region, the fixations were longer when *it* referred to a noun phrase which was used with an indefinite article. The fixations were shorter when *this* referred to a noun phrase used with a definite article. The fixations were shorter when *it* referred to the proposition in the sentences in which a noun phrase was used with an indefinite article. According to this pattern, the participants like when *it* refers to a proposition if the indefinite article is used before the noun phrase. They like *this* to refer to the noun phrase when the indefinite article is used. They like *it* when it refers to a noun phrase if a personal possessive/definite article is used. They like *this* when it refers to a proposition if a personal possessive/definite article is used. Also, the difference between *it* referring to a noun phrase and proposition was significant in the t-tests of second and total pass reading times, second pass reading times, *Itpro/np* $t(7) = 6.033$, $p = .001$; total pass reading times region 1, *Itpro/np* $t(7) = 3.595$, $p = .009$ and region 3, *Itpro/np* $t(7) = 4.272$, $p = .004$. The difference between *this* referring to a proposition and a noun phrase was significant in the t-test of second pass and total reading times, second pass reading times in region 1, *Thispro/np* $t(7) = -3.104$, $p = .017$ and region 3,

Thispro/np $t(7) = -2.475, p = .046$; regression path times in region 1: *Thispro/np* $t(7) = -3.998, p = .005$.

All these results revealed the roles of indefiniteness and definiteness in the antecedent selection of *this* and *it* in online processing. Later, we decided to check whether the definiteness/indefiniteness pattern was also seen in the production experiment. We did a linear mixed model analysis and saw only a condition effect in the native speakers' data, Null: cond $z = -2.703$; *Condition X IndeDefiniteness* $z = 2.491$; model 2: cond $z = -2.695$ *Condition X IndeDefiniteness* $z = 2.496$; model 3: condition $z = -2.700$; *Condition X IndeDefiniteness* $z = 2.508$. We did not see any indefiniteness/definiteness effect or interaction between definiteness and conditions. Again, the natives use *it* to refer to a noun phrase and *this* to refer to a proposition. Regarding all these results, we decided to run another online experiment in which we controlled definiteness/indefiniteness in the antecedent selection of *this* and *it*. However, this experiment will not be included in this PhD thesis.

4.9 Post-hoc Analysis of Experiment 1 in section 4.6 with Non-native Speakers of English

We performed a three way analysis treating Definiteness (definiteness vs. indefiniteness), Anaphora (*it* vs. *this*) and Antecedent types (proposition vs. noun phrase) as factors within subject and within item analyses. Contrary to the non-native speakers' preferences, we did not see any interaction among the factors in all eye measures (all $F1$ and $F2 < 1$ and all p 's > 1).

We conducted linear mixed effect model analyses for the non-native speakers' sentence completions. Surprisingly, we saw an interaction between the condition and indefiniteness in the non-native speakers' sentence completions. This interaction also occurs in the lmer models, too, *Condition* $z = -7.340$, *Condition X IndeDefiniteness* $z = 1.049$; *Model 1: condition* $z = -6.728$; *Model 2 condition* $z = -6.836$; *Model 3 condition* $z = -6.836$. Irrespective of whether *it* is being used with a definite or an indefinite article, non-natives use *it* to refer to a noun phrase. In the sentences with definite articles, they use *this* to refer to a

proposition. On the other hand, they like *this* when referring to a noun phrase in the sentences with an indefinite article. Their production preference for *this* was affected by definiteness and their antecedent preferences were matched with those of native speakers in the post-hoc analysis.

4.10 General Conclusions

In the online reading experiment, when *it* and *this* refer to a proposition or a noun phrase, the native speakers do not show strong preferences. We had a trend or significant result only in the participant analysis of regression path times: native speakers like when *this* refers to a proposition and *it* refers to a noun phrase. The online reading experiment with Turkish non-native speakers of English demonstrates that non-natives have different referent choices for *this* and *it* from those of non-native speakers of English. They like when *this* refers to a noun phrase and *it* refers to a proposition. These non-natives' referent preferences are significant in both participant and item analyses of second-pass reading times and are marginally significant in both participant and item analyses of total reading times. We can therefore propose that both groups have asymmetrical referent choices for *this* and *it*, but that these choices are different:

Natives: $it \Rightarrow$ noun phrase; $this \Rightarrow$ proposition

Non-natives: $it \Rightarrow$ proposition; $this \Rightarrow$ noun phrase

It should be noted that in online experiments, non-native speakers have stronger referent preferences than native speakers. This indicates that non-native speakers of English try to resolve an ambiguity in a sentence by form-function mapping in order to comprehend the sentence, whereas native speakers are flexible and thus do not show any strong preferences. This might be because native speakers use pragmatic knowledge, and both antecedent preferences for *this* and *it* referring to a proposition and noun phrase are acceptable for them in the context. Another reason might be that in online reading both the proposition and the noun phrase are strong candidates to be the antecedents for *this* and *it*, and thus are in

competition with each other (Kameyama, 1996). This may explain why we did not see strong preferences. Another reason might be a strong effect of definiteness in online tasks. All these needs to be investigated.

The reason native speakers of English do not show strong preferences can be explained in terms of the results of an experimental study by Fraizer and Clifton (1998): ‘when a sentence has been fully semantically interpreted and integrated into the current discourse model, an erroneous analysis will be more difficult to recover from’ (Frazier and Clifton, 1998). This means that in anaphora processing, native speakers make connections between *this* or *it* and a context and are not sensitive to detail.

Non-native speakers’ referent choices for *it* referring to a proposition may reveal their interlanguage grammar and the influence of the Turkish deictic system upon their L2 grammar. The correspondent of *it* in the stimuli is translated as *bu* or a *pro-drop* (see section 4.4 for the Turkish translations) and *bu* functions as a focalizer: and thus non-native speakers liked *it* referring to a proposition. Also, *this* and *it* translated into Turkish as one expression, *bu*, and their correspondences and the distinctions between them in the target language might still be problematic and unestablished.

One thing should be noted here about the native and non-native speakers’ online processing. According to Clahsen and Felser’s shallow structure hypothesis (2006), L1 and L2 processings are clearly different in the domain of morphology. While L2 learners use semantic and pragmatic knowledge to resolve ambiguity, native speakers use syntactic knowledge. Though Clahsen and Felser’s findings refer to the processing of morphology, their results are important for our study. As in their study, in the online reading experiments we saw that native and non-native speakers of English had different referent choices for *this* and *it*. However, our eye measurements did not show that native speakers use syntactic knowledge to disambiguate, whereas non-natives use semantic knowledge.

In the norming experiment with native speakers of English, *this* was mostly used to refer to the proposition in the previous sentence, whereas *it* was used to refer to the noun phrase. In contrast to the online reading experiment, the non-native speakers of English showed different antecedent preferences for *this*

and *it* in the sentence completion experiment. *It* was used to refer to a noun phrase while *this* was occasionally used to refer to a proposition. However, it is worth mentioning that the referent choice of non-natives for *this* was not clear (*this referring to a proposition* = 44%; *this referring to a noun phrase* = 42%). In other words, the uses of *this* referring to a noun phrase and proposition were almost equivalent and pairwise comparison between these variables was not significant, either. This indicates that the non-native speakers may not have a distinct and clear antecedent choice for *this* and therefore they used *this* to refer to both noun phrase and proposition.

In the offline experiments, both native and non-native speakers used *it* to refer to a noun phrase. Native speakers' preferences for *this* referring to a proposition were stronger than those of non-native speakers. Though non-native speakers show a native-like pattern of preferences for *this* and *it*, this does not necessarily imply that their grammatical knowledge is like that of natives (cf. Clahsen and Felser, 2006). The online experiment presents non-natives' mental processing and their implicit knowledge on *this* and *it*, whereas the offline experiment shows their explicit knowledge. In the online experiment, participants do not have long to check or to control their referent preferences, whereas in the offline experiment, they have more time to control their preferences and to check these against their descriptive grammar knowledge. Therefore, the online experiments reflect the non-native speakers' interlanguage grammar.

Our pattern analyses of the online and offline experiments with native and non-native speakers also demonstrate the differences between native and non-native speakers of English in referent preferences for *this* and *it*. While in the online experiments native speakers of English were sensitive to the specificity of the noun phrase, non-native speakers of English were not. Native speakers of English preferred *it* to refer to a noun phrase with a definite article and *this* to refer to a noun phrase with an indefinite article. This indicates that L2 learners' processing is shallow and less detailed than that of native speakers' of English.

In the pattern analysis of the production experiment, non-native speakers demonstrate different referent preferences from those evident in native speakers' online processing. They use *this* to refer to a noun phrase with a definite article

and *it* to refer to a noun phrase with an indefinite article. This indicates that native and non-native speakers of English have different referent choices and non-natives do not show strong native-like preferences for *this* and *it*. It must be underlined that the results of patterned analyses are only post-hoc results and the findings can not be generalized. They only provide predictions for our future experiments.

CHAPTER 5

EXPERIMENTS ON *IT* AND *THAT* REFERRING TO A PROPOSITION OR NOUN PHRASE

This chapter is composed of four sections. The first section presents the results of an online experiment with native speakers of English and their referent preferences for *it* and *that* to refer to a proposition or noun phrase. The second section presents the referent choices of native speakers in the norming experiment. The third section presents the online processing by Turkish non-native speakers when *it* and *that* refer to either a proposition or a noun phrase. The fourth section presents a comparison of the online processing of native and non-native speakers of English. The final section draws some general conclusions regarding the processing and production of these expressions by native and non-native speakers of English.

5.1 Experiment 1 with Native speakers of English: *It* and *that* referring to either a proposition or a noun phrase

The purpose of this experiment was to investigate the antecedent preferences of native speakers when *it* and *that* might refer either to a proposition or to a noun phrase. We predicted that native speakers would prefer a noun phrase as an antecedent of *it* and a proposition as an antecedent of *that*. We used the same stimuli used in Experiment 2 in section 4.2, and the conditions were as follows:

Condition 1: *it* referring to the proposition

Charlotte wrote a book. It was a difficult job but the sales were spectacular.

Condition 2: *that* referring to the proposition

Charlotte wrote a book. That was a difficult job but the sales were spectacular.

Condition 3: *it* referring to the noun phrase

Charlotte wrote a book. It was a difficult read but the sales were spectacular.

Condition 4: *that* referring to the noun phrase

Charlotte wrote a book. That was a difficult read but the sales were spectacular.

5.1.1 Method.

5.1.1.1 Participants. Forty native speakers of English from Edinburgh University participated.

5.1.1.2 Stimuli and Design. Identical stimuli to those for Experiment 2 in section 4.2 were used.

5.1.1.3 Data Analysis. Identical regions to those for Experiment 2 in section 4.2 were used in this experiment.

5.1.2 Results and Discussion. Two-way ANOVAs were conducted for each region, with repeated measures for Anaphora (*it* vs. *that*) and Antecedent Types (proposition vs. noun phrase) as within-participants and within-item factors. The fixation data for each region will be given with four different eye measures: first pass reading, regression-path times, second pass reading times and total reading times.

Table 9. Means and standard deviations for first pass reading and regression path times of all regions as a function of Anaphora (*it* vs. *that*) and antecedent types (propositions vs. noun phrase)

	FIRST PASS READING TIMES				REGRESSION PATH TIMES			
	itpro	thatpro	itnp	thatnp	itpro	thatpro	itnp	thatnp
Antecedent (R1)								
ENGLISH	1179	1206	1216	1234	1201	1206	1215	1234
SD	317.521	397.011	439.232	387.396	403.906	397.011	439.232	387.396
Anaphora(R2)								
English	231	310	242	291	266	361	280	319
SD	87.675	129.708	99.347	128.012	123.535	161.52	149.983	136.52
Ambiguous resolution(R2)								
English	469	418	453	396	622	657	634	710
SD	123.666	133.043	131.045	125.25	167.843	192.209	255.392	238.098
Conjunction (R3)								
English	289	280	274	269	315	322	326	342
SD	85.271	84.393	79.893	74.289	99.9	116.066	117.2	133
Final (R4)								
English	1048	1024	1052	1003	1843	2031	1992	1946
SD	285.751	267.71	326.591	293.946	639.14	994.675	862.537	839.589

The regions of first pass reading times did not reveal main effects or significant interaction between the factors (all F 's < 1). In the anaphora region, regression-path times revealed a trend of interaction between anaphora and antecedent in the participant analysis but not in the item analysis, $F_1(1, 39) = 3.319$, $p = .076$; $F_2(1, 39) = 2.036$, $p = .162$; *It referring to proposition* = 300 ms, $SE = 22.608$; *It referring to a noun phrase* = 300 ms, $SE = 15.115$; *That referring to proposition* = 369.800 ms, $SE = 18.529$; *That referring to a noun phrase* = 331.200, $SE = 10.707$. Native speakers did not show any antecedent preferences for *it*.

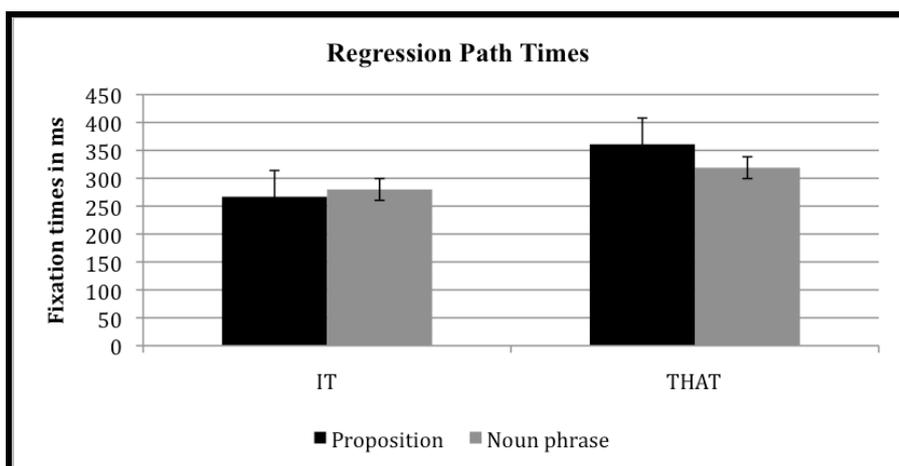


Figure 78. Means of regression path times in the disambiguating region

Table 10. Means and standard deviations for second pass and total reading times of all regions as a function of Anaphora (*it* vs. *that*) and antecedent types (propositions vs. noun phrase)

	SECOND PASS READING TIMES				TOTAL READING TIMES			
	itpro	thatpro	itnp	thatnp	itpro	thatpro	itnp	thatnp
Antecedent (R1)								
ENGLISH	333	405	397	373	1,524	1,604	1,591	1,606
SD	318	386	397	346	506	641	582	552
Anaphora(R2)								
English	83	193	92	219	291	474	295	483
SD	71	155	91	139	101	218	137	215
Disambiguating(R3)								
English	196	284	243	305	664	702	697	701
SD	155	193	220	218	154	216	242	246
Conjunction(R4)								
English	73	83	87	96	351	351	367	356
SD	55	78	73	75	107	129	125	116
Final (R5)								
English	282	327	343	330	1,332	1,353	1,400	1,336
SD	220	304	317	288	326	410	449	361

The interaction between the factors did not happen in all regions of total reading times. A trend was seen in the antecedent region of second pass reading times but this pattern was only apparent in the participant analysis, not the item analysis (see Figure 79 below) $F_1(1, 39) = 4.017, p = .052$; $F_2(1, 39) = 2.693, p = .109$; *It*

referring to proposition = 332/950 ms, SE= 50.289; It referring to a noun phrase 397 ms, SE= 50.250; That referring to proposition= 405.225 ms, SE= 61.055; That referring to a noun phrase = 372.625, SE= 54.744. The native speakers seemed to like *it* to refer to a proposition and *that* to refer to a noun phrase. However, the proportional difference between *it* referring to a noun phrase and its referring to a proposition was also marginal in t-test results, $t(39) = -1.913, p = .063$ and the difference between *that* referring to a proposition and noun phrase was not significant in t-test, $t(39) = .959, p = .343$.

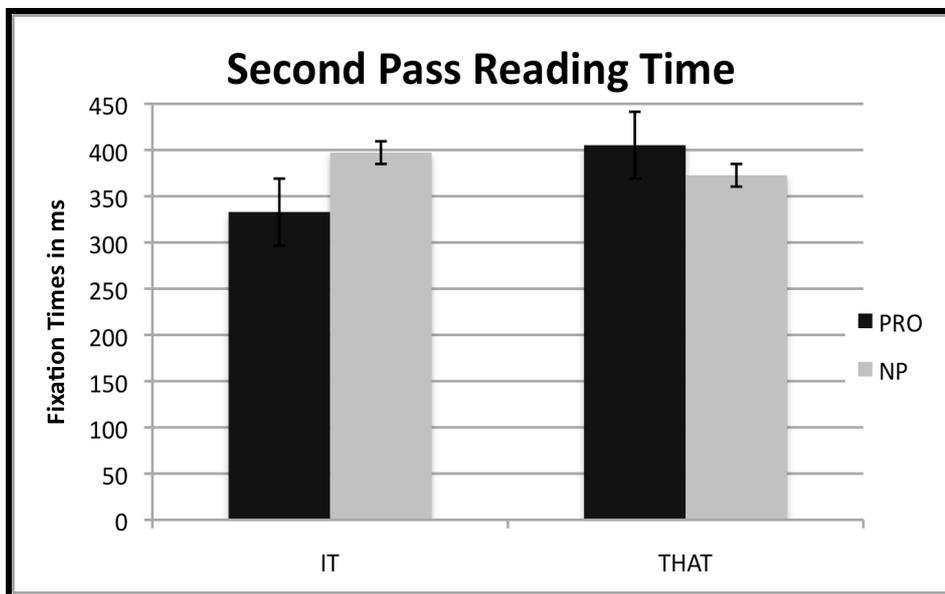


Figure 79. Means of second pass reading times in antecedent region

The disambiguating region of second pass reading times revealed the main effects of anaphora and antecedent in F1 but only a main effect of anaphora was seen in F2, anaphora: $F1(1, 39) = 15.674, p = .000$; $F2(1, 39) = 13.066, p = .001$; $It = 219.463$ ms, SE= 27.939; $That = 294.588$, SE= 29.753; Antecedent: $F1(1, 39) = 4.194, p = .047$ $F2(1, 39) = 1.760, p = .192$; Proposition= 239.913 ms, SE=24.743; Noun phrase= 274.138 ms, SE= 31.380. The reading times were longer in the *that* conditions than in the *it* conditions and F1 analysis showed the processing of a noun phrase took longer than that of a proposition. Except for the main effect of anaphora, the main effect of antecedent was not strong in either participant or item analyses.

In the online reading experiment on *it* and *that*, we only saw a trend in regression path times and second pass reading times. Our results replicated the shared hypotheses and results in the previous studies by Linde (1979), Passonneau (1989), Schuster (1989) and Borthen et al. (1997), Webber (1988). *It* and *that* differ in referent choices. However, the referent choices for *it* and *that* in our study were different from the predicted referent choices in these studies. In the studies, *it* preferred a salient entity and *that* preferred a less salient entity. However, in our study *that* preferred a salient entity (a linguistically presented entity: a noun phrase) and *it* preferred a less salient entity (a linguistically less presented entity: a proposition). According to Brown-Schmidt et. al. (2005), a proposition (or to use their own term, a ‘composite’ (i.e. the cup on the saucer)) is not an unexpected referent for *it*. In their study, they observed ‘the frequent composite interpretation for *it*’ and concluded that a composite could also be salient and compete with a linguistic entity. They also underlined that *it* is ‘highly sensitive to linguistically determined focus’. Our findings supported Brown-Schmidt et. al.’s study, showing that *it* also preferred a ‘proposition’ in our experiment, and the proposition was preferred over a linguistic entity.

The choice of noun phrase as a referent of *that* was surprising but that preference might be explained in terms of stressed/unstressed pronouns and the use of *that* as a pronoun in the relative clauses. The stressed pronouns can signal the change of focus, and thus a stressed pronoun ‘that’ indicates the shift of focus to a noun phrase (see Lakoff, 1971; Kameya, 1999). For Kameya, where there is more than one referent, an unstressed pronoun refers to a more salient entity whereas a stressed pronoun refers to a less salient entity. If we handled the stimuli in terms of stressed and unstressed pronouns, it might be argued that the proposition (VP: writing a book) might be more salient for *it* than a noun phrase in an object position.

Another possible reason the participants preferred a noun phrase as a referent of *that* might be the use of *that* as a pronoun in the relative clauses. In our experiment the participants might have ignored the punctuation (i.e. the full stop) and interpreted *that* as a modifier in a relative clause (i.e. Charlotte wrote a book

that was a difficult job). Kaiser and Trueswell (2008) also observed the same modifier effect in their online experiment on *tämä*.

All these are possible explanations as to why we had patterns which differed from our predictions. However, the interaction we saw in the antecedent region of second pass reading times and in the disambiguating region of regression path times was only a trend and was not seen in the item analysis. Therefore, we still did not have a clear measure of the participants' preferred referent choice for *that* and *it*. As Brown-Schmidt et. al. state, this is potentially problematic when comparing anaphors that have different preferred interpretations, when several potential referents exist, and when the preferred referent differs across conditions. In order to discover the possible factors that may play a role in referent choice, we decided to perform a post-hoc analysis. We also decided to run a norming experiment to explore native speakers' referent selection for these expressions.

5.2 Experiment 2 With Native-Speakers: Norming Experiment

In this sentence completion experiment, we aimed to see whether the online native speakers' antecedent preferences for *that* and *it* were identical to those in the offline norming experiment. We predicted that the offline experiment would reveal much clearer native speakers' antecedent preferences for *it* and *that* than the online reading experiments.

5.2.1 Method.

5.2.1.1 Participants. Sixteen paid Turkish non-native speakers of English from Edinburgh University participated. They had not participated in previous online or offline experiments.

5.2.1.2 Stimuli and Design. Identical stimuli to those in Experiment 1 in section 5.1 were used. The only difference from Experiment 1 in section 5.1 was that the rest of the sentences after *that* and *it* were removed.

5.2.1.3 Data Analysis. Continuations were categorized in accordance with the types of antecedents defined in Experiment 1 in section 5.1. Ambiguous sentence completions and cases of illegible handwriting were referred to a native speaker of English. After discussion of these completions with the native speaker, if the antecedents of *it* and *that* were not clear, they were handled under the category of ‘others’.

5.2.2 Results and Discussion. A linear mixed effects regression (LMER) analysis was performed to model the relative proportion of references to the proposition (writing a book) and the noun phrase (a book). We set up a model to treat references to the proposition and noun phrase as response variables. This analysis was based on 2 (responses: proposition \times noun phrase) \times 2 (types of anaphora: *it* \times *that*). The LMER analysis showed that there were more references to the proposition for *that* than for *it*, $Z = -7.376$, $p < .05$; $It = 19.38\%$, $That = 45.00\%$, while the cases of *it* referring to the noun phrase were higher than those of *that*, $It = 72.5\%$; $That = 38.44\%$ (see Figure 80 below). Models in the random slope analyses also revealed a significant interaction for *that*, *Model 1: condition that* $z = -6.058$; *Model 2: condition that* $z = -6.034$. The proportional difference between *it* referring to a proposition and its referring to a noun phrase was significant, $It_{pro/np} t(16) = 9.619$, $p = .000$. Similarly, the proportional difference between *that* referring to a proposition and a noun phrase was significant, too, $That_{pro/np} t(16) = -6.320$, $p = .000$.

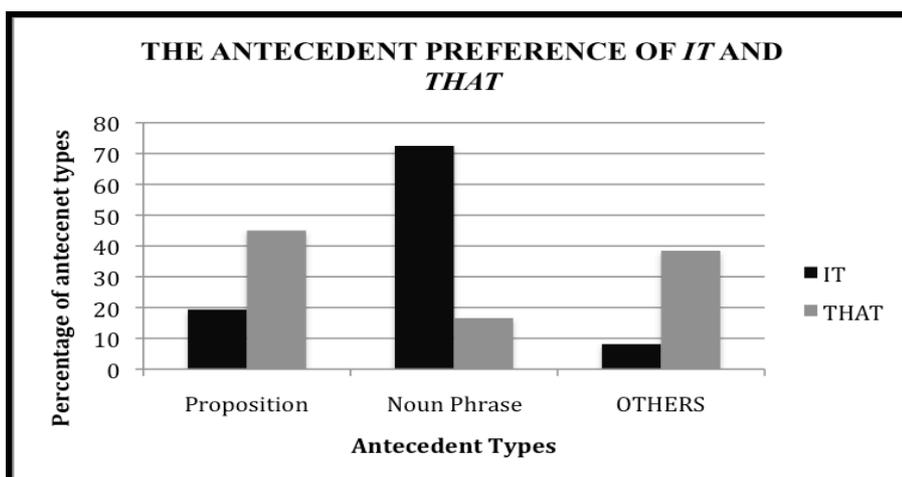


Figure 80. Antecedent preferences of native speakers of English in norming experiment

We handled 8.13% of *it* and 38.44% of *that* uses under the ‘other’ category and excluded this category from the analysis (see Figure 81 below).

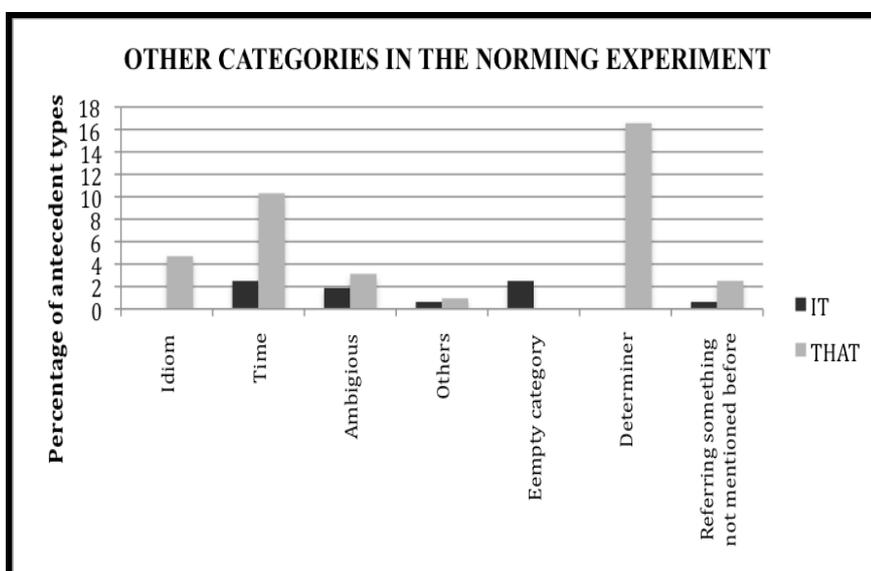


Figure 81. Other categories it and that refer to in the norming Experiment

To summarize, in the online experiment, the native speakers had a tendency to prefer *that* when it referred to a noun phrase, whereas in the norming experiment, the native speakers used *that* to refer to a proposition. In the online experiment, natives did not have any preference for *it*, whereas in the norming

experiment, they used *it* to refer to a noun phrase. The results of online experiments with native speakers of English were not strong, since we saw a trend only for *it* and *that* referring to a proposition and noun phrase. The findings in the norming experiment support the arguments on the contrastive antecedent preferences of *it* and *that* (Webber, 1988; Brown-Schmidt et al., 2005) or the different degree of referent choices in multi-functional approach (Kaiser et al., 2008). However, the main question arising is: why do we see different referent choices for *it* and *that* across experiments? The next question is: why do native speakers' online choices for *it* differ between the experiment for *it* and *this* and the experiment for *it* and *that*?

5.3 Experiment 3 with Turkish Non-Native Speakers of English: *it* and *that* referring to a proposition or noun phrase

We hypothesized that Turkish non-native speakers might have different referent preferences for *that* and *it* from native speakers of English, since the Turkish language has a different deictic system from English. To test our hypothesis, we used the same stimuli used in Experiment 1 in section 5.1. The conditions we used with non-native speakers of English were as follows:

Condition 1: *it* referring to a proposition

Semiramis wrote a book. It was a difficult job but the sales were spectacular.

Condition 2: *that* referring to a proposition

Semiramis wrote a book. That was a difficult job but the sales were spectacular.

Condition 3: *it* referring to a noun phrase

Semiramis wrote a book. It was a difficult read but the sales were spectacular.

Condition 3: *that* referring to a noun phrase

Semiramis wrote a book. That was a difficult read but the sales were spectacular.

5.3.1 Method.

5.3.1.1 Participants. Thirty-three paid Turkish non-native speakers of English participated in the experiment. They started to learn English at 12 and they were all third or fourth year students in the Foreign Language Teaching Department. All took the METU proficiency exam at the start of the university education and the mean of their scores from the exam was 80, which is equal to 102 TOEFL and 7.5 IELTS. Nearly all of them were not proficient in any other languages, although some of them defined themselves as pre-intermediate or beginner in other languages. Those students were asked in which language they felt most proficient: ‘English’ or ‘any other language’. The answer of all participants was ‘English’ and they also said that they use ‘English’ more often than any other non-native language for chatting, language classes, watching films, etc. Therefore, we also included these students’ data in the analysis. The students who had been abroad for more than three months at some point in their lives were excluded in the data analysis.

5.3.1.2. Procedure. We used an identical procedure to that of Experiment 1 in section 5.1

5.3.1.3 Data Analysis. We used identical regions to those of Experiment 1 in section 5.1

5.3.2 Results and Discussion. A two way ANOVA was run for reading times for each region, with repeated measures for Anaphora (*that* vs. *it*) and Referent types (proposition vs. noun phrase) as a between participant factor (F1) and as a within subject (F2). The means of second pass and total reading times and regression path times in each region are given in Table 11. Only the disambiguating regions revealed significant interactions between the factors and a trend in the anaphora was seen in the second pass reading times.

Table 11. Means and standard deviations for second pass and total reading times and regression-path times of all regions as a function of Anaphora (it vs. that) and antecedent types (propositions vs. noun phrase)

	TOTAL PASS READING TIMES				SECOND PASS READING TIMES				REGRESSION PATH TIMES			
	itpro	thatpro	itnp	thatnp	itpro	thatpro	itnp	thatnp	itpro	thatpro	itnp	thatnp
Antecedent (R1)												
TURKISH	2,465	2,399	2,301	2,352	746	721	616	705	1,734	1,713	1,708	1,692
SD	937	685	656	610	731	602	448	605	432	361	404	380
Anaphora (R2)												
TURKISH	498	598	442	589	161	189	113	193	431	490	420	519
SD	179	177	129	175	161	155	85	159	131	156	188	177
Disambiguating (R3)*												
TURKISH	1,136	1,094	1,030	1,160	420	377	320	408	903	887	842	901
SD	351	322	242	369	392	371	220	382	236	172	188	176
Conjunction (R4)												
TURKISH	571	553	545	575	173	168	158	196	460	463	438	436
SD	152	183	103	186	108	156	108	179	143	154	115	99
Final (R5)												
TURKISH	2,447	2,450	2,376	2,475	810	740	798	810	3,719	3,636	3,322	3,714
SD	805	882	650	723	751	717	575	800	2,035	1,786	1,068	1,741

* $p < .05$

Second pass reading times did not reveal main effects or interaction between the two factors in antecedent, conjunction or final regions. In the anaphora region, a marginal 2 way interaction between the factors (*Anaphora: that vs. it*) X (*Antecedent types: proposition vs. noun phrase*) was seen, $F_1 (1,32) = 2.946$, $p = .096$; $F_2 (1,39) = 1.705$, $p = .199$; *It referring to a proposition* = 162 ms, $SE = 28.014$; *That referring to a proposition* = 190 ms, $SE = 16.966$; *It referring to a noun phrase* = 114 ms, $SE = 14.802$; *That referring to a noun phrase* = 193 ms, $SE = 27.643$. In the disambiguating region, a significant interaction between the factors was seen but not in the item analysis, $F_1 (1,32) = 5.545$, $p = .025$; $F_2 (1,39) = 2.613$, $p = .114$; *It referring to a proposition* = 420 ms; $SE = 63.009$; *That referring to a proposition* = 378 ms, $SE = 64.573$; *It referring to a noun phrase* = 321 ms, $SE = 38.249$; *That referring to a noun phrase* = 409 ms, $SE = 66.431$. Fixations were longer when *it* referred to a proposition than when it referred to a noun phrase. Also, the proportional differences between *it* referring

to a proposition and *it* referring to a noun phrase was significant in t1 and a trend in t2, *Itpro/np: t1* (33)= 2.470, $p = .019$ *Itpro/np: t2* (39)= 1.754, $p = .087$. Fixations were longer when *that* referred to a noun phrase but the proportional differences between *that* referring to a proposition and *that* referring to a noun phrase were not significant in the pairwise comparison, *Thatpro/np: t1* (33)= 787, $p = .437$; *Thatpro/np: t2* (39)= -100, $p = .921$.

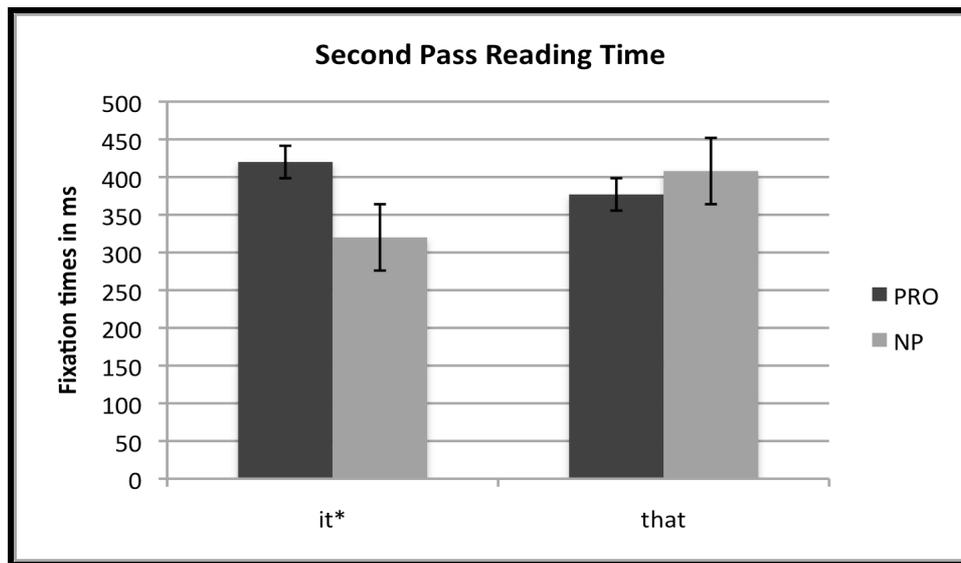


Figure 82. Means of second pass reading times in the disambiguating region

Total pass reading measures did not show any main effects or interaction in the antecedent, conjunction or final regions. In the anaphora region, main effects of anaphora and antecedent were seen in the participant analysis, *Anaphora: F1* (1,32)= 44.548, $p = .000$; *F2* (1,39)=21.530, $p = .000$; *It*=470ms, $SE = 24.606$; *That*= 593 ms, $SE = 28.971$; *Antecedent: F1* (1,32)= 4.162, $p = .050$; *F2* (1,39)= 2.405, $p = .129$; *Proposition*= 548ms, $SE = 28.606$; *Noun phrase*= 516ms, $SE = 24.161$. Fixations were longer in the conditions when *it* and *that* referred to a proposition than when it referred to a noun phrase. A significant 2 way interaction between the factors occurred in the disambiguating region in both participant and item analyses (see Figure 83), *F1* (1,32)= 9.789, $p = .004$; *F2* (1,39)= 5.894, $p = .020$; *It referring to a proposition*=1136 ms, $SE = 61.044$; *That referring to a*

proposition = 1094 ms, SE= 56.048; *It referring to a noun phrase*=1030 ms, SE= 42.154; *That referring to a noun phrase*= 1160 ms, SE= 64.197.

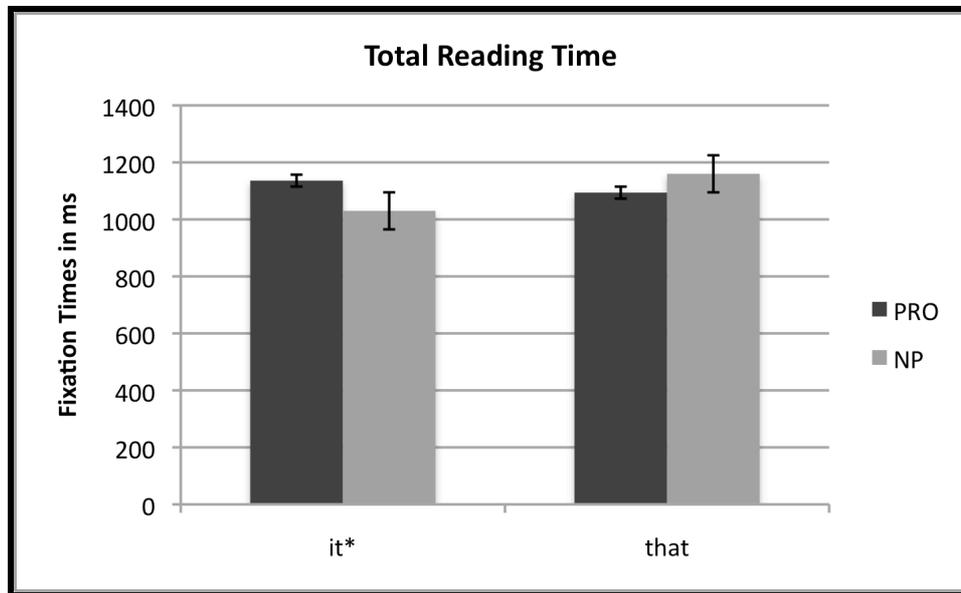


Figure 83. Means of total reading times in the disambiguating region

As with the second pass reading time measures in the disambiguating region, fixations were longer when *it* referred to a proposition than when *it* referred to a noun phrase. Pairwise comparison of *it* referring to a proposition and *it* referring to a noun phrase was also significant, $It_{pro/np}: t1 (33) = 2.216, p = .034$; $It_{pro/np}: t2 (39) = 1.971, p = .056$. The fixations were longer when *that* referred to a proposition than when it referred to a noun phrase, but the pairwise comparison for *that* across the conditions was marginal only in t1. $That_{pro/np}: t1 (33) = -1.864, p = .071$; $That_{pro/np}: t2 (39) = -1.312, p = .191$.

A significant two way interaction was found in the disambuating region of regression path times in item analysis and *that* was marginal in the participant analysis, see Figure 84; $F1 (1,32) = 3.219, p = .082$; $F2 (1,39) = 4.421, p = .042$; *It referring to a proposition*=902 ms; SE= 41.042; *That referring to a proposition* = 887 ms, SE=29.912; *It referring to a noun phrase*=842 ms, SE= 32.711; *That referring to a noun phrase*= 901 ms, SE= 30.570. Regressions were longer when *it* referred to a proposition than when it referred to a noun phrase. Pairwise comparison analysis showed a marginally significant difference between *it*

referring to a proposition and *it* referring a noun phrase, $t_{1(32)} = 1.784$, $p = 0.84$; $t_2(39) = -541$, $p = .592$.

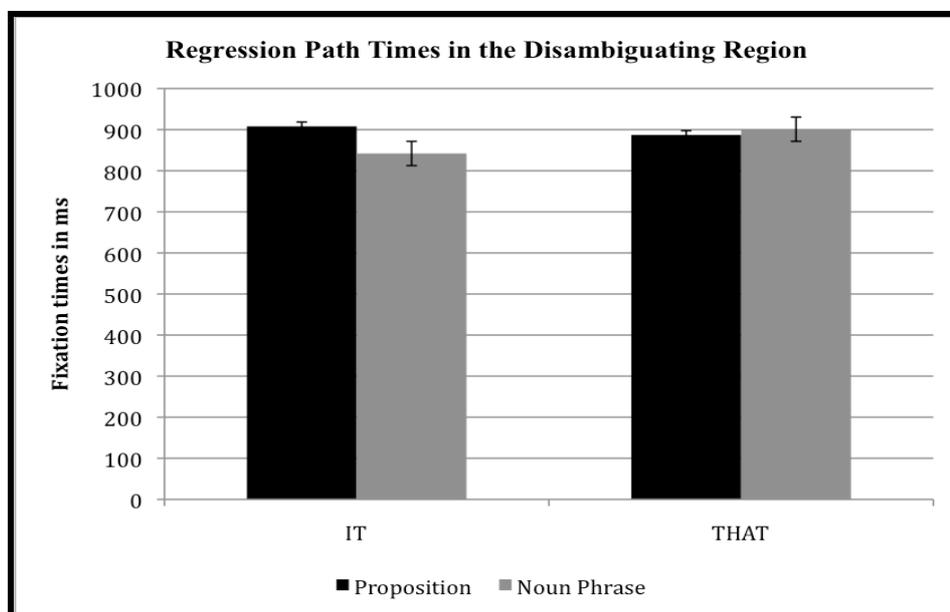


Figure 84. Means of regression-path times in the disambiguating region

To conclude, the results of the online eye-tracking experiment with non-native speakers of English, the participant and item analyses of total reading times, the participant analysis of second pass reading times and the item analysis of regression part times showed a significant interaction between the anaphora and antecedent types to which *that* and *it* refer. Non-native speakers like *it* when *it* refers to a noun phrase. On the other hand, they like *that* when *that* refers to a proposition, which was seen only as a trend that did not reach significance in the pairwise comparison. Non-native speakers' preferences match the assumptions on *it* and *that* in the literature (see Brown-schmidt et al., 2008; Passoneau, 1989). The question then arises: why, for the use of *it* by non-native speakers, do we have a difference in the patterns between the experiment on *it* and *that* and the experiment *it* and *this*? In this experiment, though we saw a trend for the referent preferences for *that*, non-native speakers' online preferences match the assumptions in the literature.

5.4 Experiment 4 with Turkish Non-Native Speakers of English: Norming Experiment

This sentence completion experiment investigated whether the online non-native speakers' antecedent preferences for *that* and *it* were identical to those in the offline norming experiment. The offline experiment would reveal much clearer native speakers' antecedent preferences for *it* and *that* than the online reading experiments.

5.4.1 Method.

5.4.1.1 Participants. Sixteen paid Turkish non-native speakers of English from Middle East Technical University participated. They had not participated in the previous online or offline experiments.

5.4.1.2 Stimuli and Design. Identical stimuli to those in Experiment 3 in section 5.3 were used. The only difference from Experiment 3 in section 5.3 was that the remainder of the sentences after *that* and *it* were removed.

5.4.1.3 Data Analysis. Continuations were categorized in accordance with the types of antecedents defined in Experiment 3 in section 5.3 (see the categories for coding below). Ambiguous sentence completions and cases of illegible handwriting were referred to a native speaker of English. After discussion of these completions with the native speaker, if the antecedents of *it* and *that* were not clear, they were handled under the category of 'others'.

The categories for coding the antecedents of *it* and *that* were as follows:

1. If *it* or *that* referred to the proposition, then its antecedent was coded as the proposition.

- Sencan pruned the bonsai tree. That was a great feeling for her,

- Ozan stole 700.000.000 TL. It caused him for a lifelong prison.
 - Duygu crossed the Atlantic. It was a great success for her.
2. If *it* or *that* referred to the noun phrase, then its antecedent was coded as the noun phrase.
- Cem wrote a poem. That was the same of Nazım Hikmet's.
 - The Duchess auctioned a piece of her lingerie. It was bought by a rich lady and she wanted to use it with her lover.
3. Other categories:
- Ferit donated a guitar. That was the moment he cried.
 - The Emporer built a huge castle. That castle had an huge impact on his power.
 - Feriha felled the sapling. That was the end of discussion.

5.4.2 Results and Discussion. A linear mixed effects regression (LMER) analysis was performed to model the relative proportion of references to the proposition (writing a book) and the noun phrase (a book). We set up a model to treat references to the proposition and noun phrase as response variables. This analysis was based on 2 (responses: proposition \times noun phrase) \times 2 (types of anaphora: *it* \times *that*). The LMER analysis showed that there were more references to the noun phrase for *it* than for *that*, $z = -6.183$, $p < .05$; $It = 67.19\%$; $That = 35.94\%$, while the cases of *that* referring to the proposition were higher than those of *it*, $It = 24.69\%$; $That = 37.19\%$ (see Figure 85 below). Models in the random slope analyses also revealed a significant interaction for *that*, *Model 1: conditionthat* $z = -6.115$; *Model 2: conditionthat* $z = -5.587$. The proportional difference between *it* referring to a proposition and its referring to a noun phrase was significant, $It_{pro/np} t(16) = -8.228$, $p = .000$. However, the proportional difference between *that* referring to a proposition and a noun phrase was significant, too, $That_{pro/np} t(16) = .203$, $p = .842$.

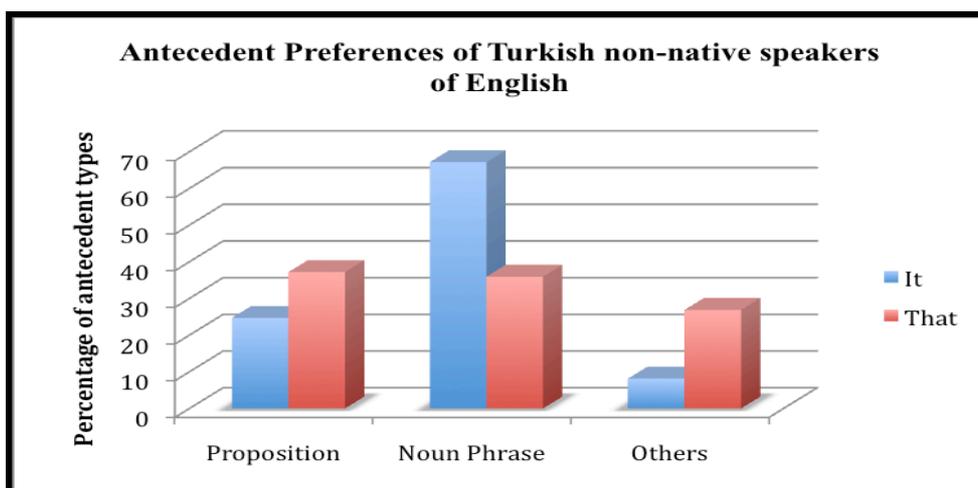


Figure 85. Antecedent preferences of Turkish non-native speakers of English in norming experiment

8.13% of *it* and 26.88% of *that* uses were handled under the ‘other’ category and excluded from the analysis (see Figure 86 below).

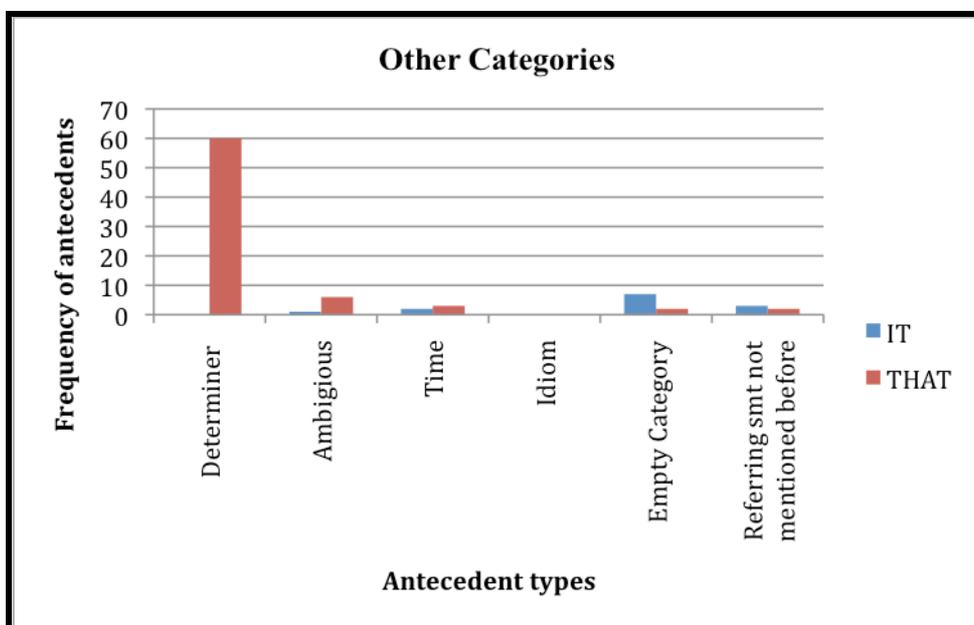


Figure 86. Other categories *it* and *that* refer to in the norming Experiment

To summarize, in the online experiment, the non-native speakers had a tendency to prefer *that* when it referred to a proposition. Similarly, in the norming experiment, the non-native speakers used *that* to refer to a proposition. However, the percentage of uses of *that* to refer to the proposition was close to that of uses referring to the noun phrase, and thus their preference for *this* was indeterminate. In the online experiment, their preference for *that* referring to the proposition was also only slight. Unlike *that*, non-natives did also have a clear preference for *it* in the norming experiment and their preference for *it* was the same as in their online preference. They used *it* to refer to a noun phrase.

5.5 Experiments 1 and 3: Comparison of Online Tracking by Native and Non-Native Speakers of English

This section presents to compare how native speakers and non-native speakers of English track the referents of *that* and *it* to refer to a proposition or a noun phrase in Experiments 1 and 3 in section 5.1 and 5.3.

5.5.1 Method.

5.5.1.1 Participants. Forty paid native English-speaking volunteers aged 21-24 from the University of Edinburgh and thirty-two paid Turkish non-native speakers of English from Middle East Technical University participated, and all were unaware of the purpose of the study.

5.5.2 Results and Discussion. Independent analyses were performed on the data for each group. Also, three-way ANOVAs were conducted for the reading times for each region, with repeated measures for Anaphora (*that* vs. *it*), Antecedent types (proposition vs. noun phrase) and Language Groups (English vs. Turkish) as a between participant factor (F1) and as a within subject (F2). In the following, the means for total reading and second pass times and regression path times are given in Table 4. Only the anaphora and disambiguating regions

revealed significant interactions between the factors and the results of these regions are discussed below.

Table 12. Means and standard deviations for second pass and total reading times and regression-path times of all regions as a function of Anaphora (*it* vs. *that*) and antecedent types (propositions vs. noun phrase) and Language Groups (English vs. Turkish).

	TOTAL PASS READING TIMES				SECOND PASS READING TIMES				REGRESSION PATH TIMES			
	itpro	thispro	itnp	thisnp	itpro	thispro	itnp	thisnp	itpro	thispro	itnp	thisnp
Antecedent (R1)												
English	1,524	1,591	1,591	1,606	333	405	397	373	1,201	1,206	1,215	1,234
SD	506	582	582	552	318	386	318	346	404	439	439	387
TURKISH	2,465	2,399	2,301	2,352	746	721	616	705	1,734	1,713	1,708	1,692
SD	937	685	656	610	731	602	448	605	432	361	404	380
Anaphora(R2)												
ENGLISH	291	474	295	483	83	193	92	219	266	361	280	319
SD	101	218	137	215	71	155	91	139	124	162	150	136
TURKISH	498	598	442	589	161	189	113	193	431	490	420	519
SD	179	177	129	175	161	155	85	159	131	156	188	177
Disambiguating (R3)*												
English	664	702	697	701	196	284	243	305	622	657	634	710
SD	154	216	242	246	155	193	220	218	168	192	255	238
TURKISH	1,136	1,094	1,030	1,160	420	377	320	408	903	887	842	901
SD	351	322	242	369	392	371	220	382	236	172	188	176
Conjunction (R4)												
English	350	351	367	356	73	84	87	96	315	463	326	342
SD	107	129	125	116	55	78	73	75	100	154	117	133
Turkish	571	553	545	575	173	168	158	196	460	463	438	436
SD	152	183	103	186	108	156	108	179	143	154	115	99
Final (R5)												
English	1,331	1,352	1,400	1,335	282	327	343	330	1,843	2,031	1,993	1,947
SD	326	410	449	362	220	304	317	288	639	995	863	840
TURKISH	2,447	2,450	2,376	2,475	810	740	798	810	3,719	3,636	3,322	3,714
SD	805	882	650	723	751	717	575	800	2,035	1,786	1,068	1,741

* $p < .05$

The total pass reading time measure did not show any main effects or interaction in antecedent, anaphora and final regions (all F 's < 1). In the disambiguating region, 2 and 3 way interactions were seen in both participant and item analyses, see Figure 87; 3 way interaction: $F_1(1,72) = 10.953$, $p = .001$; $F_2(1,39) = 4.167$, $p = .048$; 2 way interaction: $F_1(1,72) = 4.971$, $p = .029$; $F_2(1,39) = 4.897$, $p = .033$.

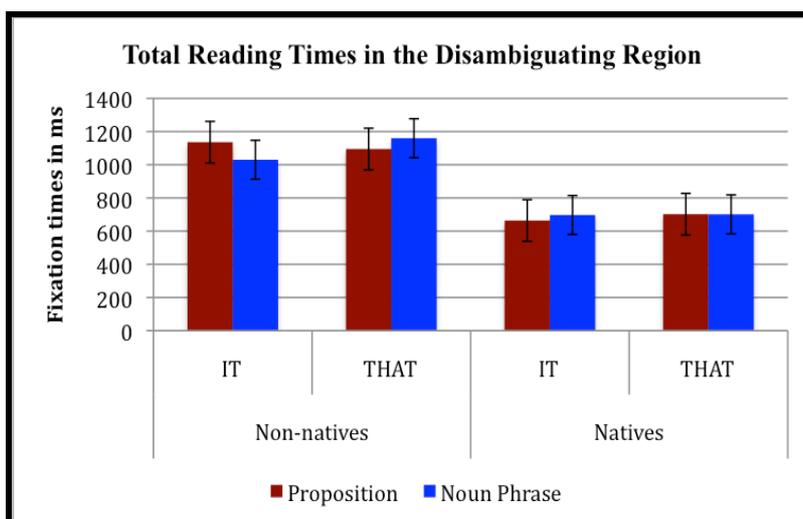


Figure 87. Means of Total reading times in the disambiguating region

Separate ANOVAs of non-native speakers showed a two way interaction between anaphora and antecedent types, *Turkish participants*: $F_1 (1,32) 9.789, p= .004$; $F_2 (1,39) 5.894, p= .020$. However, in separate ANOVAs of native speakers a two way interaction between the factors did not occur, *English participants*: $F_1 (1,40)= .996, p= .324$; $F_2 (1,40)= .543, p= .466$. While native speakers of English did not show a preference for *that*, non-native speakers liked when *that* referred to a proposition, *English participants*: *That referring to a proposition*= 701 ms, $SE= 216.260$; *That referring to a noun phrase*= 700.825ms, $SE= 48.529$; *Turkish participants*: *That referring to a proposition*= 1030 ms, $SE=42.125$, *That referring to a noun phrase*= 1160 ms, $SE= 53.495$. However, the pairwise comparison of *that* in non-native speakers' results was not significant, *English participants*: *Thatpro/np t1 (39)= .033, p= .974*, *Thatpro/np t2 (39)=0.22 p= .983*; *Turkish participants*: *Thatpro/np t1 (32)= -1.864, p= .071*, *Thatpro/np t2= -1.183, p=.244*. Therefore, non-natives' referent preferences for *that* was the only pattern. On the other hand, native speakers did not show any referent preference for *it* again, whereas non-native speakers of English liked *it* referring to a noun phrase this time, *English participants*: *It referring to a proposition*= 664 ms, $SE= 41.390$; *It referring to a noun phrase*= 697 ms, $SE= 38.220$; *Turkish participants*: *It referring to a proposition*= 1136 ms, $SE= 45.568$; *It referring to a noun phrase*= 1030 ms, $SE= 42.145$. The pairwise comparison of *it* in the two

conditions was also significant in the non-native speakers' data, *Turkish participants*, $I_{tpro/np} t_2 (39) = 1.971, p = .056$; $I_{tpro/np} t_1 (32) = 2.216, p = .034$.

Second pass reading times in the anaphora region demonstrated a marginal two way interaction, (see Figure 88) $F_1(1.72) 3.919, p = .052$; $F_2 (1.39) 8.269, p = .056$. Separate ANOVA results showed that the two way interaction was because of the pattern in the non-native speakers' data but not in the native speakers' data, *Turkish participants*: $F_1 (1, 32) = 2.946, p = .096$; $F_2 (1, 39) = 1.705, p = .109$ *English participants*: $F_1 (1, 40) = .772, p = .385$; $F_2 (1, 39) = 1.705, p = .109$. Fixations were longer when *it* referred to a proposition than when it referred to a noun phrase, *Turkish participants*: $I_{tpro/np} t_1(33) = 2.528, p = .017$; $I_{tpro/np} t_1(33) = 1.754, p = .087$. However, non-natives did not have any preference for *that* in the anaphora region, *Turkish participants*: $Thatpro/np t_1 = -.223, p = .825$; $Thatpro/np t_1 = -.100, p = .921$.

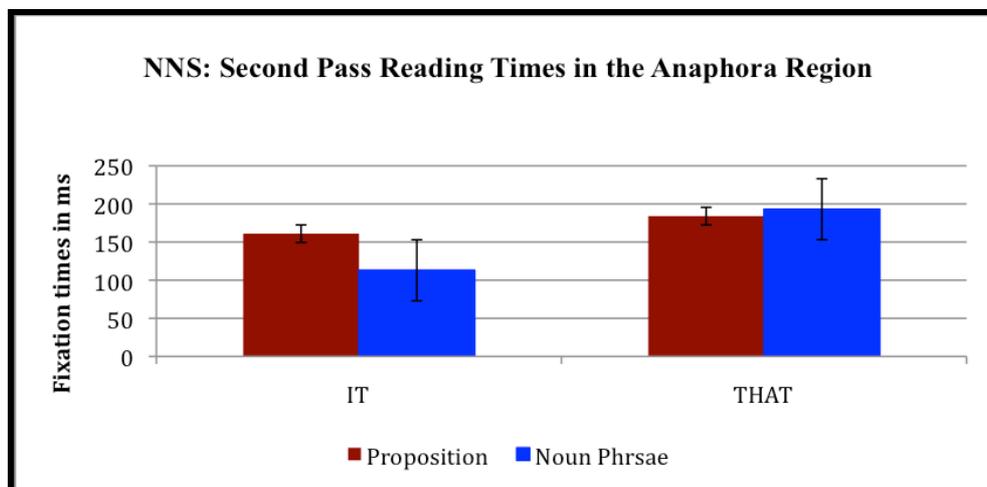


Figure 88. Means of non-native speakers' second pass reading times in the anaphora region

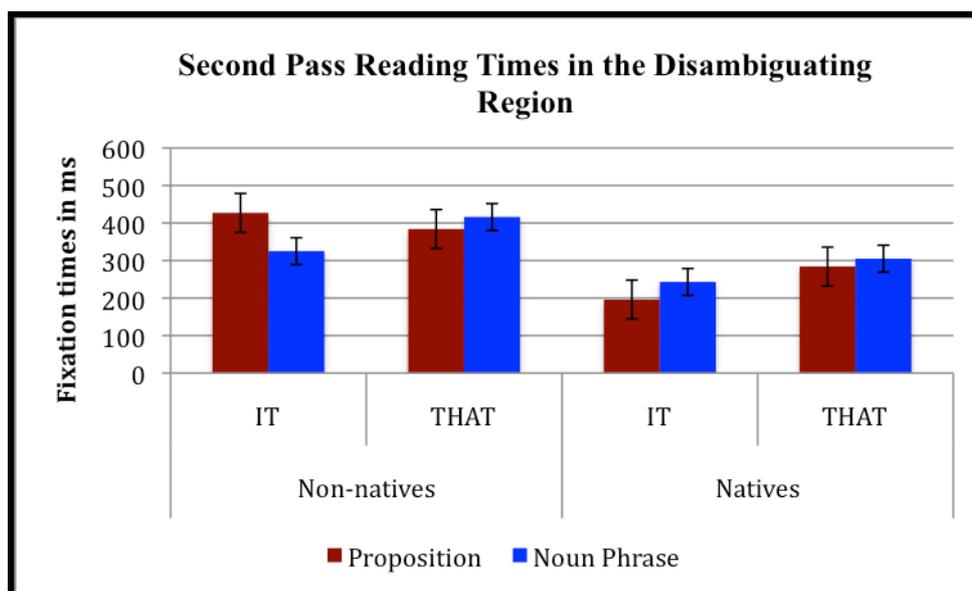


Figure 89. Means of second pass reading times in the disambiguating region

In the disambiguating region of second pass reading times revealed a three way interaction in the participant analysis but not in the item analysis (see Figure 89) $F1(1, 72) = 6.048, p = .016$; $F2(1, 39) = .689, p = .155$. While native speakers did not show any preference for *that* referring to an entity, non-native speakers had a tendency to prefer *that* referring to a proposition, *English participants: That referring to a proposition = 284 ms, SE = 193.003, That referring to a noun phrase = 305 ms, SE = 217.631; Turkish participants: That referring to a proposition = 378 ms, SE = 370.944, That referring to a noun phrase = 409 ms, SE = 381.617*. The proportional difference between *that* referring to a proposition and a noun phrase was not significant in the non-native speakers' data, *Turkish participants: Thatpro/np $t1(32) = -787, p = .437, Thatpro/np t2 = -521, p = .606$* . Non-natives' fixations were longer when *it* referred to a proposition than when it referred to a noun phrase, whereas natives' fixations were slightly longer when *it* referred to a noun phrase, *Turkish participants: It referring to a proposition = 421 ms, SE = 46.812; It referring to a noun phrase = 321 ms, SE = 38,250; English participants: It referring to a proposition 196 ms, SE = 42.519; It referring to a noun phrase = 243 ms, SE = 34.742*. Non-native speakers' referent preference for *it* was also significant in the pairwise comparison but native speakers' preference for *it* was not significant, *Turkish participants: Itpro/np $t1(32) =$*

2.440, $p = 019$, $I_{pro/np} t_2 (39) = 1.656$, $p = .106$; English participants : $I_{pro/np} t_1 (39) = -2.113$, $p = 041$, $I_{pro/np} t_2 (39) = -1579$, $p = .123$.

Regression-path time measures did not show main effects or the interaction between the factors (Anaphora X Antecedent types X Language Groups). In the final region of regression path times showed a significant interaction between these factors in the participant analysis but not in the item analysis (see Figure 90), 3 way interaction: $F_1 (1,72) = 5.409$, $p = .023$; $F_2 (1,39) = 1.752$, $p = .193$.

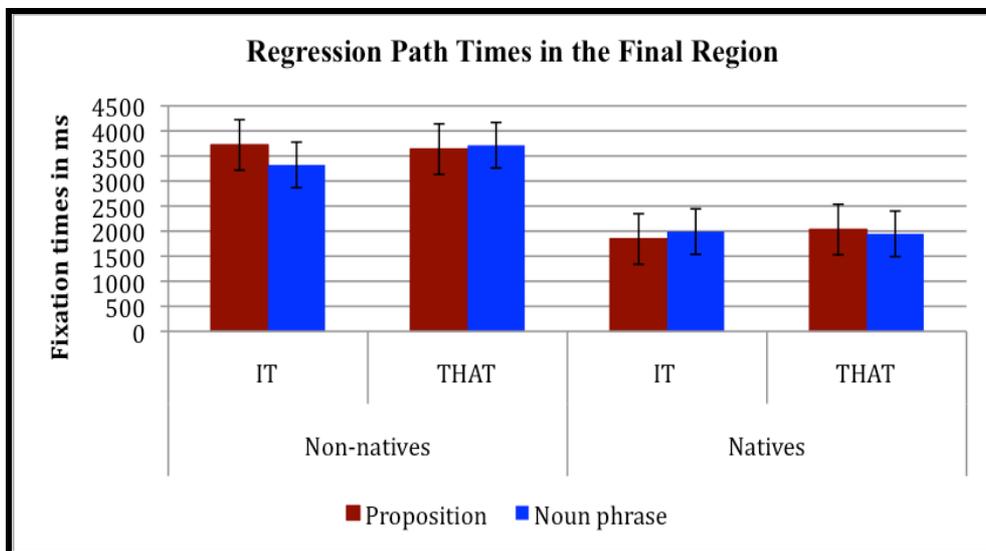


Figure 90. Means of regression path times in the final region

As seen in the figure above, the final region only gave the pattern for the referent preferences for non-native speakers' referent preferences for *it*, English participants: *It referring to a proposition* = 3719 ms, $SE = 251.674$, *It referring to a noun phrase* = 3322 ms, $SE = 167.207$; Turkish participants: *It referring to a proposition* = 1843 ms, $SE = 228.595$, *It referring to a noun phrase* = 1993 ms, $SE = 151.873$.

In conclusion, native speakers of English did not have any referent preference for *that*, whereas non-native speakers of English tended to prefer *that* to refer to a proposition in the disambiguating region of total reading and second pass reading times. On the other hand, native speakers had a tendency to like *it* to

refer to a proposition, whereas non-native speakers liked *it* to refer to a noun phrase. Non-native speakers referent preferences for *that* and *it* were consistent across different eye measures.

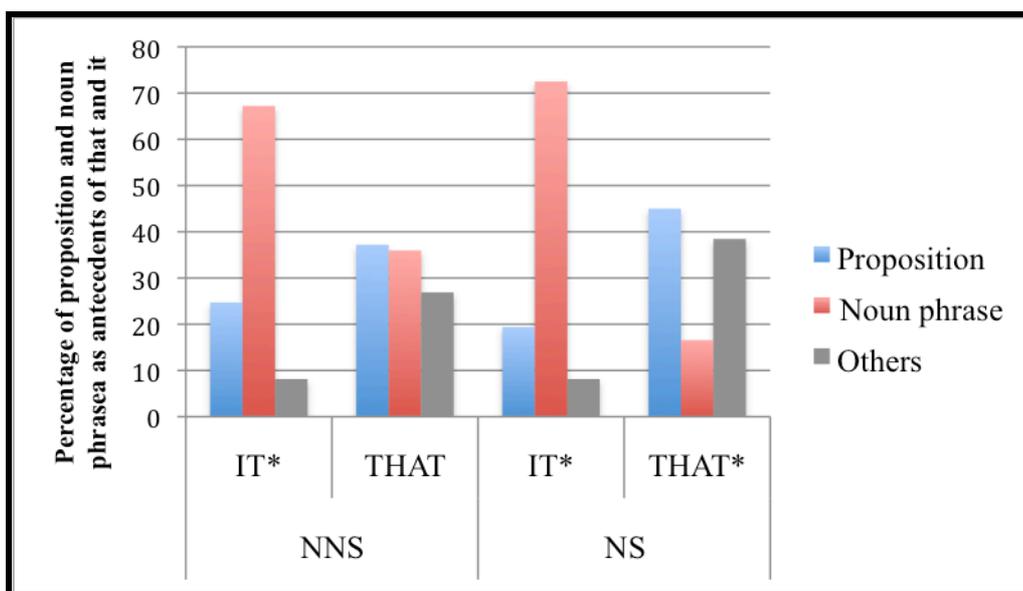
5.6. Sentence Completion Experiments 2 and 4: Comparison of Native and Non-Native Speakers of English

The comparison of the sentence completions by native and non-native speakers of English in Experiments 2 (section 5.2) and 4 (section 5.4) was carried out in order to define the antecedent preferences of *that* and *it*. It was hypothesized that non-native speakers would have clear antecedents for *that* and *it* in the norming experiment, and that their preferences would be much clearer than those of native speakers of English.

5.6.1 Method. Identical stimuli were used to those in Experiments section 5.1 and 5.3. The parts after *that* and *it* were left blank to be completed.

5.6.1.1 Participants. Sixteen paid non-native speakers from Middle East Technical University and sixteen paid native speakers from the University of Edinburgh participated.

5.6.2 Results and Discussion. A linear mixed effect regression analysis (LMER) was conducted, treating the relative proportion of references to proposition and noun phrase (proposition vs. a noun phrase) and Anaphora (*that* vs. *it*) between Language Groups (English vs. Turkish). The lmer analysis did not show the differences between groups and their referent preferences for *that* to be significant $z = -4.745$ (see Figure 14 below): Turkish participants: *conditionthat* $z = -6.183$, *Itpro/np* $t(16) = -8.228$, $p = .000$; *Thatpro/np* $t(16) = .203$, $p = .842$; English participants: *conditionthat* $z = -6.058$, *Itpro/np* $t(16) = 9.619$, $p = .000$; *Thatpro/np* $t(16) = -6.320$, $p = .000$



*p<.05

Figure 91. Percentage of proposition and noun phrases that natives and non-natives prefer for *that* and *it*

Both native speakers and non-native speakers of English had noun phrase preferences for *it*. Compared to the native speakers, the non-native speakers of English did not show any antecedent preferences for *that*. However, in the native speakers' completion, cases of *that* referring to the proposition were higher than those of *that* referring to the noun phrase. In the non-native speakers' completions, references to the proposition with *that* were higher than with *it*.

Native speakers referred to other categories in 8.13% of uses of *it* and 38.44% of uses of *that*, whereas for non-native speakers those figures were 8.13% and 26.88% respectively. (see Figure 92 below for other categories).

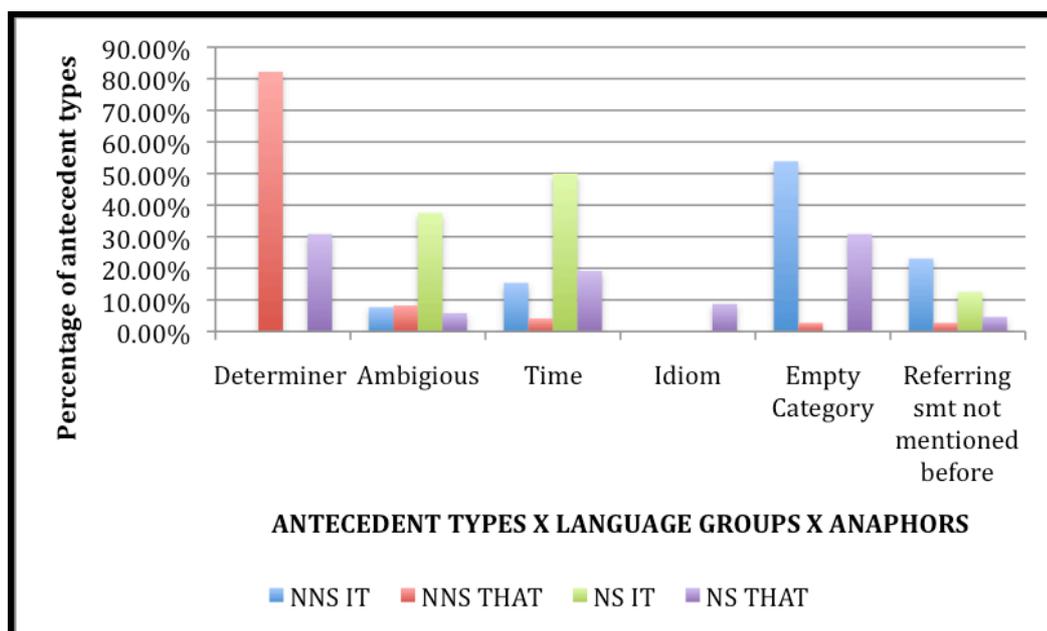


Figure 92. Percentage of other categories that non-native speakers and native speakers prefer for *that* and *it*

In the other categories, both groups used *that* as a determiner before noun phrases, *English participants: determiner = 30.81%; Turkish participants = 82.19%*. While in the native speakers' completions the percentage of *that* as an empty category was 30.81%, in the non-native speakers' completions, the percentage of *that* as an empty category was 2.74% but the percentage of *it* as an empty category was 53.85%.

In the native speakers' completions, references to the entity that had not been mentioned before was 4.65% for *that* and 12.50% for *it*, whereas in the non-native speakers' completions, those were 2.64% for *that* and 23.08% for *it*.

To sum up, both native and non-native speakers of English referred to a noun phrase using *it*, whereas unlike native speakers of English, the non-native speakers of English did not show strong antecedent preferences for *that*. The native speakers used *that* to refer to a proposition.

Both groups used *that* as a determiner. The percentages of uses of *that* in reference to a time expression and to an empty category were higher than for non-native speakers. The use of *that* ambiguously was more frequent in native speakers' completions than in those of non-native speakers.

5.7 General Conclusions

The online experiment on *it* and *that* with native speakers of English showed a trend only for the referent choices of *it* and *that*, but the pattern was not strong in eye movement measures in the participant and item analyses. Therefore, we can argue that the native speakers of English did not show any online referent preferences for *that* for two reasons. The first reason might be that both a proposition and a noun phrase in the object position are equally salient and thus the two items compete to be referents for *that*: therefore we did not see any strong preference for *that*. Another reason might be that the participant did not recognize the full stop and interpreted *that* as a pronoun in a relative clause, resulting in a slight preference for the noun phrase as a referent.

On the other hand, native speakers had a slight preference for *it* and they liked *it* to refer to a proposition. A proposition as a referent of *it* was also seen in Brown-Schmidt et al. (2005). However, their referent preference for *it* was again not strong.

Contrary to the native speakers of English, the non-native speakers of English showed a referent preference for *that* and *it*. They did form-function mapping while reading. Their referent preferences also match formal grammar rules. They like *it* to refer to a noun phrase and *that* to refer to a propositional phrase. Their referent preference for *it* was slightly stronger than for *that*. In other words, their antecedent choice for *that* was not significant in the pairwise comparison and thus their preference for *that* to refer to a proposition was only slight. Here, a question needs to be answered: why do we see different referent choices for pronoun *it* and textual deixis *that* and *this* across experiments with native and non-native speakers of English? The answer for the non-native speakers might be related to the corresponding items in Turkish. *It* and *this* both correspond to ‘*bu*’ and there would be overlapping functions in Turkish. Therefore, it would be difficult for non-native speakers to differentiate the functions of *it* from *this* in the target language. In online experiments, the antecedents or overlapping options compete with each other. On the other hand, in the experiment on *it* and *that*, there were no such competing options for *it*, or overlapping functional roles for the pair *it* and *that*, since in Turkish *that* is

equivalent to ‘*o*’ and *it* to ‘*bu*’ (see the translation of conditions into Turkish and the translation of condition 2 for *that* below). This might explain why we saw a symmetry between *it* and *that*, in line with the literature. In the online experiment non-native speakers appeared to tend to fall back on their grammatical knowledge from their mother tongue and the overlapping features between mother tongue and target language compete in the online processing.

Contrary to the findings in the online experiment with the natives, in the offline experiment with native speakers of English, we saw an asymmetry between textual deixis ‘*that*’ and pronoun confirmed ‘*it*’. Cases of *it* referring to the noun phrases were more frequent than cases of *that*. References of *that* to the proposition were more common than for *it*. Differently from native speakers, the referent choices of non-native speakers of English were not asymmetrical: no clear antecedent preference for *that* and *it* for the noun phrase was seen. Similar to the non-natives’ online readings, their antecedent preference for *that* was not strong in the offline experiment either, and thus references to the proposition and noun phrases with *that* were similar. The offline experiment showed that their antecedent preferences for *that* were indeterminate.

The effect of definiteness for *that* in the online and offline experiments was not analyzed, but such analysis would be the logical next step for future studies.

Turkish Translation of Stimuli

Condition 1

Charlotte wrote a book. **It** was a difficult job but the sale-s were spectacular.

Charlotte yazdı bir kitap . Ø ti bir zor iş ama Ø satış-lar di harikula-de .

(literal translation)

a- Charlotte bir kitap yazdı. Ø Zor bir işti ama satışlar harikuladeydi.

(actual translation)

b- Charlotte bir kitap yazdı. Zor bir işti **bu** ama satışlarharikuladeydi .

(actual translation)

Condition 2

Charlotte wrote a book. **That** was a difficult job but the sales were spectacular.

Charlotte yazdı bir kitap . **Bu** ti bir zor iş ama Ø satışlar di harikula-di.
(literal translation)

a- Charlotte bir kitap yazdı. **Bu** zor bir işti ama satışlar harikuladeydi. (actual translation)

b- Charlotte bir kitap yazdı. Zor bir işti o ama satışlar harikuladeydi. (actual translation)

Condition 3

Charlotte wrote a book. **It** was a difficult read but the sales were spectacular.

Charlotte yazdı bir kitap. Ø -ti- bir zor okunması ama satışlar harikuladeydi.
(literal translation)

a- Charlotte yazdı bir kitap. Ø Okunması zor bir kitaptı ama satışlar harikuladeydi. (actual translation)

b- Charlotte yazdı bir kitap. Okunması zor bir kitaptı **bu** ama satışlar harikuladeydi. (actual translation)

Condition 4

Charlotte wrote a book. **That** was a difficult read but the sales were spectacular.

a- Charlotte yazdı bir kitap. **Bu** ti bir zor okunması kitap ama satışlar harikuladeydi. (literal translation)

b- Charlotte yazdı bir kitap. **Bu** okunması zor bir kitaptı ama satışlar harikuladeydi. (actual translation)

CHAPTER 6

IT AND THIS REFERRING TO NOUN PHRASES

This chapter is composed of four sections. The first section presents the results of an online experiment with native speakers of English and their referent preferences for *it* and *this* to refer to a distant noun phrase and a recent noun phrase. The second section presents the referent choices of native speakers in the norming experiment. The third section presents the online processing by Turkish non-native speakers when *it* and *this* refer to either a distant noun phrase or a recent noun phrase. The fourth section presents a comparison of the online processing of native and non-native speakers of English. The final section draws some general conclusions regarding the processing and production of these expressions by native and non-native speakers of English.

6.1 Experiment 1 with Native speakers of English: *it* and *this* referring to noun phrases

The purpose of Experiment 1 was to explore the role of NP status in the referent preferences of *it* and *this*. In order to compare *it* and *this*, we designed a 2×2 (variable 1 \times variable 2) within subject experiment. We had two levels of anaphor (*it* and *this*) and two levels of noun phrases (more distant noun phrase in the subject position and more recent noun phrase in the object position). We manipulated the referents of *it* and *this* by mismatching/matching referential expressions with the features of noun phrases in subject/object positions. Two forms of referential expressions were used: a referential expression that refers to the noun phrase in the subject position (i.e.. **The room was small and had a large jug in the centre. *It/this* had a large window and looked stylish.**) or a referential expression that refers to the noun phrase in the object in the previous sentence (**The room was small and had a large jug in the centre. *It/this* had a**

large handle and looked very stylish.) Relying on the assumptions in the literature, we tested two hypotheses:

- 1- *It* refers to a distant noun phrase in the subject position when the referential expression is matched with the features of the noun phrase.
- 2- *This* refers to a recent noun phrase in the object position when the referential expression is matched with the features of the noun phrase.

In order to test our hypothesis, the conditions in the experimental stimuli were set up as in the following examples:

Condition 1: *it* referring to the distant noun phrase in the subject position

The bedroom was small and had a large bed. It had a walnut wardrobe and looked very posh.

Condition 2: *this* referring to the distant noun phrase in the subject position

The bedroom was small and had a large bed. This had a walnut wardrobe and looked very posh.

Condition 3: *it* referring to the recent noun phrase in the object position

The bedroom was small and had a large bed. It had a walnut headboard and looked very posh.

Condition 4: *this* referring to the recent in the object position

The bedroom was small and had a large bed. This had a walnut headboard and looked very posh.

We predicted that fixations would be longer when *this* referred to the distant NP in the subject position and when *it* referred to the recent noun phrase in the object position. If such longer fixations occurred, this would reinforce Gundel et al.'s (1993) and McCarthy's (1995) argument that *this* brings an activated/less salient but non-topicalized entity into discourse whereas *it* signals the continuation of the discourse though the entity is distant. Therefore, *it* would bring a salient entity into focus.

6.1.1 Method

6.1.1.1 Participants. Forty paid native English-speaking volunteers aged 21-24 from the University of Edinburgh participated, and all were unaware of the purpose of the study.

6.1.1.2 Stimuli and Design. After *it* and *this*, adjectives were used in case these words would be skipped during reading. The recent noun phrases in the object position were always used with an adjective such as ‘a large jug’, ‘a parked Ferrari’ and ‘a small cupboard’. The referent preferences of *it* and *this* were measured for semantic consistency. References of *this* or *it* to the entity were controlled by matching or mismatching features for the noun phrases (e.g. ‘*It/this* had a walnut wardrobe/headboard’, referring to either *The bedroom was small* or *had a large bed*). The referential expressions were followed by the clauses with *and* in case participants would see the word parafoveally during the fixation on the previous region.

Some of the noun phrases in the subject position used included *the bedroom*, *the hotel*, *the night club*, *the castle*, and *the fair*. The noun phrase in the subject position was a big object or an object within a big space, whereas the second noun phrase was always related to the entity in the subject position.

There were 40 experimental sentences for each of the four experimental conditions illustrated above. Four files were constructed: in each file an item appeared in only one condition and each condition appeared an equal number of times. There were 60 filler items which were similar in length to the control sentences. In the filler items, descriptions of the places or objects were given. The texts were presented as one or two written lines. The number of characters in each line was between 85 and 95. *This* and *that* in the second sentence and referential expressions always appeared towards the middle of the line. Each participant saw all the fillers.

6.1.1.3 Procedure. The one hundred and ten texts were presented in a fixed random order, such that no two experimental items appeared adjacent to each other. Thirteen participants were assigned to each list. The experiment began with

eight fillers to familiarize the participants with the experimental procedure. We used an Eyelink 1000 eye-tracker in a table-mounted mode and a chin rest was used to stabilize the participant's head. We tracked only the right eye but the viewing was binocular. Items appeared on a monitor approximately 60 cm from the participant's eyes. To see each item, the participant looked at a moving blank square on the screen and in this way, before each item, the calibration of the eyes was checked by the experimenter. After reading each item, the participant pressed the X-button on the controller to see the question and then pressed the left button for the left answer and the right button for the answer on the right.

6.1.1.4 Data Analysis. Fixations of less than 80 ms and more than 1200 ms were excluded from the analysis. Texts were divided into 4 regions:

Region 1 (antecedent): The room was small and had a large jug in the centre./

Region 2 (anaphora): It/This had/

Region 3 (disambiguating): a large window/handle

Region 4 (conjunction): /and looked/

Region 5 (Final region) stylish.

6.1.2 Results and Discussion. The condition-by-region means in critical regions are reported in Figures 93a and 93b and Table 13. The means for each region were analyzed using repeated measures ANOVA treating anaphora (it-this) and Noun phrase status (distant as a subject vs. recent as an object) as within-participant and within-item factors. Analyses were performed on the means of each participant, collapsing over items (F1), and for each item, collapsing over participants (F2). Data will be reported for three eye-movement measures: second-pass reading times, regression-path times and total reading times.

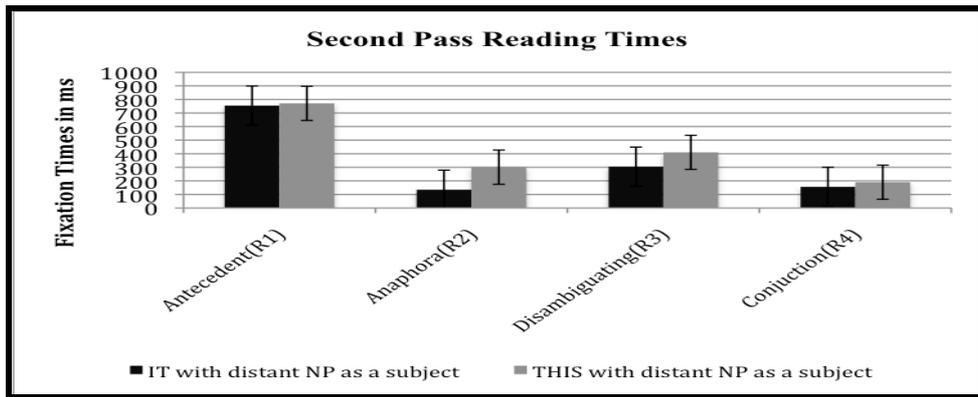


Figure 93a. Means of second pass reading times in all regions for the NP in the subject position

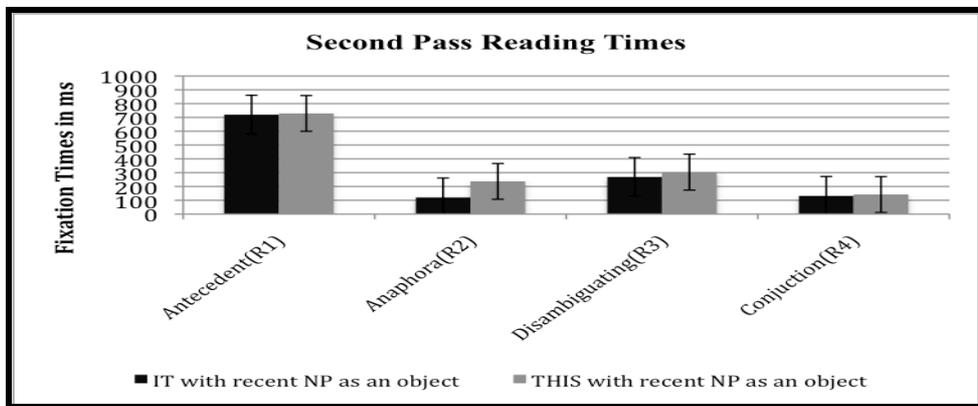


Figure 93b. Means of second pass reading times in all regions for the NP in the object position

Second pass reading time measures (see Figure 94) in the anaphora region showed a significant interaction between anaphora (*it* vs. *this*) and referent types (*distant NP as a subject* vs. *recent NP as an object*) in the participant analysis but not in the item analysis, $F_1(1, 39) = 5.432, p = .025$; $F_2(1, 39) = 2.368, p = .132$.

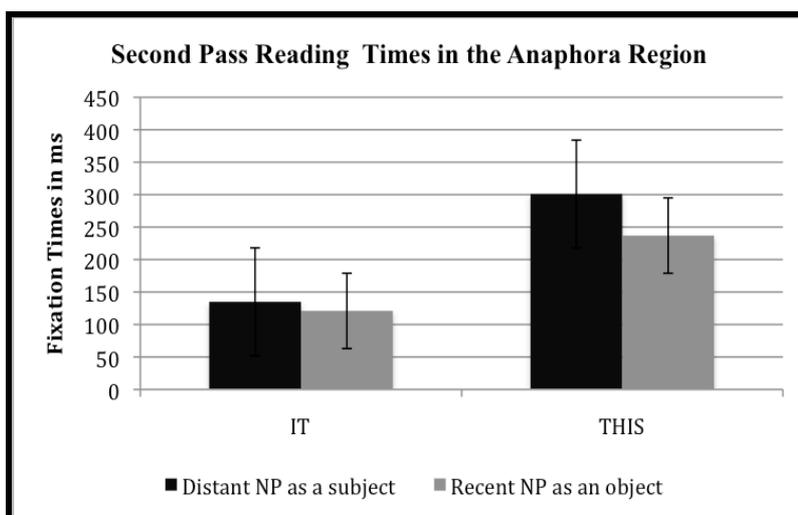


Figure 94. Means of second pass reading times in anaphora region for anaphora (it vs. this) referent types (distant NP vs object NP)

While native speakers of English did not show any preference for *it*, they preferred *this* to refer to a noun phrase in the object position, *It referring to a distant noun phrase*= 135 ms, *SE*= 20.215; *This referring to a distant noun phrase*= 301 ms, *SE*= 27.936; *It referring to a recent NP*= 121 ms, *SE*= 20.013; *This referring to a recent NP*= 237 ms, *SE*= 27.978. Pairwise comparison of *this* to refer to a distant noun phrase and recent noun phrase was significant, *This*_{subj/obj} *t*₁ (39)= 3.583, *p*= .001; *This*_{subj/obj} *t*₂ (39)= 2.067, *p*= .045. In the disambiguating region, the main effect of anaphora and referent types in the participant and item analyses was seen (see Figure 14), *Anaphora*: *F*₁(1, 39)= 11.276, *p*= .002; *F*₂ (1,39)=11.134, *p*= .002; *Antecedent*: *F*₁(1, 39)= 12.394, *p*= .001; *F*₂ (1,39)=5.018, *p*= .031 and a trend was also seen in the participant analysis but not in the item analysis, *F*₁(1, 39)= 3.227, *p*= .080; *F*₂ (1,39)=1.368, *p*= .249. The processing of *this* conditions was longer than for *it* conditions, *This*= 357 ms, *SE*= 35.212, *It*= 287 ms, *SE*= 35.281. The processing of the distant noun phrase in the object position was longer than for the recent noun phrase in the subject position, *Distant NP as a subject*= 358 ms, *SE*= 39.069, *Recent NP as an object*= 286 ms, *SE*= 30.705. The pattern showed that native speakers preferred the recent NP in the object position as a referent of *this* and *it*, *It referring to a distant NP as a subject* =305 ms, *SE*=40.405; *This referring to a distant NP as a*

subject= 410 ms, *SE*=42.790; *It* referring to a recent NP as a *subject*= 269 ms, *SE*= 32.582; *This* referring to a recent NP as an *object*= 304 ms, *SE*=35.134. The difference between *this* referring to a distant NP and *this* referring to a recent NP was significant in the pairwise comparison analysis, *This**subj/obj* *t*1 (39)= 3.106, *p*= .004; *This**subj/obj* *t*2 (39)= 2.573, *p*= .014. The proportional difference between *it* referring to a distant NP and *it* referring to a recent NP was significant in the participant analysis but not in the item analysis, *It**subj/obj* *t*1 (39)= 1.789, *p*=.081; *It**subj/obj* *t*2 (39)= .790, *p*= .434.

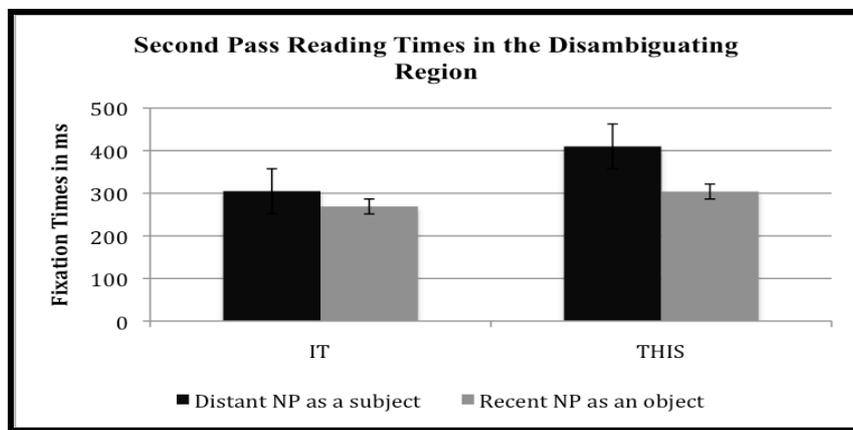


Figure 95: Means of second pass reading times in the disambiguating region for anaphora (*it* vs. *this*) referent types (distant NP vs object NP)

The final region of second pass reading times showed a significant interaction between the factors in the participant and item analyses (see Figure 96), *F*1(1, 39)= 5.114, *p*= .029; *F*2 (1,39)=5.402, *p*= .025.

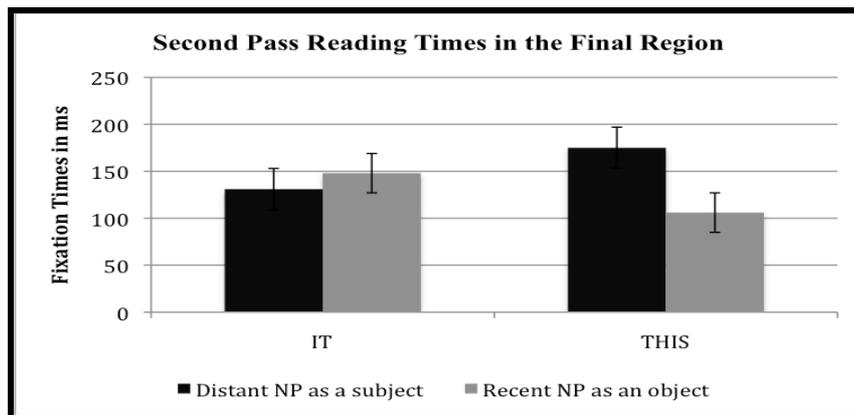


Figure 96. Means of second pass reading times in the final region for anaphora (it vs. this) referent types (distant NP vs object NP)

Natives preferred *this* to refer to a recent NP as an object and had a tendency to prefer *it* to refer to a distant NP as a subject, *It referring to a distant noun phrase*= 131 ms, SE= 23.488; *This referring to a distant noun phrase*= 174 ms, SE= 28.987; *It referring to a recent NP*= 148 ms, SE= 26.784; *This referring to a recent NP*= 106 ms, SE= 16.405. Pairwise comparison analysis supported the finding that native speakers liked *this* when referring to a recent NP in the object position, *This*_{subj/obj} *t1* (39)= 2.648, *p*= .012; *This*_{subj/obj} *t2* (39)= 2.527, *p*= .016. On the other hand, the proportional difference between *it* when referring to a distant NP in the subject position and *it* when referring to a recent NP in the object position was not significant, *It*_{subj/obj} *t1* (39)= -.610, *p*=.545; *It*_{subj/obj} *t2* (39)= -.896, *p*= .376.

Table 13. Means of total pass reading times and regression path times in all regions as a function of Anaphora (it vs. this) and antecedent types (a distant NP as a subject vs. a recent NP as an object)

	TOTAL PASS READING TIMES				REGRESSION-PATH TIMES			
	it with a distant NP	this with a distant NP	it with a recent NP	this with a recent NP	it with a distant NP	this with a distant NP	it with a recent NP	this with a recent NP
Antecedent (R1)								
ENGLISH	2,621	2,726	2,508	2,655	1,891	1,977	1,798	1,930
SD	863	1,021	904	860	596	790	468	651
Anaphora(R2)								
English	368	539	363	506	302	356	272	356
SD	146	192	173	215	116	150	99	138
Disambiguating(R3)								
English	773	825	752	730	657	743	626	718
SD	232	215	213	191	202	260	138	233
Conjunction(R4)								
English	511	546	476	487	553	655	557	589
SD	186	190	193	171	206	293	275	250
Final (R5)								
English	661	686	623	607	1,790	1,880	1,681	1,612
SD	249	183	273	183	1,220	1,162	1,299	925

In total reading time measures (see Table 13 above), we only saw main effects of antecedent in the conjunction and final regions (antecedent effect in the conjunction region: $F(1, 39)=8.776, p=.005$; antecedent effect in the final region: $F(1,39)=4.912, p=.033$). In these regions fixations when *this* and *it* referred to a distant NP in the subject position were longer than for a recent NP in the object position, *conjunction region: Distant NP as a subject= 528 ms, SE= 25.253; Recent NP as an object= 482 ms, SE= 25.849; Final region: Distant NP as a subject= 673 ms, SE= 34.333; Recent NP as an object= 615 ms, SE= 30. 843*.

Regression path times (see Table 13 above) only showed a main effect of anaphora in the disambiguating region, $F(1, 39)=10.883, p=.002$; $F(1,39)=12.491, p=.001$. Regressive eye movements happened more in the *this*

conditions than in the *it* conditions. In the final region, main effect of antecedent was seen in the participant analysis but not in the item analysis, $F1(1, 39) = 9.226$, $p = .004$; $F2(1, 39) = 1.515$, $p = .226$; *This* = 641 ms, $SE = 24.542$; *It* = 730ms, $SE = 35.846$. Regressive eye movements occurred more in cases with the distant NP as a subject than in cases with the recent NP as an object, *Distant NP as a subject* = 1836 ms, $SE = 176.969$; *Recent NP as an object* = 1646 ms, $SE = 162.375$. Interactions between the factors were not seen in the regions of regression path times.

To conclude, in the anaphora region of second pass reading times, a significant interaction between anaphora and referent types was seen in the participant analysis. The native speakers preferred *it* and *this* referring to a recent noun phrase. This indicated that they preferred to use recency strategy to resolve the ambiguity. However, later their referent preferences for both *this* and *it* changed in the final region of second pass reading times and their preferences were significant in F values and the pairwise comparisons. Instead of preferring a recent noun phrase as antecedent of *it* and *this*, they preferred *it* referring to a distant noun phrase and *this* referring a recent noun phrase. Their processing of *this* and *it* when referring to a distant and recent noun phrase indicated that they started with an anaphora processing strategy to resolve the ambiguity but later used their formal grammar rules.

It was also seen that native speakers' preferences for *it* referring to a distant NP was not as strong as their preferences for *this* referring to a recent noun phrase. The reason why we did not see a strong preference for *it* might be explained in terms of the accessibility of *it* to a NP in the subject and object positions. In the literature, it is commonly assumed that *it* prefers to refer to a linguistically presented entity (see Brown-Schmidt et al., 2005). Both NP statuses are suitable for *it* and thus two referent options compete with each other (see Kameyama, 1996). Another reason might be that the preference relating to *this* was stronger since keeping the recent entity in the short-term memory was easier than keeping the distant noun phrase. Therefore, the references of *it* to a distant noun phrase were not strong. The norming experiment was run with the native

speakers in order to investigate their referent preferences at the production stage and see whether they have similar referent preferences for *this* and *it*.

6.2 Experiment 2 with Natives: Norming Experiment

To see the role of noun statuses in the use of *this* and *it*, we used the same stimuli as in Experiment 6.1.

6.2.1 Method.

6.2.1.2 Participants. Sixteen paid native speakers of English from Edinburgh University participated. They had not participated in previous online and offline experiments.

6.2.1.2 Stimuli and Design. Identical stimuli were used to those in Experiment 1 in section 6.1. The only difference from Experiment 1 in section 6.1 was that the remainders of the sentences after *this* and *it* were removed. Native speakers of English were given sentences such as the following:

The bedroom was small and had a large bed. It/*this*

6.2.1.3 Data Analysis. Continuations were categorized in accordance with the types of antecedents defined in Experiment 1 in section 6.1. Ambiguous sentence completions and cases of illegible handwriting were referred to a native speaker of English. After the discussion of these completions with the native speaker, if the antecedents of *it* and *this* were not clear, they were handled under the category of ‘others’.

6.2.2 Results and Discussion. A linear mixed effects regression (LMER) analysis was performed to model the relative proportion of references to the distant NP as a subject (i.e the bedroom) and the recent noun phrase as an object (i.e bed). We

set up a model to treat references to the noun phrase as response variables. This analysis was based on 2 (responses: distant NP × recent NP) × 2 (types of anaphora: it × this). The lmer analysis showed that there were more references to the recent NP with *this* than to the distant noun phrase, $Z = 6.550$ $p < .05$; *This with the distant NP = 12.81 %*, *This with the recent NP = 50.00 %*, while the number of cases of *it* referring to the distant noun phrase was higher than for *this*, *It with the distant NP = 40%*; *It with the recent NP = 45%* (see Figure 97 below. It should be noted that *it* was more flexible than *this* in referring to noun phrases in object and subject positions. However, we saw that *it* is slightly more sensitive to a recent noun phrase than a distant noun phrase.

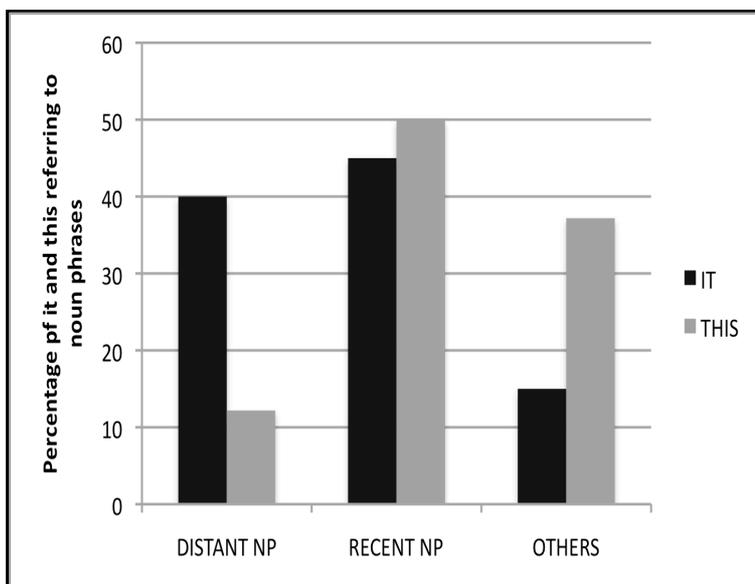


Figure 97. Percentage of distant and recedent noun phrases that natives prefer for *that* and *it*

Models in the random slope analyses also revealed a significant interaction for *this*, *Model 1: conditionthis* $z = 8.170$; *Model 2: conditionthis* $z = 7.172$; *Model 3: conditionthis* $z = 7.315$.

6.2.3 Other categories in the Experiment. In the norming experiment, the participants used *this* and *it* to refer to other entities in the given sentence. The following figure gives the percentages of the other categories *this* and *it* were used to refer to:

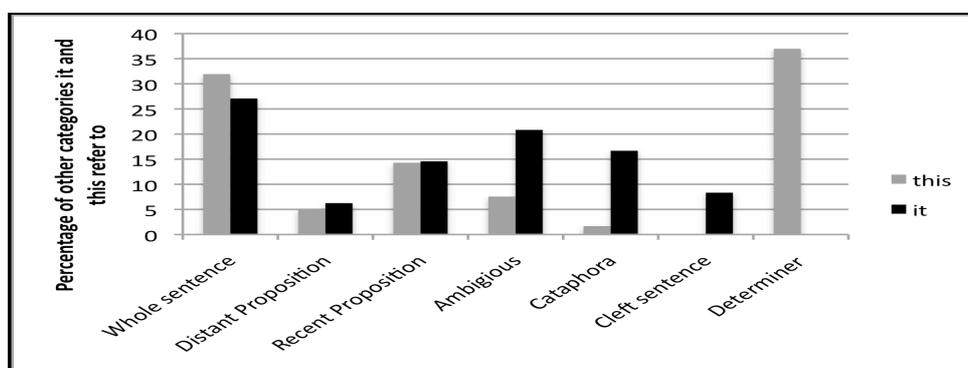


Figure 98. Percentages of other categories

31.93% of pronominal uses of *this* referred to the whole sentence, whereas 27.08% of uses of *it* picked up the whole sentence as an antecedent. Only 5.04% of the pronominal uses of *this* and 6.25% of uses of *it* pointed to the distant proposition. 14.29% of the pronominal uses of *this* and 14.58% of uses of *it* referred to a recent proposition. While 20.83% of uses of *this* were used ambiguously, 7.56 % of uses of *it* were ambiguous. In 36.97% of uses of *this*, the word was used as a determiner.

To summarize the findings of the norming experiment: native speakers of English showed a referent preference for *this*. They preferred to use *this* to refer to a recent noun phrase as an object position. They also liked to use *it* to refer to a recent noun phrase. Similar to the results of the online reading experiment in section 6.1, in the norming experiment we saw a recency effect. In other words, the recent mentioned entity is preferred to the entity mentioned earlier. However, we can say that the number of references with *it* to a distant noun phrase was higher than with *this*. Therefore, we can argue that *it* is more accessible to the distant noun phrase than *this*. The findings of the norming experiment are thus in line with those from the online experiment.

6.3 Experiment 3 with Non-Natives: *it* and *this* referring to Noun phrases

The purpose of this experiment was to explore non-native speakers' referent preferences regarding *this* and *it* when they refer to a distant noun phrase as a subject or a recent noun phrase as an object.

6.3.1 Method. The same stimuli as in Experiment 1 in section 6.1 were used.

6.3.1.1 Participants. Forty paid Turkish non-native speakers of English participated and they did not know the purpose of the experiment.

6.3.1.2 Procedure. We followed the same procedure as in Experiment 1 (see section 6.1.2.3). We used an Eyelink II in a head-mounted mode.

6.3.1.3 Data Analysis. We used identical regions to those used in Experiment 1 (see section 6.1.2.4). To recap, the following regions were used:

Region 1 (antecedent): The room was small and had a large jug in the centre./

Region 2 (anaphora): It/This had/

Region 3 (disambiguating): a large window/handle

Region 4 (conjunction): /and looked/

Region 5 (Final region) stylish.

6.3.2 Results and Discussion. The condition-by-region means in critical regions are reported in Tables 14 and 15. The means for each region were analyzed using repeated measures ANOVA treating anaphora (*it*-*this*) and Noun phrase status (distant as a subject vs. recent as an object) as within-participant and within-item factors. Analyses were performed on the means of each participant, collapsing over items (F1), and for each item, collapsing over participants (F2). Tables are given for four eye-movement measures: second-pass reading times, regression-

path times and total reading times.

Table 14. Means of second pass reading times in all regions as a function of Anaphora (*it* vs. *this*) and NP status (*a distant NP as a subject* vs. *a recent NP as an object*)

	SECOND PASS READING TIMES			
	it with a distant NP	this with a distant NP	it with a recent NP	this with a recent NP
Antecedent (R1)				
TURKISH	1,042	1,075	1,053	1,049
SD	917	973	980	1,217
Anaphora(R2)				
TURKISH	201	316	145	324
SD	179	224	125	265
Disambiguating(R3)				
TURKISH	482	536	417	529
SD	350	393	342	446
Conjunction(R4)				
TURKISH	235	261	232	248
SD	168	218	209	256
Final (R5)				
TURKISH	248	291	234	273
SD	264	312	243	310

Second pass reading times did not show main effects or any interaction between the factors *anaphora (it vs this)* and *NP status (a distant NP vs. a recent NP)*. In the anaphora region, an interaction between anaphora and noun phrase statuses was seen in the participant analysis but it was a trend in the item analysis (see Figure 99 below), $F_1 (1,39) = 4.163, p = .048$; $F_2 (1,39) = 2.939, p = .094$. Fixations were longer when *it* referred to a distant noun phrase, *It referring to a distant NP* = 202 ms, $SE = 28.373$; *It referring to a recent NP* = 146 ms, $SE = 19.690$. Pairwise comparison analysis also supported the referent preference for *it*, $t_{(40)} = 2.750, p = .009$; $t_{(40)} = 2.770, p = .009$.

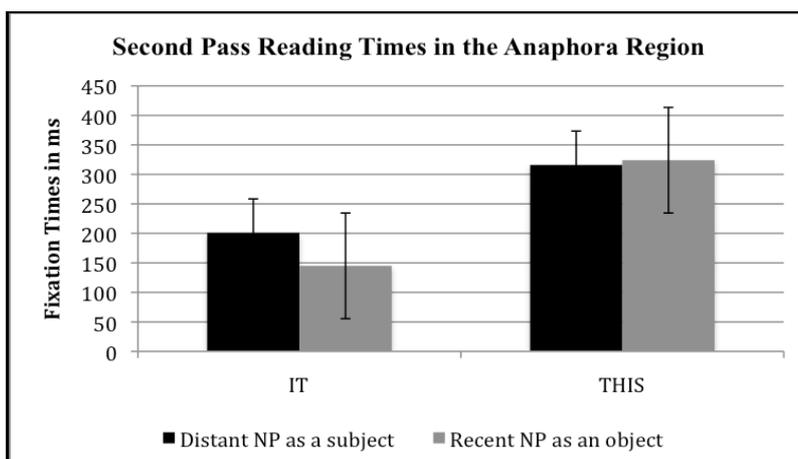


Figure 99. Means of second pass reading times in the anaphora region as a function of Anaphora (*it* vs. *this*) and NP status (*a distant NP as a subject* vs. *a recent NP as an object*)

Table 15. Means of regression path times in all regions as a function of Anaphora (*it* vs. *this*) and NP status (*a distant NP as a subject* vs. *a recent NP as an object*)

	REGRESSION PATH TIMES			
	it with a distant NP	this with a distant NP	it with a recent NP	this with a recent NP
Antecedent (R1)				
TURKISH	2,821	2,804	2,814	2,846
SD	704	457	625	748
Anaphora(R2)				
TURKISH	525	612	503	607
SD	204	212	128	192
Disambiguating(R3)				
TURKISH	957	934	958	982
SD	229	177	264	223
Conjunction(R4)*				
TURKISH	680	796	745	687
SD	266	381	285	229
Final (R5)				
TURKISH	2,435	2,758	2,424	2,963
SD	1,015	1,143	1,077	1,141

*p<.05

In the disambiguating region, only main effect of anaphora was seen but no interaction between the factors did occurred, $F1(1,39) = 6.557$; $F2(1,39) = 9.629$, $p = .004$. The processing of *this* took longer than that of *it*, $It = 449\text{ ms}$, $SE = 50.267$ $This = 533\text{ ms}$, $SE = 64.413$. In the conjunction and final regions, no main effects or interaction was observed (all $F's < 1$).

In the regression path times of the antecedent, anaphora and disambiguating regions (see Table above), no main effects or interactions between the factors were seen (all $F's < 1$). In the conjunction region, an interaction between Anaphora and NP status was evident in the item analysis and a marginal interaction was seen in the participant analysis, $F1(1,39) = 3.839$, $p = .057$; $F2(1,39) = 6.533$, $p = .015$.

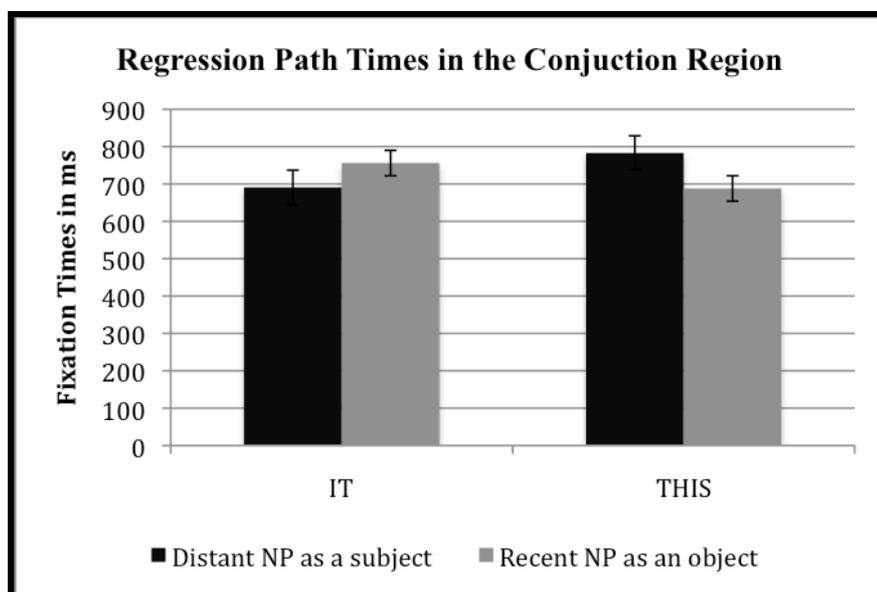


Figure 100. Means of regression path times in the conjunction region

References with *it* to the recent NP required longer fixations than those with *this*, $It\ referring\ to\ a\ recent\ NP = 745\text{ ms}$, $SE = 45.090$ $This\ referring\ to\ a\ recent\ NP = 687\text{ ms}$, $SE = 36.229$. Fixations were longer when *it* referred to the distant NP than when *this* referred to the distant NP, $It\ referring\ to\ a\ distant\ NP = 680\text{ ms}$, $SE =$

42.106 *This* referring to a recent NP= 796 ms, SE= 60.302. Pairwise analysis did not show significant differences between *it* referring to a distant NP and a recent NP, *It*distant/recentNP $t1(39)=-1.260$, $p=.215$; *It*distant/recentNP $t2(39)=-1.356$, $p=.183$. The proportional difference between *this* referring to a distant NP and a recent NP became significant in the t2 analysis and a trend in the t1 analysis, *This*distant/recentNP $t1(39)=1.704$, $p=.086$; *This*distant/recentNP $t2(39)=2.110$, $p=.041$. In the regression path times for the final region, we saw only main effect of anaphora in the item analysis and a marginal effect in the participant analysis, $F1(1,39)=3.890$, $p=.056$; $F2(1,39)=9.016$, $p=.005$. Fixations were longer in the conditions with *this* than in those with *it*, *It*= 2430 ms, SE= 139.657; *This*=2726 ms, SE= 151.126.

Total reading times did not present any main effects of interaction between the factors in all regions (all F's <1).

To conclude, Turkish non-native speakers of English did not have any referent preference for *this* and preferred the recent NP as a referent of *it* judging from the anaphora region of second pass reading times. However, the conjunction region of regression path times revealed their referent choice for *this*, too. They liked *it* referring to a distant NP and *this* referring to recent NP. However, the pairwise comparison analysis only supports the referent preference for *this*, not for *it*. Again, the non-native speakers' preferences for *this* and *it* when they referred to a distant and recent noun phrase were in accordance with the formal rules in the literature. According to the formal grammar rules they learn at school, *it* refers to an entity in the subject position, whereas *this* refers to an entity that is not a topic in the object position.

6.4 Experiment 4 with Non-Natives: Norming Experiment

The purpose of this Experiment was to examine the referent preferences of Turkish non-native speakers of English for *this* and *it*.

6.4.1 Method. To define non-native speakers' referent preferences, we used the same stimuli as in Experiment 3 in section 6.3.

6.4.1.1 Participants. Sixteen paid non-native speakers from Middle East Technical University participated. They had not participated in the previous online and offline experiments in this study.

6.4.1.2 Stimuli and Design. Two booklets were composed and each participant completed one condition of each stimulus. A sample stimuli given to the participants is in the following:

Condition 1

The room was small and had a large jug in the centre. It

Condition 2

The room was small and had a large jug in the centre. This.....

6.4.1.3 Procedure. The booklets were given out in a classroom in different sessions. Four students participated in each session. The participants were asked whether the text contained any unknown words. They were given time to look up the definitions of these words.

6.4.1.4 Data Analysis. Continuations were categorized in accordance with the types of referents defined in Experiment 3 in section 6.3 (see the categories for coding below). Ambiguous sentence completions and cases of illegible handwriting were referred to a native speaker of English. After discussion of these completions with the native speaker, if the antecedents of *it* and *this* were not clear, they were handled under the category of ‘others’.

6.4.2 Results and Discussion. A linear mixed effects regression (LMER) analysis was performed to model the relative proportion of references to the distant NP as a subject (the room) and the recent NP as an object (a jug). We set up a model to treat references to the distant and recent noun phrases as response variables. This analysis was based on 2 (responses: distantNP × recentNP) × 2 (types of anaphora: it × this). The LMER analysis showed that there were more

references to the recent noun phrase for *this* than for *the distant noun phrase*, $Z=3.559$, $p<.05$; *This with a distant NP*= 11.35 %, *this with the recent NP* = 27.47 %. Cases of *it* referring to the distant noun phrase were more frequent than those with *this*, *It with a distant NP* = 33.69%; *It with a recent NP*= 35.16% (see Figure 101 below). Models for the *this* condition in the random slope analyses were also significant, *Model 1: condition this* $z=6.255$; *Model 2: condition this* $z=4.467$; *Model 3: condition this* $z=6.237$. The proportional difference between *this* referring to a distant noun phrase and its referring to a recent noun phrase was significant, *This with a distant NP/with a recent NP* $t(15)=-3.967$, $p=.001$. The proportional difference between *this* and *it* referring to a distant NP was also significant, *This with a distant NP/It with a distant NP* $t(15)=4.635$, $p=.000$. However, the proportional difference between *it* and *this* referring to a recent NP was not significant, *This with a recent NP/It with a recent NP* $t(15)=.226$, $p=.824$.

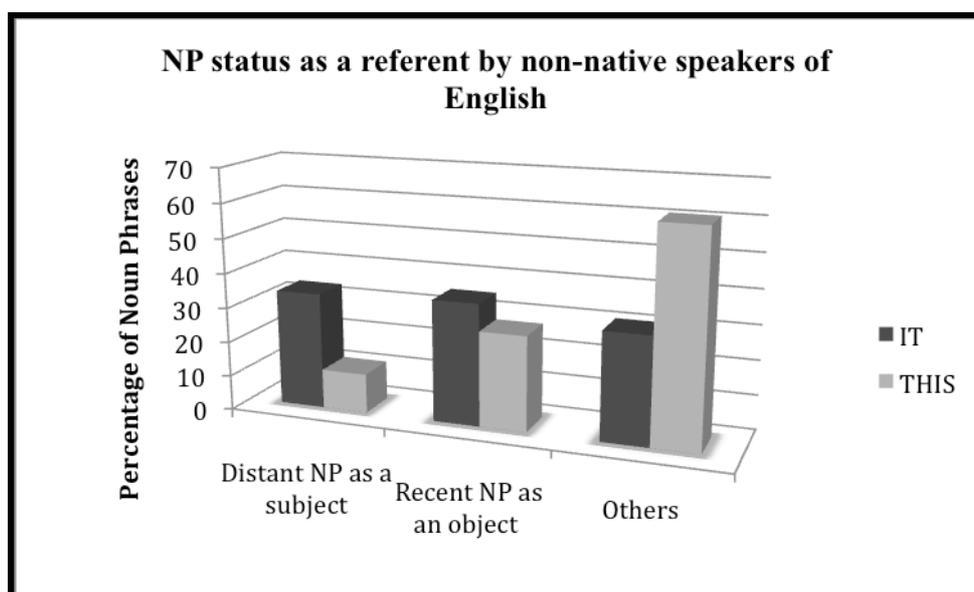


Figure 101. Percentage of *this* and *it* referring to distant and recent noun phrases

We handled 31% of *it* and 61% of *this* uses under the ‘other’ category and excluded this category from the LMER analysis (see Figure 102 below).

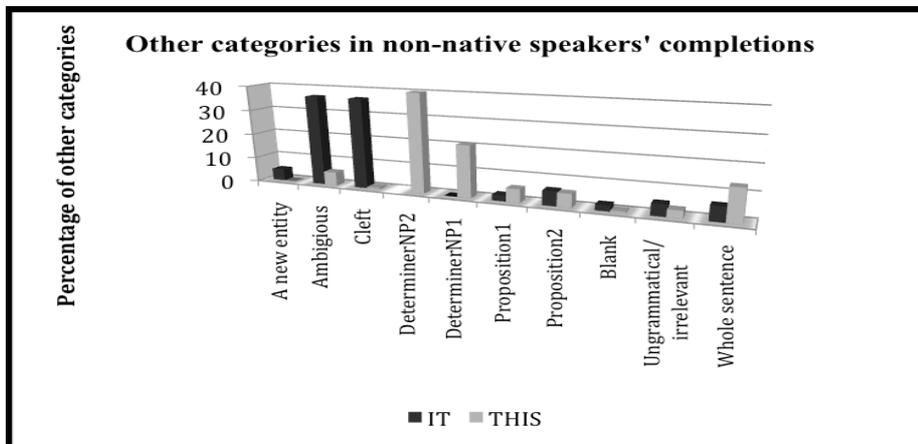


Figure 102. Other categories *it* and *this* refer to in the norming Experiment

46% of uses of *this* referred to a recent proposition; 37% of uses of *it* were ambiguous. A proposition was more frequently preferred as a referent of *this* than of *it*. A recent proposition was preferred for *this* more frequently than a distant proposition, 46% of uses of *this* referred to a recent proposition; 26% of uses of *this* referred to a distant proposition. In 37% of uses of *it*, *it* functioned as an empty pronoun in a cleft sentence, and in 4 % of *it* uses the word introduced a new focus that had not been mentioned in the previous part of the sentence.

To sum up, non-native speakers of English used *this* to refer to a recent noun phrase. A distant noun phrase was preferred for *it* rather than *this*. *It* was flexible in referring to both distant and recent noun phrases.

6.5 Experiments 1 and 3: Comparison of Online Tracking by Native and Non-Native Speakers of English

In this section, native speakers' and non-native speakers' of English online referent preferences of *this* and *it* when referring to different noun phrases are compared.

6.5.1 Method. The method used to explore native and non-native speakers of English is given below.

6.5.1.1 Participants. Forty paid native English-speaking volunteers aged 21-24 from the University of Edinburgh and thirty-three paid Turkish non-native speakers of English from Middle East Technical University participated, and all were unaware of the purpose of the study.

6.5.1.2 Data Analysis. The same regions were used as in section 6.1.1.4.

6.5.2 Results and Discussion. Independent analyses were performed on the data for each group. Also, three-way ANOVAs were conducted for the reading times for each region, with repeated measures for Anaphora (*this* vs. *it*), Noun phrase status (a distant noun phrase as a subject vs. a recent noun phrase as an object) and Language Groups (English vs. Turkish) as a between participant factor (F1) and as a within subject (F2). In the following, the means for first pass reading times, regression path times and second pass times and are given in Table 16. The regions that revealed significant interactions between the factors are discussed below.

Table 16. Means of first pass times in all regions as a function of Anaphora (*it* vs. *this*) NP status (*a distant NP as a subject* vs. *a recent NP as an object*) and Language (*English* vs. *Turkish*)

	FIRST PASS READING TIMES			
	it with a distant NP	this with a distant NP	it with a recent NP	this with a recent NP
Antecedent (R1)				
English	1,953	1,981	1,858	2,822
SD	516	519	433	817
TURKISH	2,797	2,807	2,825	2,008
SD	644	600	620	542
Anaphora(R2)*				
ENGLISH	268	304	286	309
SD	51	74	84	61
TURKISH	387	486	400	484
SD	135	211	132	189
Disambiguating (R3)				
English	417	411	484	430
SD	115	97	97	117
TURKISH	659	668	769	726
SD	167	169	192	180
Conjunction (R4)				
English	371	367	363	348
SD	89	70	98	66
Turkish	552	558	573	562
SD	180	170	174	146
Final (R5)				
English	473	491	449	474
SD	249	253	218	226
TURKISH	763	765	782	726
SD	219	239	285	268

The first pass reading times for the disambiguating region revealed main effects of anaphora, antecedent and a two way interaction between antecedent and language, *Anaphora: F1 (1,80) = 7.699, p = .007; F2 (1,39) = 8.884, p = .000; Antecedent: F1 (1,80) = 14.977, p = .000; F2 (1,39) = 7.221, p = .011; Noun phrase status X Language: F1 (1,80) = 7.064, p = .010; F (1,39) = 8.565, p = .006*. For both groups, fixations were longer for *it* than for *this* in all the conditions, *It = 708 ms, SE = 21.448; This = 450 ms, SE = 11.103*. The processing of the distant noun phrase took longer than that of the recent noun phrase, *Distant NP = 596 ms, SE = 15.129; Recent NP = 561 ms, SE = 16.802*. The figure below shows that both groups had slightly longer fixations in the distant noun phrase conditions than the recent noun phrase conditions. The fixations of Turkish participants were longer than those of native speakers of English and thus we saw a two-way interaction between noun phrase status and language.

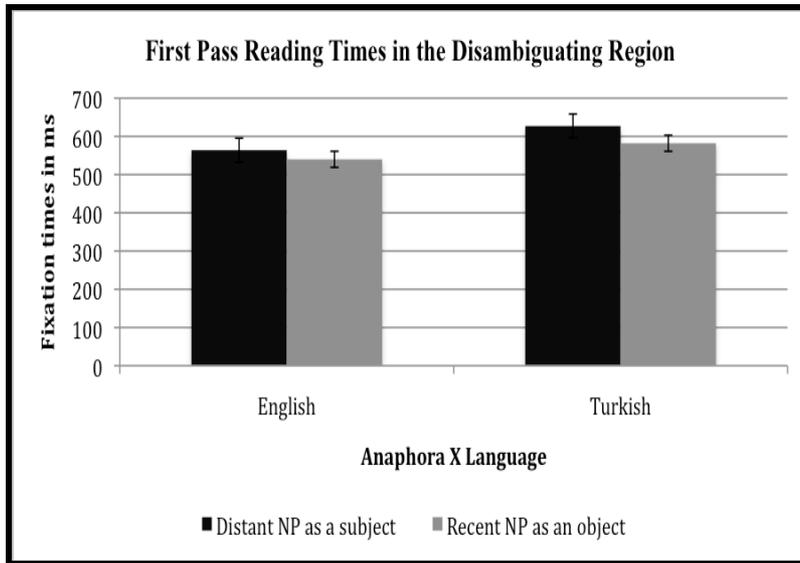


Figure 103. Means of first pass reading times in the disambiguating region as a function of language and noun phrase status.

In the first pass reading times for other regions we did not see any two- or three-way interactions between the factors. The fixation times for second pass readings are given in the following table.

Table 17. Means of second pass times in all regions as a function of Anaphora (*it* vs. *this*), NP status (*a distant NP as a subject* vs. *a recent NP as an object*) and Language (*English* vs. *Turkish*)

	SECOND PASS READING TIMES			
	it with a distant NP	this with a distant NP	it with a recent NP	this with a recent NP
Antecedent (R1)				
English	756	771	720	729
SD	623	513	666	485
TURKISH	1,042	1,075	1,053	1,049
SD	917	973	980	1,217
Anaphora(R2)*				
ENGLISH	135	301	121	237
SD	128	177	127	177
TURKISH	201	316	146	324
SD	179	224	125	265
Disambiguating (R3)*				
English	305	410	268	304
SD	256	271	206	222
TURKISH	483	536	417	529
SD	350	393	342	446
Conjunction (R4)				
English	156	191	133	248
SD	126	167	135	256
Turkish	234	261	232	142
SD	168	218	209	127
Final (R5)				
English*	131	175	148	106
SD	149	183	169	104
TURKISH	248	292	234	273
SD	264	312	243	310

* $p < .05$

In the second pass reading times for the anaphora region, a three-way interaction was visible between Anaphora (*it* vs. *this*), NP status (*a distant NP as a subject* vs. *a recent NP as an object*) and Language (*English* vs. *Turkish*), $F_1(1,78) = 8.995$, $p = .004$; $F_2(1,39) = 6.565$, $p = .014$. While Turkish participants had a clear referent preference for *it*, non-native speakers of English did not show any preference for *it*, Turkish participants: *It referring to a distant NP* = 201 ms, $SE = 24.634$; *It referring to a recent NP* = 145 ms, $SE = 19.852$; English participants: *It referring to a distant NP* = 136 ms, $SE = 24.634$; *It referring to a recent NP* = 121 ms, $SE = 19.852$. Turkish speakers liked when *it* referred to a recent noun phrase, which might be due to the limitations of the short-term memory span. T-test

results for F1 and F2 also supported the findings regarding Turkish speakers' referent preferences, too, *Turkish participants: Itdistant NP/recent NP t1(39)= 2.750, p= .009; ItdistantNP/recent NP t2(39)= 2.770, p= .009; English participants: Itdistant NP/recent NP t1(39)= 1.055, p= .298; ItdistantNP/recent NP t2(39)= .619, p= .539*. Native speakers of English showed a clear referent preference for *this* whereas Turkish speakers did not show any referent preference for *this*, *Turkish participants: This referring to a distant NP= 316 ms, SE= 31.937; This referring to a recent NP=323 ms, SE= 35.621; English participants: This referring to a distant NP= 301 ms, SE= 31.937; This referring to a recent NP= 237 ms, SE= 35.621*. Native speakers of English liked *this* when referring to a recent noun phrase, which is also supported in T-test results of F1 and F2, *English participants: Thisdistant NP/recent NP t1(39)=3.583, p=.001 ThisdistantNP/recent NP t2 (39)= 2.067, p=.045; Turkish participants: ThisdistantNP/recentNP t1(39)= -330, p= .743; ThisdistantNP/recent NP t2 (39)= -441, p=.661*.

The second pass reading times in the disambiguating region revealed a marginal three-way interaction in F1 but not in F2, *F1 (1,78)= 3.936, p= .051; F2 (1,39)= 2.223, p= .144*. The pattern showed that native speakers of English preferred when *this* referred to a recent noun phrase as an object, *Turkish participants: This referring to a distant NP= 536 ms, SE= 53.375; This referring to a recent NP=529 ms, SE= 55.731; English participants: This referring to a distant NP= 410 ms, SE= 53.375; This referring to a recent NP= 304 ms, SE= 55.731*. T-test results for F1 and F2 also supported the native speakers' preference for *this*, *English participants: This referring to a distant/recent NP t1(39)= 1.789, p= .081; This referring to a distant/recent NP t2(39)= 3.106, p= .004*. Again, non-native speakers of English did not show any preference for *this* and had a tendency to like *it* referring to a recent noun phrase, *Turkish participants: This referring to a distant/recent NP t1(39)= 210, p= .835; This referring to a distant/recent NP t2(39)= -107, p= .915*. Fixation times in all regions of total reading times are given in Table 18.

Table 18. Means of total reading times in all regions as a function of Anaphora (*it* vs. *this*), NP status (*a distant NP as a subject* vs. *a recent NP as an object*) and Language (*English* vs. *Turkish*).

	TOTAL PASS READING TIMES			
	it with a distant	this with a distant	it with a recent	this with a recent NP
Antecedent (R1)				
English	2,621	2,725	2,508	3,765
SD	863	1,021	904	1,264
TURKISH	3,735	3,759	3,751	2,654
SD	991	997	924	860
Anaphora(R2)				
ENGLISH	368	539	363	505
SD	146	192	173	215
TURKISH	562	788	524	793
SD	211	286	171	304
Disambiguating (R3)				
English	773	1,206	752	730
SD	267	412	239	256
TURKISH	1,144	822	1,182	1,256
SD	373	293	359	483
Conjunction (R4)				
English	511	546	476	487
SD	186	190	193	171
Turkish	786	820	804	808
SD	241	261	252	308
Final (R5)				
English	661	686	623	607
SD	249	268	273	183
TURKISH	1,018	1,068	1,029	1,005
SD	324	377	442	399

In the disambiguating region, we only see a two-way interaction between NP status and language in both F1 and F2, $F1(1,78) = 6.776, p = .011$; $F2(1,39) = 6.856, p = .013$. In other regions, neither a two- or three-way interaction between the factors was seen.

The following table gives the fixation times for regression path time measures:

Table 19. Means of total reading times in all regions as a function of Anaphora (*it* vs. *this*), NP status (*a distant NP as a subject* vs. *a recent NP as an object*) and Language (*English* vs. *Turkish*).

	REGRESSION PATH TIMES			
	it with a distant NP	this with a distant NP	it with a recent NP	this with a recent NP
Antecedent (R1)				
English	1,891	1,977	2,825	1,930
SD	596	790	620	651
TURKISH	2,797	2,821	1,798	2,823
SD	644	646	468	817
Anaphora(R2)				
ENGLISH	302	356	271	612
SD	116	150	99	252
TURKISH	514	618	489	355
SD	280	324	233	138
Disambiguating (R3)				
English	657	742	950	718
SD	202	260	239	233
TURKISH	955	934	626	968
SD	257	231	138	256
Conjunction (R4)				
English	553	655	556	589
SD	206	293	275	250
Turkish*	691	783	756	688
SD	248	314	294	227
Final (R5)				
English	1,789	1,880	1,681	1,612
SD	1,220	1,162	1,299	925
TURKISH	2,470	2,784	2,489	2,687
SD	1,579	1,940	1,738	2,218

*p<.05

Regression path time measures in the conjunction region only revealed a two-way significant interaction between anaphora and antecedent, $F1(1,78) = 4.114$, $p = .046$ $F2(1, 39) = 1.462$, $p = .017$. Separate ANOVA's showed that the two-way interaction was present in the Turkish speakers' data but not in the English speakers' data, $F1(1, 78) = 3.389$, $p = .057$; $F2(1,39) = 6.553$, $p = .015$. Turkish participants started to have native-like preferences for *this* and *it*. Fixations were longer when *this* referred to a distant noun phrase than when *it* did so. They had a tendency to like *it* when referring to a distant noun phrase. T-test results supported the proportional difference between *this* referring to a distant noun phrase and a recent noun phrase, *Turkish participants: This with a distant noun phrase/recent*

noun phrase $t1(39) = 1.704, p = .086$; *This with a distant noun phrase/recent noun phrase* $t(2) = 2.110, p = .041$. However, the difference between *it* referring to a distant noun phrase and to a recent noun phrase was not significant in T1 and T2 results, *Turkish: It with a distant noun phrase/recent noun phrase* $t1(39) = -1.260, p = .215$; *It with a distant noun phrase/recent noun phrase* $t2(39) = -1.356, p = .183$.

To summarize the results of the comparison between English and Turkish speakers of English, the second pass reading times in the anaphora region demonstrated that Turkish speakers did not show any referent preference for *this*, whereas English speakers liked *this* when referring to a recent noun phrase as an object. Also, the same referent preference of English speakers for *this* was seen in the second pass reading times for the disambiguating region. In the regression path time measures for the conjunction region, Turkish speakers showed referent preferences for *this* and *it*. Their preferences were in line with the native speakers' referent preferences, as seen in the second pass reading times in the anaphora and final regions. Both groups liked *this* referring to a recent noun phrase. For both groups, there was a slight preference for *it* when referring to a distant noun phrase but that preference was not significant in t-test results.

The pattern in this experiment has two implications in relation to the literature. The first implication is that, as assumed in the literature, *this* brings an unattended entity into focus. According to this assumption, the entity in the subject position, which is accepted as a topic of discourse, is more focused than an entity in the object position. Therefore, instead of *this*, *it* brings a focused entity into focus. However, in the results we did not see any referent preference for *it*, which indicated that topicality and the syntactic positions of the noun phrase may not on their own be adequate to explain referent preferences for *it*. The noun phrase as a subject or an object can be brought into focus by *it*. Here, *this* is more sensitive to the degree of focality than *it*. The second implication of this experiment is that Turkish speakers of English achieved native-like performance immediately after the disambiguating region: both Turkish and English speakers have the same referent preferences regarding the noun phrase status as a referent of *this* and *it*. However, their online processing was observed to be different. In

the determination of antecedents, native speakers of English initially used a recency strategy, whereas the non-native did not. In the final region, the native speakers' initial preferences changed in the direction of the formal rules in the literature. The non-native speakers only obeyed the rules of grammar. They firstly decided the antecedent of *it*, which was more unmarked, salient and known than *this*. Later, they interpreted the antecedent of *this* which was marked and less used and salient compared to *it*.

6.6 Sentence Completion Experiments 2 and 4: Comparison of Native and Non-Native Speakers of English

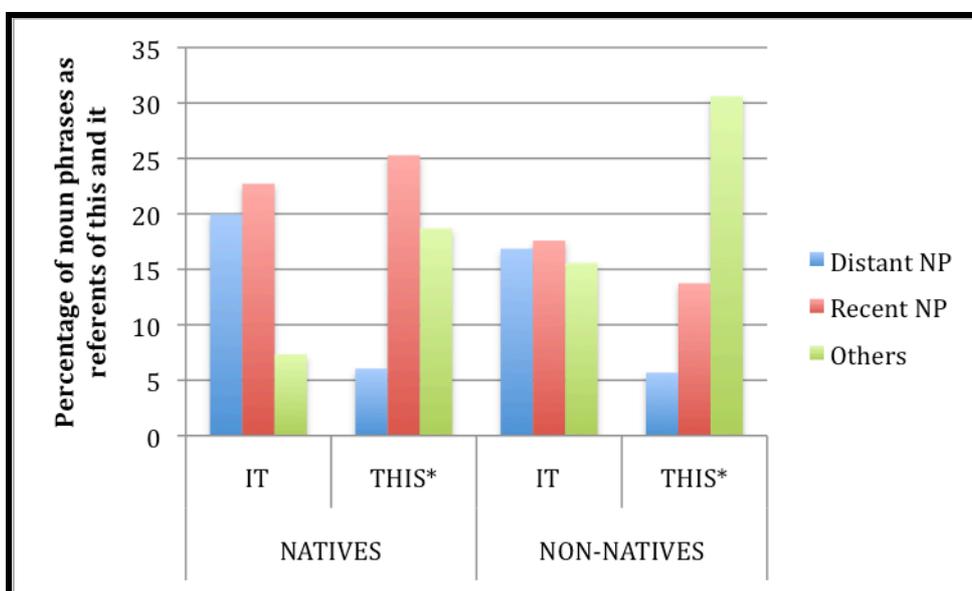
We explored which noun phrases native and non-native speakers would select as referents of *this* and *it* if they were asked to complete sentences. We hypothesized that native speakers' preferences would be much stronger in the production experiment and non-native speakers would have time to tap their explicit knowledge and would perform with native-like proficiency.

6.6.1 Method. Identical stimuli were used to those in Experiment section 6.1. The parts after *this* and *it* were left blank to be completed.

6.6.1.1. Participants. Fourteen paid non-native speakers from Middle East Technical University and fourteen paid native speakers from the University of Edinburgh participated.

6.6.2. Results and Discussion. A linear mixed effect regression analysis (LMER) was conducted, treating the relative proportion of references to Noun phrases (distant NP vs. recent NP) and Anaphora (*this* vs. *it*) between Groups (English vs Turkish). The lmer analysis did show the main effect of *this* to be significant, $z = 6.241$ (see Figure 12 below), *English participants: conditionthis* $z = 6.529$, *Turkish participants* $z = 3.559$. The interaction between condition (i.e *this* or *it*) and language was not significant, $z = -1.258$. The pairwise comparison of English participants' references of *it* to a distant and recent entity was not

significant, whereas that of *this* to a distant and recent entity was significant, *It with a distant NP/with a recent NP* $t(14) = -168, p = .869$. On the other hand, the pairwise comparison of Turkish non-native speakers' references of *it* to a distant and recent entity was significant but their pairwise comparison of references of *this* to a distant and recent entity was not significant, *This with a distant NP/with a recent NP* $t(14) = -10.370, p = .000$; Turkish participants: $z = 3.559$, *It with a distant NP/with a recent NP* $t(14) = -3.577, p = .003$; *This with a distant NP/with a recent NP* $t(14) = -164, p = .872$.



* $p < .05$

Figure 104. Percentage of noun phrases that natives and non-natives prefer for *this* and *it*

Both native speakers and non-native speakers of English had the same noun phrase preferences for *this* and *it*. Both groups used *it* to refer to distant and noun phrases. However, references of *it* referring to a distant noun phrase were higher than those of *this*. Again, both groups used *this* to refer to a recent noun phrase. Native speakers used *it* to apply to other categories in 7.3 % of cases, and *this* to apply to other categories in 18.68 % of cases, whereas non-native speakers used *it*

in 56 % of cases and *this* in 30.58 % to refer to other categories (see Figures 105 and 106 below for other categories).

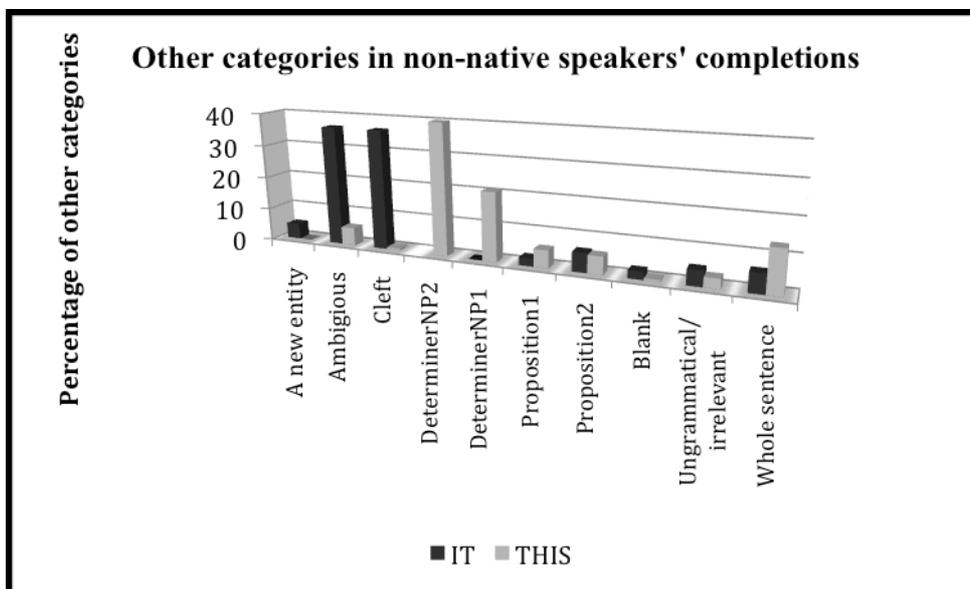


Figure 105. Percentage of other categories that non-native speakers prefer for *this* and *it*

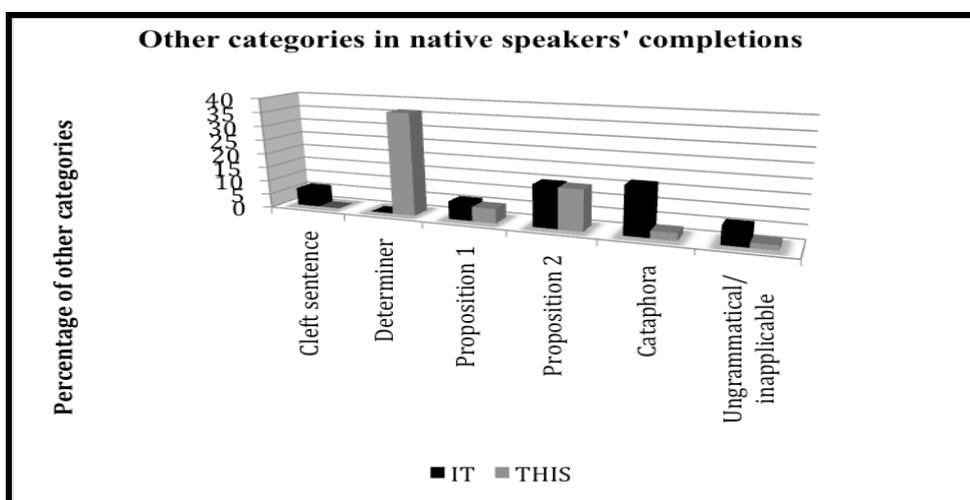


Figure 106. Percentage of other categories that non-native speakers prefer for *this* and *it*

In the other categories, both groups used *this* as a determiner before noun phrases, *English participants: Determiner = 36.44%; Turkish participants= Determiner NP1= 20.96%; Determiner NP2= 40%*). Both groups used *this* to refer to a whole

sentence, *English participants: It= 27.66%, this= 32.2%; Turkish participants: It= 5.88%, This= 13.17%*. References to propositions by the non-native speakers were less frequent than those by native speakers, *English participants: Propositions with it= 21.22%, Propositions with this= 19.49%; Turkish participants: Propositions with it= 8.23%, Propositions with this= 10.78%*).

To sum up, both native and non-native speakers of English referred to a recent noun phrase using *this*, whereas the frequency of references with *it* to distant and to recent noun phrases were similar. However, in both groups, references with *it* to a distant noun phrase were more common than those with *this*. Native speakers had a tendency to use *it* to refer to a recent noun phrase. Both groups used *this* to refer to a whole sentence. In the other category analysis, the percentage of propositions as referents of *it* was lower in native speakers' completions than in non-native speakers'.

6.7 General Conclusion

In the online experiment, native speakers firstly selected a recent noun phrase as the antecedent of *this* and *it* in the anaphora region of second pass readings. In the last region of second pass readings, their preferences changed in the direction of the formal rules and the pre-experiment prediction. They preferred *this* referring to a recent noun phrase and *it* referring to a distant noun phrase. On the other hand, Turkish speakers did not have any antecedent for *this* and they preferred *it* referring to a distant noun phrase. Their initial preference for *it* matched with the formal rules given in the literature. In the second pass reading times for the conjunction region, they showed a preference for *this* and they preferred *this* referring to a recent noun phrase. They kept their antecedent preference for *it* the same. The online experiment with Turkish speakers showed that the L2 learners were trying to apply prescriptive rules that they learned in language classes. The prescriptive rules they learned at school regarding the use of *it* and *this* are different: while they learn that *it* should be used to refer to an entity in the subject position, they learn that *this* should be used to refer to an entity that is not in the subject position. Then, one could argue that if the prescriptive rules were used by

the L2 learners, why did the L2 learners not show a strong preference for *it* referring to a distant noun phrase? One possible reason might have been the limitation of the short term memory, since the distant noun phrase may not have been prominent in their short memory. Or, as the offline experiment showed, the Turkish non-native speakers used *it* to refer to both distant and recent noun phrases. This might be another reason why the strong distant noun phrase preference was not evident in the online and offline experiments. Native speakers' preferences for *it* were also flexible: NPs in the subject and object positions might have been competing referent choices since in their descriptive grammar, *it* might be able to access noun phrases in the subject and object positions.

In the norming Experiments with native and Turkish non-native speakers of English, there were more references to *this* referring to a recent noun phrase and *it* referring to a distant noun phrase. Our results in the online and offline experiments support Kaiser and Trueswell's (2008) multi-functional approach to anaphoric expressions. They propose that the sensitivity of anaphoric expressions to different referents varies from one form to another. The findings of this study supported Filik, Paterson and Sauerman's findings (2009) regarding how 'highly-complex semantic-pragmatic information associated with different focus-sensitive particles' played a role in sentence processing. In the online processing of noun phrases as antecedents of *this* and *it*, encoded pragmatic and semantic information affected the referent preferences for *this* and *it*. *This* brought an unfocused but activated noun phrase into foci, whereas *it* had a tendency to bring a topic in the subject position as a distant noun phrase into focus. Or, it might be argued that encoded pragmatic and semantic information in *it* enabled it to access both distant and recent noun phrases and signalled that either can be a topic in the following section with respect to the intention of the user. This also supports Clifton and Ferreira's (1987) explanation on the superfluity of saliency and distance accounts, and suggests a noun phrase in the subject or the object position can be 'equally good for' a pronoun. The findings regarding the references of *this* to a recent noun phrase point to the role of attentional and foci states in the selection of one anaphoric expression and anadeictic function of *this*. Cornish stated that deixis functioned like anaphors (referring back) and pointers to less focused entities.

Therefore, *this* not accessing the distant entity also indicates its anadeictic function, which is different from anaphors.

Our results supported Poesio and Modjeska's *this*-NP hypothesis (2005). Poesio and Modjeska (2005) performed an annotation study to identify the cognitive statuses of noun phrases (i.e. activated or in focus) as referents of *this*. They defined noun phrases as being 'activated' and 'in focus' in terms of the tenets of Centering Theory (Grosz, Joshi and Weinstein, 1995; Walker, Joshi and Prince, 1998) and Gundel, Hedberg, and Zacharski's activation hierarchy (1993). Their *this*-NP hypothesis was that 'this-NPs are used to refer to entities which are activated. However, pronouns should be preferred entities in focus' (p. 3). CT defined the most highly ranked entity which was topic in the subject position, can be backward-looking centers. Therefore, *this*-NPs would be used to refer to entities other than backward-looking centers and the most highly-ranked entity. Our online and norming experiments' findings were in line with Poesio and Modjeska's findings. There were preferences for *this* referring to a less salient noun phrase in the object position instead of to a highly salient entity in the subject position. Our findings on *this* also supported Linde's (1979) and Passonneau's (1989) hypotheses. Linde and Passonneau proposed that discourse deixis referred to an entity that is not the topic but that is salient.

Though Nicolay and Swinney (1988, 1999) studied the role of NP statuses in the processing of relative clauses (i.e. *The boxer knew that the doctor for the team was sure to blame him/himself for the injury*), they listed constraints that had a role in anaphora processing. Syntactic positions of information (i.e the positions of NPs as subjects or objects) and their prominence in the memory were the constraints on anaphora processing and these constraints were effective in the selection of the initial candidate for referential expressions. They claimed that NPs in the subject position were more prominent in the memory than those in the object positions. They found that after the pronoun, 'the syntactically appropriate antecedent was reactivated'. In other words, the topic (i.e subject NPs) in a subject position was more often preferred than NPs in an object position. In our online experiments, we found that a syntactically appropriate referent was activated for

this and *it*, but that referent changed with respect to the encoded pragmatic and semantic significance inherent in *this* and *it*.

The results of the online reading experiments in this study supported the findings in the psycholinguistic studies regarding the affect of focus on eye movement measures (Birch and Rayner, 1997; Filik, Paterson and Sauermann, 2009; Sturt, Sanford, Stewart and Dawydiak, 2004; Ward and Sturt, 2007). Similar to the findings of these studies, the focus effect was only seen in the late eye movement measures, not in the early measures. Native speakers' preferences for *this* as re-establishing focus were seen in the final region of second pass reading times and the anaphora region of the second pass reading also showed the same preference. However, it is worth saying that the non-natives' preference for *this* occurred in the conjunction region of the regression path times, which also signaled that the non-native speakers of English used their syntactic knowledge to clarify the ambiguity. This also supported Clahsen and Felser's (2005) argument regarding the mental representation of the target language by L2 learners and Sorace's (2000) suggestion that L2 learners are good in terms of syntactic knowledge but not when it comes to knowledge of discourse and pragmatics.

CHAPTER 7

SUMMARY AND GENERAL DISCUSSION

This chapter consists of two major sections. The first section, 8.1, summarizes the results of the experiments in the study and presents the general conclusions to be drawn on the basis of these results. Section 8.2 presents the implications of the present study, while the next section provides suggestions for further research.

7.1 Summary of the Study and General Conclusions

The aim of this study was to investigate two main issues: (1) the functional specifications that the literature assumes to be inherent in *this*, *that* and *it*, and to guide sentence processing in different ways; (2) the procedural instructions *this*, *that*, and *it* signal to native and non-native speakers of English, and the similarities and differences between Turkish non-native speakers of English and native speakers of English in the online and offline processing of these expressions. In the following, each of these main issues is handled in turn.

7.1.1 Functional specifications inherent in *this*, *that* and *it* in online and offline experiments. In order to investigate the functional specifications of *this*, *that* and *it*, three groups of online and offline experiments were run. In the first group of experiments (see sections, 3.1, 3.2, and 3.4), where the functional specifications of *this* and *that* were controlled by their access to discourse segments (i.e the left frontier vs. the right frontier), *this* and *that* did not guide the native speakers of English to different segments and thus to different processing. The use of *this* and *that* to refer to the right frontier was preferred over reference to the left frontier. This finding supports Webber's (1988) assumption regarding the access of *this* and *that* to the right frontier. Contrary to McCarthy's (1994) assumption regarding *that*, the use of *that* to refer to the right frontier in focus was preferred over its use to refer to the left frontier, which is not current or

marginalizable. In Experiment 3 in section 3.4, and in the corpus study, it was also found that only *this* could access the left frontier and bring an unfocused entity there into focus. In Experiment 3, even when the semantic content made a deictic connection to the right frontier unfeasible, a deictic connection to the left frontier still seemed difficult for readers to make. This problematizes Asher and Lascarides' (2003) assumption that the left frontier can be accessed when semantic or rhetorical relations are established between the unit with discourse deixis and its antecedent. However, the production and corpus study revealed another story from that told by the online reading experiments on *this* and *that*. The production experiment did reveal a slight statistical difference in the relative frequencies with which *this* and *that* access the left frontier. Yet in all these cases, *this* accessed the left frontier more frequently and easily than *that*, again contradicting the assumptions of Çokal (2005), Cornish (2001), McCarthy (1995), and Webber (1988). The access of *this* to the left frontier supports the hypotheses of Asher and Lascaride's and Grosz and Sidner's (1986) regarding the accessibility of the left frontier to referential expressions if and only if a semantic relation and intentional structure is established between the information in the current and the earlier clauses.

All this indicates that the functional specifications of *this* and *that* regarding the access to the left and right frontier can vary between the production and the reading processes. Such variations in functional specifications might be due to the different components used in the production and the writing processes. In the production processes, the intentional state of the writer/speaker plays a role in the choice of *this* or *that*. If the intention of the speaker is to talk about an unfocused entity, then s/he slightly prefers to use *this* rather than *that*, since *this* is intention-marked and can thus access an early clause, whereas *that* is only focused-marked and cannot. On the other hand, in the reading processes, the working memory and readers' attentional states have central roles. During reading, according to Garrod and Sanford's Focus Memory Framework (1977), the *explicit focus* and the *implicit focus* are active. The explicit focus corresponds to the entities currently in focus, whereas the implicit focus contains currently active background information such as text scenario or first event chunk. For

readers, the right frontier is generally the explicit focus in the working memory, whereas the left frontier corresponds to the implicit focus. Thus the mapping of the left frontier with the deictic expressions in the explicit focus is too weak to be retrieved. Shallow processing, then, occurs when *this* and *that* refer to the left frontier. Since *this* and *that* are focus-marked in reading, they do not guide sentence processing differently. This also demonstrates that during the processing of discourse deixis in reading not only co-textual processing but also focus-marked mental representation occurs.

In the second group of experiments in sections 4.1, 4.2, 4.3, 5.1 and 5.2, the functional specifications of *this*, *that* and *it* regarding their antecedent types (i.e. a proposition or a noun phrase) were investigated. In the literature, it is widely assumed that *this*, *that* and *it* refer to different antecedent types and thus establish different foci/attentional states in discourse (see McCarthy, 1995, Passonneau, 1989, Webber, 1989). An unmarked item *it* is assumed to refer to a topical entity in current focus whereas *this* and *that* are assumed to signal a shift of focus by referring to a less-salient entity. As in the online experiments given above on the access to the frontiers, in the online experiment, contrary to the assumptions in the literature, the functional specifications inherent in *this*, *that* and *it* did not strongly guide native speakers' sentence processing in different ways: instead, shallow processing occurred. In Experiment 4.2, however, native speakers showed a tendency to use *this* to refer to a proposition and *it* when referring to a noun phrase, while in Experiment 5.1., they had a tendency to use *that* to refer to a noun phrase and *it* to refer to a proposition. The tendency regarding *this* and *it* matches the predictions based on Webber's findings from the corpus study, Passoneous's (1989) claim that referential deictic expressions prefer a non-subject entity as an antecedent, and the results of the other experimental studies (Brown-Schmidt et al., 2005; Kaiser et al., 2008 and Fossard et al., 2011). On the other hand, the tendency for *that* to refer to a noun phrase did not support the experimental findings of Brown-Schmidt et al. and Webber's and Passoneous's claims. The change of native speakers' preferences regarding *it* might be understood to reinforce Gundel et al.'s (2003) proposal, showing that *it* can refer to both a proposition and noun phrase.

On the other hand, clear asymmetrical functional specifications of *this*, *that* and *it* were observed in the norming experiments in sections 4.3 and 5.2: *it* was used for a noun phrase and *that* and *this* were used for a proposition. The findings in the norming experiment support the arguments regarding the contrastive antecedent preferences of *it* and *that* (Webber, 1988; Brown-Schmidt et al., 2005) or the different degree of referent choices in the multi-functional approach (Kaiser et al., 2008). Again, such reaction differences to the functional specifications of *this*, *that* and *it* can be explained in terms of the distinction between the characteristics of the reading and the writing processes.

The third group of experiments in section 6.1, where the role of the NP status (i.e. a distant noun phrase and a recent noun phrase) in the referent preferences of *it* and *this* was explored, revealed that functional specifications in *this* and *it* relating to the selection of noun phrase status as antecedent guided sentence processing in the last region of the second pass reading differently. It is worth saying that the native speakers' first preference was for the recent noun phrase for *this* and *it*, since they preferred to use a recency strategy to disambiguate. Later, their preferences in relation to *this* were for the recent entity, and for *it*, the distant entity. The preferences in the online reading supported Gundel et. al's (1993) and McCarthy's (1994) statements on *this* bringing an activated/less salient but non-topicalized entity into discourse and *it* signalling the continuation of the discourse although the entity is distant. It was also seen that their access via *it* to a distant noun phrase antecedent was not strong as it was for *this*. The same pattern in the type of noun phrase regarded as antecedent was also seen in the norming experiment. The references with *this* to the recent noun phrase were more frequent than those with *it*, and the references with *it* to the distant noun phrase were more frequent than those with *this*. Similar to the online reading experiment, the number of uses of *it* to refer to a distant noun phrase and to a recent noun phrase was very similar, which also supported Clifton and Ferreira's (1987) suggestion that the subject and object noun phrases can be antecedents for pronouns. The results showed that the proposals on the functional specifications on *it*, which assumed *it* only access to the a distant noun phrase, should be approached tentatively, since the continuation of the topic can be

carried out by referring to a distant or a recent entity. The online and offline findings on the functional specification of *this* regarding the noun phrase status showed the anadeictic function of *this* when referring to the recent entity. Cornish (2007) defined anadeictic expressions as those that can retrieve an already presented referent within a discourse representation and whose referent does not have to be highly salient. Therefore, it can be argued that the anaphoric expression *it* can be flexible, referring to either a distant or a recent noun phrase, and that the foci status and syntactic noun phrase statuses *it* creates are not prior. On the other hand, the noun phrase status of *this* is strictly governed by the foci status *this* signals. This indicates that *this* has a special function and specification that makes it different from anaphoric *it*. The sensitivity of *this* to the level of foci was much more prominent than topicalisation. This finding of the study also supported Fossard and Rigalleau's (2006) findings on the distinction between French demonstratives and anaphors. Fossard and Rigalleau found that the referential functioning of the demonstrative pronoun *celui-ci/celle-ci* was constrained in terms of entity focusing, but in an opposite way in comparison with that of the 3rd person pronoun *il/elle*. Our findings showed the sensitivity of *this* to the level of foci, and *this* generally brought the less salient noun phrase into focus.

These three group of experiments showed that the functional specifications of *it*, *this* and *that* are not as visible in the online reading tasks as the assumptions in the literature would suggest, since several factors play roles in their processing and use. In the processing of these expressions the following uncontrolled factors play a role: the working memory, the limitations of the working memory, the attentional states of the reader, the anaphora processing strategies, shallow processing, less inferential processing, the personal use and experiences of each participant with regards to discourse deixis (e.g. his/her dialect). In the offline production experiment, except for the experiments on the access of *this* and *that* to discourse segments, the functional specifications specified in the literature on *this*, *that* and *it* were seen, with slight differences which might be due to the participants' accessing their explicit knowledge instead of their implicit knowledge.

The third group of online experiments showed the functional specifications as in line with the literature, and the reason for this might be the type of antecedents the first and second experiment explored. The third group of experiments focused on the noun phrase as an antecedent type. It explored the basic syntactic rule that governed the use of *this* and *it*. Of the three types of antecedent (discourse segment, proposition and noun phrase) access to the noun phrase by the deictic expression is far more explicit, relying less on inference than the other two. The native speakers of English were not even consciously aware of these differences in the level of markedness, saliency, and explicitness governing their use of *this*, *that* and *it*. Therefore, their performance on functional specifications across the experiments changed.

7.1.2 The procedural instructions these expressions signal to Native and Non-native speakers of English. In the first and second group of experiments, *this*, *that* and *it* signalled different procedural instructions to native and non-native speakers of English. Initially, both groups accepted *this* referring to the left frontier but later the preferences in the two groups changed. While native speakers of English preferred *this* and *that* referring to the right frontier, non-native speakers preferred *this* referring to the right frontier and *that* to the left frontier. In Experiment 3, again native speakers initially preferred *this* referring to the left frontier but in later regions, they too preferred *that* referring to the right frontier. Again, in Experiment 3, the non-native speakers had different initial preferences for *this* and *that* from native speakers. They initially preferred *this* referring to the right frontier and they did not have any frontier preference for *that*. However, later the non-natives preferred *this* referring to the right frontier and *that* referring to the left frontier. In the first pass reading times for the last region, non-native speakers' frontier preferences changed again, to *this* referring to the left frontier and *that* referring to the right frontier. The results of these online reading experiments showed that *this* and *that* give different procedural instructions to native and to non-native speakers of English. While *this* signals a focaliser function to natives, it signals an accessing to a proximal/distal frontier to non-natives. Native speakers' preferences did not vary as non-native speakers of

English did. In the online processing of non-native speakers of English, two competing specifications seemed to compete and thus give rise to different preferences. However, in the production experiment, proximal/distal functions of *this* and *that* were more prominent than the focaliser specification of *this*.

Regarding the variations in the preferences and competing options in the non-natives' processing, it can be said that Turkish non-native speakers of English differed from native speakers of English in their processing of the referents of *this*, *that*, and *it*. In the online reading experiments, native speakers performed a shallow processing of *this* and *that*. On the other hand, the non-native speakers had much deeper processing since they carried out form-function mapping following the grammar rules in their mental representations. Unlike native speakers, they did not use an anaphora processing strategy such as recency during reading.

Generally speaking, in the experiments regarding the access of *this* and *that* to the left and right frontiers, asymmetrical discourse segment preferences for *this* and *that* on the part of the native speakers were not clearly observed. On the other hand, in the non-native speakers' reading and production experiments, it was very clear that they had asymmetrical discourse segment preferences for *this* and *that*. This is likely to be because asymmetrical antecedent preferences were what they learned at school. However, the antecedents they preferred were not the correct ones.

In the second group of experiments, where the antecedent preferences (proposition and noun phrase) of *this*, *that* and *it* were measured, the Turkish non-native speakers differed from native speakers of English in their processing in the online reading experiment. Again, while native speakers did not show strong antecedent preferences for *this* and *that* in the online processing, non-native speakers performed form-function mapping, relying on their syntactic knowledge. For native speakers of English, in the experiment on *it* and *this*, the antecedent preference for *this* was a proposition, while the antecedent preference for *it* was a noun phrase. In the experiment on *it* and *that*, the native speakers did not show any preference for *that* but they had a tendency to prefer *it* referring to a proposition. Non-native speakers of English had different antecedent preferences,

which did not accord with the assumption in the literature. In the experiment on *this* and *it*, the non-natives preferred *this* referring to the noun phrase and *it* referring to the proposition; in the experiment on *that* and *it*, they had a tendency to prefer *that* referring to a proposition and *it* referring to a noun phrase. Therefore, in online reading *this*, *that* and *it* do not signal the same procedural instructions to native and non-native speakers of English. While native speakers did not show strong online preference for *this* and *that*, the non-native speakers had preferences for *this* referring to a noun phrase and for *that* referring to a proposition. While native speakers preferred *it* referring to a noun phrase and proposition across different online experiments, the non-native speakers preferred *it* referring to a noun phrase.

Contrary to the results of the online experiment in section 4.1, in the offline experiment native speakers of English showed clear preference regarding *this*, *that* and *it*. *This* and *that* were used to refer to a proposition and *it* to refer to a noun phrase. On the other hand, non-native speakers of English had different preferences regarding *this*, and used *this* and *that* to refer both to a noun phrase and a proposition. This may indicate that they did not have any formulaic rules for the use of *this* and *that*, and thus the representation of *this* and *that* in their interlanguage is not like that of native speakers. In contrast to the online experiment, non-natives used *it* to refer to a noun phrase and their antecedent preference of *it* was similar to that of natives.

In the third group of experiments, where *this* and *it* referred to distant and recent noun phrases, *this* and *it* seemed to signal the same procedural instructions to native and the non-native speakers of English. The reason the non-natives have similar preferences here can be explained in terms of learning practice in the language classroom. The noun phrase references were the first things they learned there. They learned the distal rules and the differences between *it* and *this* in relation to distal aspects and topicalisation. Also, the noun phrase status as antecedent for *this* and *it* is less uninterpretable, complicated or unmarked than in the case of access to discourse segments or uninterpretable antecedent types (i.e proposition or noun phrase). In the third group of experiments, the Turkish non-

natives only followed the formal syntactic rules during online and production experiments.

In the online processing of the status of the noun phrase as referent of *this* and *it*, the processing of natives and non-natives seemed to be different. Again, native speakers used a recency strategy to resolve the ambiguity, while the non-native speakers did not. While native speakers disambiguate in the final region of second pass reading, the non-native speakers resolve the ambiguity in the conjunction region of the regression path times. This indicates that the native speakers' processing of anaphoric expressions related to the focus occurring in the late eye-measures, whereas in the non-native speakers' processing this occurred in the early measure, since unlike native speakers, the non-natives processed the anaphoric expressions by using rules rather than semantics or discourse.

The results of these experiments revealed that native speakers of English and non-native speakers of English had different preferences for *this*, *that* and *it* in online and offline experiments. Though in the third group of experiments, both groups had the same antecedent preferences, the resources they drew upon to disambiguate seemed to be different and their disambiguations occurred in different regions. All these findings indicate that the Turkish non-native speakers had different mental representations for *this*, *that* and *it*. The possible reasons behind *this* are given in the implications section regarding second language acquisition.

7.2 Implications of findings

In the next section, the implications of the findings in the three experimental groups are given regarding (1) the experimental studies, (2) studies and hypotheses in second language acquisition and (3) theoretical linguistics.

7.2.1 The implications of the findings to experimental studies in psycholinguistics. According to the situational model (Anderson, Garrod and Sanford, 1983; Morrow, Greenspan and Bower, 1987) and the narrative shift model (Zwaan, 1996), discourse representation is updated and the first event or

the scenario becomes inaccessible when a new event is introduced. This study has implications for the situational model, showing that in online reading, the first event on the left frontier was open for the non-native speakers, whereas it was closed for the native speakers (see section 8.1 and 8.2 and the experiments in chapter 3 for the details). The assumptions in the narrative shift model seemed not to be applicable to the non-native speakers' processing. The access of *this* and *that* to the left frontier in the non-native speakers' preferences was due to the application of grammar rules. They did not pay attention to the sequence of events or how the discourse developed. Their purpose was to resolve the ambiguity through recourse to their grammar knowledge.

Brown-Schmidt, Byron and Tanenhaus (2005) proposed that clear asymmetrical referent choices for demonstratives in online experiment was problematic, since several potential referents compete with each other. However, there were asymmetrical patterns in the selection of antecedents. Kaiser and Trueswell (2008) argued that there were form-specific factors that distinguished one anaphoric expression from another, but referential expressions could show different degrees of sensitivity to different factors. Though these studies pointed to strong asymmetrical antecedent preferences for demonstratives and pronouns, the online experiments with the right and the left frontier and the experiments regarding propositions and noun phrases as antecedents of *this* and *that* did not show clear symmetrical differences between *this*, *that* and *it* during reading. This indicated that shallow processing entailing less inferencing was preferred by native speakers. Alternatively, they preferred a recency strategy to disambiguate and they mostly did not need to reanalyze their antecedent preference anomalies. However, in the third online experiment group, a tendency was seen with regard to the asymmetrical antecedent preference of *this* and *it* when these expressions referred to distant or near noun phrases. The findings of these experiments may indicate that some factors that govern the asymmetrical preferences were more unmarked and dominant than others. For instance, noun phrase saliency may be a basic rule regarding the distinction between demonstratives and pronouns. However, the accessibility of frontiers is marked and therefore the experiment on the frontiers did not reveal strong preferences, unlike the third group of

experiments. All these points indicate that the antecedent's saliency and markedness determine the asymmetrical pattern in the use of demonstratives and anaphors, which needs to be taken into consideration in the determination of the degree of sensitivity of each anaphoric expression to different antecedents.

Compared to native speakers, non-native speakers always showed asymmetrical antecedent preferences for *this* and *it*, which indicated the effect of focus on formed language classes, where grammatical functions and differences were explicitly taught. However, the mental representations of the non-native speakers were not as is commonly assumed in the literature. This asymmetrical preference of non-native speakers may indicate the formal grammar approach or co-textual approach to the anaphoric expressions instead of the functional grammar where the information, intentional and attentional status play a role. Selinker proposed that L2 learners' preferences or assumptions regarding the target language were also affected by teaching methods/instructions and the transfer of the rules they learned at schools, which meant training-induced incorrect hypotheses regarding the target language. Our findings clearly showed the role of teaching and the transfer of the rules they learned at schools in the determination of which discourse segments *this* and *that* can refer to. Similarly, Niimura and Hayashi (1996) pointed to the ease of the proximal/distal function of demonstratives since they were learned at the beginning of language learning, but noted that the low and medium focus that *that* and *it* create was not acquired by Japanese learners since it was at the interface between their discursive and psychological functions and they remained unsure when to use one and when the other. Though Young (1996) pointed to the correct use of *this* and *it* in Czech and Slovak L2 learners' writing, he argued that Czech and Slovak L2 speakers of English performed form and function mapping in the use of articles and demonstratives. In other words, L2 learners in the study had a tendency to match a single form with a single function. Our results also supported the findings of Young. The form-function mapping was being done by the non-native speakers and they had single and asymmetrical functions for each item.

Another difference between the processing of demonstrative and anaphors was pointed out by Fossard, Garnham and Cowles (2011). They showed that

personal pronouns caused an early antecedent integration with referential expression whereas demonstratives did not. In our online rearding experiments, such early processing distinctions between discourse deixis and pronoun were not seen.

The literature also specified recency as one of the strategies used in anaphora processing (Clark and Sengul, 1979, Sturt, Scheepers and Pickering, 2002). Our online reading experiments with native speakers supported theories regarding the use of recency strategies by native speakers, but they also showed that the non-native speakers did not make use of recency strategies. This indicated that, though Clahsen and Felser (2006) proposed that processing strategies are universal, the use of strategies may not be accomplished by non-native speakers who pay attention to the language structure instead of to the activation of all language skills.

Our results with native speakers in the first and third groups of experiments challenged the findings and claims of those studies which argue for the importance of the first mention as an antecedent instead of a recent event (see Hudson-D'zmura and Tanenhaus, 1998; Gernsbacher and Hargraves, 1988; Gordon, Grass, & Gillion, 1993; Jarvikivi, Gompel, Hyona and Bertram, 2005). The access of non-native speakers of English to the left frontier can be explained by reference to the Structure Building Framework: the first event was not forgotten because it was the first mentioned. Also, activation strengthens the prominence of the first mention. As the structure building framework guessed, when the new event is entered, related concepts are activated by native speakers and thus the first event is forgotten. On the other hand, the first event on the left frontier were processed well by the non-native speakers since the mechanism takes a longer time to suppress and activate other related mental representations and thus enhancement becomes less powerful.

Although Clahsen and Felser's explanation regarding the activation of explicit and implicit knowledge in the offline and online experiments was only for non-native speakers, it is interesting to note that the same distinction was seen regarding the native speakers' activation of explicit and implicit knowledges across online and offline tasks. According to Clahsen and Felser's (2006) shallow

structure hypothesis, L2 learners' processing is shallower and less detailed than that of native speakers. However, in our online experiments, we observed that native speakers' online processing too was shallow, or 'flexible'. This was in line with Ferreira's et al. (2001) 'good enough language processing' approach for monolinguals. According to Ferreira's et al. (2001), readers were happy with their inaccurate representations from a text, since their processing aimed to make a sense from the text and when they reached that point, they stopped processing: in other words, shallow processing occurred.

The shallow processing of native speakers indicates that the cognitive status and the antecedent preferences of anaphoric expressions shown by Gundel et al. (1993) are not strong in online reading compared to writing. This might be because of distinctions between the reading and writing tasks. In the reading tasks, the readers get the gist and focus on the recent, salient entity: they do not use inferential processing, essential for the resolution of demonstratives (see Cornish, 2006), much. Their processing is simple rather than detailed, whereas in the writing, the intentional state, syntactic rules and pragmatic factors such as the degree of attention and foci they wanted to create are all important. Contrary to the assumptions with which this study began, as cue phrases in the online reading, *this* and *that* did not direct the attention of the reader to different antecedents or parts of a sentence. In the offline experiment, because of the intentional states, the cognitive status of *this*, *that* and *it* was as Gundel et.al predicted,

7.2.2 The implications of the findings to second language acquisition.

Our findings have implications for Sorace and Filiaci's (2006) interface hypothesis, which arose mainly out of a focus on overt-null pronouns in Italian, Spanish and English. Supporting Sorace and Filiaci's (2006) interface hypothesis and applying it to the demonstrative systems in Turkish L2 learners, the findings of this study showed that besides the features of the target language at the interface level, the L1 and the overlapping and non-overlapping features in the two languages play major roles in L2 learners' not having native-like preferences and their indeterminate uses. In the first group of experiments, the antecedent preferences of *this* and *that* were controlled by syntactic factors (i.e the distance

from the frontiers) and discourse factors (markedness of *this* and *that* regarding prominence, intention and focus). Similarly, in the second group of experiments, the antecedent preferences of *this*, *that* and *it* were also controlled by both syntactic factors (i.e the position of the entity in the previous sentence) and discourse factors (i.e the degree of focus intended to be created). If the antecedent is salient in discourse, *it* is preferred. If the antecedent is less-focused, *this* and *that* are preferred in order to change the focus from the salient entity to a less-salient one. Or, if an early frontier is to be referred to, the prominence and intention-marked *this* is preferred to the focused-marked *that*. As seen, in order to determine the antecedents of *this*, *that* and *it*, L2 learners need to know syntactic rules that determine the given entities' saliency in discourse, discourse factors like the level of attention, the kind of focus *this*, *that* and *it* signal, the antecedent types that *this*, *that* and *it* select, as well as pragmatic factors. Therefore, *this*, *that* and *it* are items at the interface level where syntactic, discursive and pragmatic rules all together govern their use. The participants' online reading of when *this* and *that* referred to the left frontier indicated that non-natives presented optionality compared to the natives (see the explanation in Sorace's (2000) and Papp's (2000) and Lozano (2006)'s studies on optionality). That is, they have indeterminate choices and accepted both. In our online reading experiments we saw that optionality, but this was not what governed the participants' processing strategies. Rather these were determined by the competition between the unmarked and marked features of *this* and *that* in their explicit and implicit knowledge. The second group of online reading experiments' results showed that the antecedents of *this* and *it* were problematic and L2 learners had a slight preference for *this* referring to the noun phrase and for *it* referring to the proposition. The L2 learners did not take into consideration discourse factors that govern the antecedent preferences of these expressions. The results also indicate that they were aware of the syntactic rules governing the use of one anaphoric expression to another, but the functional mappings of anaphoric expressions to the foci these expressions signal were not correct. Again, the offline experiment results with the non-native speakers showed again that *this* was problematic, and their antecedent preference for *this* was indeterminate in the offline experiment.

The indeterminate antecedent preference for *this*, or the optional use of *this* to refer to both a proposition or a noun phrase and the change of antecedent preference for *it* across experiments might indicate the L1 effect on the online reading and production experiments. *It* could be translated as pro-drop, or ‘*bu*’ was used instead of *it* at the end of the sentence. *Bu* at the end of the sentence functions as a focalizer. *This* was also translated into Turkish, becoming ‘*bu*’ at the beginning of a sentence’. In English, we have two different anaphoric expressions which are assumed to function differently, whereas their Turkish equivalent is only one anaphoric expression (‘*bu*’) which functions slightly differently. *This* and *it* translate into Turkish as one expression, *bu*, and their correspondences and the distinctions between them in the target language might still be problematic and unestablished.

In the online reading of L2 learners, only a slight preference for *that* referring to a proposition was evident, and the same preference for *that* was not seen in the production experiment. Similar to L2 learners’ preference for *this* in the production experiment, L2 learners’ antecedent preference for *that* was indeterminate. Again, this result can be explained by reference to the deixis system in Turkish. In some cases, when the sentences have negative or contrastive meanings, *that* was translated as *o*. Therefore, it would be difficult for non-native speakers to differentiate the functions of *it* from *this* and *that* in the target language. In online experiments, overlapping options as antecedents compete with each other. On the other hand, in the experiment on *it* and *that*, there were no such competing options for *it*, or overlapping functional roles for the pair *it* and *that*, since in Turkish *that* is equivalent to ‘*o*’ and *it* to ‘*bu*’. This might explain why we saw a symmetry between *it* and *that*, in line with the literature in the online reading. However, that symmetry disappeared in the production experiment, which indicates that the function of *that* in signalling a less-focused entity in the target language was problematic for the Turkish non-native speakers. The possible L1 effects at the interface level supports Serratrice, Sorace, Filiaci and Baldo’s (2011) argument regarding ‘the cross-linguistic influence at the interface between morphosyntactic and discourse/pragmatic features in bilingual acquisition’. Our findings implied for Sorace et al.’s hypothesis that besides the

degree to which the deictic function needs to be inferred at the interface level, the L1 effect and the distributions of deictic and anaphoric expressions across the two languages play a major role in creating indeterminate and optional uses and non-native-like preferences.

Our study showed that though the L2 learners were advanced in the target language, they still had problems in focus and topic, which supported Lozano's Impaired Syntax Discourse Functional Features hypothesis and Razono's claim on unstable focus and topic in L2 learners' grammar. According to the Impaired Syntax Discourse Functional Features hypothesis, L2 learners know formal syntactic rules but they fall down in terms of their knowledge regarding interpretable features such as focus and topic. Differently from Lozano's, our findings in the first and second groups of experiments showed that L2 learners were aware of the interpretable feature but their knowledge was not as strong as their syntactic knowledge. For instance, the second group of online reading experiment results showed that the antecedents of *this* and *it* were problematic and L2 learners had a slight preference for *this* referring to the noun phrase and for *it* referring to the proposition. The L2 learners did not take into consideration discourse factors that govern the antecedent preferences of these expressions. The results also indicate that they were aware of the syntactic rules governing the use of one anaphoric expression over the other, but their functional mappings of anaphoric expressions to the foci these expressions signal were not correct.

The findings of these experiments also have implications for Tokowicz and MacWhinney's (2005) assumption on the interactive activation model in online and offline experiments (for the model, see Kroll and Tokowicz 2004). They proposed that if the structures contrast, or suggest contrasting interpretations, L2 learners prefer the interpretation that matches their L1, and in comprehension, L2 learners use their L1 to understand the structures in L2. The findings of this study showed that the problematic items in L2 learners' interlanguage do not have to contrast with the mother tongue. If the target language has two or three marked items corresponding to the one marked item in the mother tongue, then L2 learners would not show strong online preference for the features of the target items because they would need to differentiate the

features of the corresponding items in the target language, where problems and difficulties arose. The assumption of this study, here, was in line with Hulk and Muller's (2000) finding on cross-linguistic influence at the interphase level, when the features in the two languages would overlap but differ from each other subtly, and with White's (1991) partial overlapping argument regarding features overlapping between two languages where L2 learners would have difficulties. As Tokowicz and MacWhinney added, in production, learners will produce an L2 that has an 'L1 syntactic accent'. In the production experiment, the L1 effect on the indeterminacy of *this* was especially visible. In addition, the use of explicit knowledge in the processing of *it* was observed. It might be said that as Tokowicz and MacWhinney predicted, in production explicit knowledge and the L1 grammar effect were competing. If L2 learners were not sure about the target structure, then they showed optional or indeterminate preferences. If they knew the grammar rule (or thought they did), they opted for its application.

On the other hand, the native-like preferences of non-native speakers regarding noun phrases as referents of *this* and *it* supported Tokowicz and MacWhinney's (2005) findings on the sensitivity of the items that are unique to the target language. That L2 learners were better in the third group of experiments than in the second group might be explained by the degree to which the deictic functions need to be inferred and their common representations in the textbooks and language classes. In other words, the noun phrase as an antecedent type is unmarked and overt than the proposition or discourse frontier as referents of *this*, *that* and *it*. Also, in language classes, noun phrases as antecedents were taught to the L2 learners through proximal/distal rules. This indicates that features in the target language should be handled in terms of their interpretability, from the less interpretable to the more interpretable. Adopting such an approach would show L2 learners' preferences and processing more comprehensively. In addition, Tokowicz and MacWhinney's findings indicated that the features that are different from the mother tongue or that overlap while showing subtle differences should be investigated in relation to other languages, to explore L2 learners' online sensitivities across languages features in the target language can be understood better.

The indeterminate use of *this* and the different antecedent preferences for *it* across offline and online experiments also support Weinreich's (cited Swan, 2007) and Eckman's (1997) proposals. For Weinreich, if the target language has asymmetrical constituents which are not parallel in the mother tongue, then language transfer would occur. According to Eckman's markedness hypothesis, when the constituents in the target language are marked and the corresponding features in the mother tongue are relatively less marked, L2 learners will have difficulties. In our findings, though the left frontier was closed for topic continuation in the mother tongue, the Turkish non-native speakers found the left frontier accessible for *this* and *that*. This indicated that though the rule of the target language does not exist in their mother tongue, they had acquired it. Also, the effect of language teaching should be underlined again. The accessibility of spatially distant entities by deixis in spoken discourse is taught in the language classroom, and is in fact one of the first things the non-native speakers learned, a fact also mentioned in Niimura and Hayashi's study. Therefore, the proximal/distal rule is an unmarked rule for them, but the selection of which deictic expression to deploy in written texts is marked with subtle distinctions. Therefore, the L2 learners seemed to overgeneralize the rules in spoken discourse to the use of *this* and *that* in reading and production. Though they were proficient in the target language, overgeneralizations were still seen.

Clahsen and Felser (2005) argued that offline and online tasks measure different forms of knowledge: explicit knowledge in the offline task and implicit knowledge in the online task. Roberts, Gullberg and Indefrey (2008) found an L1 effect in offline tasks but did not observe the same effect in the eyetracking experiment. Contrary to Roberts et al., however, Clahsen and Felser (2006) pointed out that L2 learners were native-like in the offline tasks but they differ from the native speakers in the online experiments. Our production results showed that a difference between native and non-native speakers exists in the production tasks, too. Since in the production experiments L2 users drew upon the explicit knowledge in their interlanguage, their preferences were not those of native speakers. They had unacceptable target features that differ from the assumptions in the literature (see the experiments in chapters 3 and 4). On the other hand, in

the first group of online experiments, we saw the competition of explicit and implicit forms of knowledge. Erçetin and Alptekin (2012) argued that there is a correlation between explicit knowledge and the working memory, and that advanced Turkish learners of English, showing a propensity for text-bounded reading and, as a result, vocabulary-biased processing, employed explicit knowledge in anaphora resolution but did not use implicit knowledge. Contrary to Erçetin and Alptekin, the findings of the first group of experiments showed that Turkish non-native speakers of English mostly use their explicit knowledge during online processing of anaphors, but this does not mean that they do not use or activate their implicit knowledge. Their implicit knowledge was activated but it was not as strong as their explicit knowledge in the online reading (see the focaliser function of *this* in the first and third experiments in section 3 with the non-native speakers). The implication of this is that L2 learners relied on explicit knowledge, which would be much safer than relying on the features they got from the natural data.

Clahsen and Felser pointed to the shallow processing of non-native speakers as a result of inadequate L2 language representation. The findings of this study show that L2 learners do not have enough language representation of the target language at the discursive and pragmatic level and their processing relies upon form-function mapping to resolve ambiguities. Though Sorace and Clahsen and Felser have some contradictory arguments, the findings of this study support their main claims. If Clahsen and Felser's shallow processing is taken to include the representation of the target language, then shallow processing occurred in the L2 learners' language processing. However, if shallow processing is taken in the sense of not resolving or not trying to resolve ambiguity, then the shallow processing hypothesis is not applicable here. McDonald (2000) proposed that L2 learners focused on surface forms in reading, which were not even tackled by native speakers because of their difficulty level. The online results of the experiments showed that L2 learners put much more effort into form-function mapping than native speakers of English. This seems to support Witzel, Witzel and Nicol's (2012) proposal that L2 learners' rely on deeper processing rather than shallow to encode surface forms. However, this study indicated that their

deeper processing does not mean that their processing is native-like, as the literature suggests.

Alongside Witzel et al.'s study, this study indicates that shallowness in Clahsen and Felser should be differentiated in terms of the correct representation of the target language, not trying form-function mapping, performing inaccurate form-function mapping or being happy with the incorrect inference and not changing it. Clahsen and Felser's study suggests shallow processing is only for non-native speakers but as Ferreira et al. have shown, shallow processing can be seen in monolinguals too. This indicates that, contrary to common assumptions regarding detailed processing, both native and non-native speakers perform shallow processing, which might be a universal strategy of the human processing mechanism. However, in order to understand the shallow processing of both native and non-native speakers, the reasons for the shallow processing of monolinguals and bilinguals in the literature should be taken into consideration together and future experiments should be run with the two groups. For instance, investigating the uninterpretable features at the interface level in Sorace and Filiaci's study, the failure to allocate all processing resources (i.e. syntax, pragmatics, discourse and inferential systems) in Clahsen and Felser's study, and the preference for inaccurate representation instead of complex analysis in Ferreira et al.'s study would give much new information and enrich our understanding. For instance this study showed that the shallow processing of native speakers might have been the result of the deployment of a recency strategy: one interpretation was enough for natives, whereas the shallow processing of non-native speakers resulted from the interface features and L1 residue. The findings of this study also indicate that native speakers do not tackle ambiguity, and inaccurate antecedents were adequate for them. On the other hand, though the non-natives' final interpretations were inaccurate too, they put in much more effort than native speakers, which might be explained by Ferreira et al.'s suggestion that the comprehenders' performances improve when they know that their ability to read and understand sentences is being measured. Here, the non-natives were shown to be good at reading because they knew that their L2 language use was being measured for the study. On the other hand, native

speakers were confident in their interpretations because they are native speakers and because their interpretations might be flexible.

7.2.3 The implications of the study for theoretical linguistics.

Regarding the noun phrases that *this* and *it* referred to, the predictions in the literature were fulfilled. However, the claim that *it* referred to the distant noun phrase for topic continuation since the distant noun phrase was highly salient was found to be questionable. The findings of the third experiment also have implications for Centering theory. CT claimed the highly ranked entity which is a topic or focus can be a backward-looking centre. This study showed that the less salient entity can be a backward-looking center. The study also showed that the pronoun *it* can also refer to a less-salient entity rather than a highly-salient entity. Though CT mentions the attentional states of noun phrases in the establishment of foci and assignment of pronouns, this study also shows in the first and the second groups of experiments that propositions can be the antecedents for referential expressions. Both *this* and *that* indicate a change of foci and *this* can signal a smooth shift by bringing an entity into focus that has been mentioned in an earlier clause. The findings supported Poesio and Modjeska's (2005) findings in their annotation study, where preferences for *this* referring to a less salient noun phrase in the object position instead of a highly salient entity in the subject position were found. This finding also supported Linde's (1979) and Passonneau's (1989) hypotheses that discourse deixis refers to an entity that is not topical but that is salient.

Another implication of this study is for the studies in the literature which assume a distinction between *this* and *that* or different functional specifications inherent in *it*, *this* and *it*. Contrary to the literature, strong functional specifications inherent in these expressions were not seen in either the online reading or in the offline reading. Instead, unexpected specifications inherent in *this* and *that* were seen (see the first experiment group and the second experiment group). These findings indicated that the understanding of demonstratives in the literature is not strong enough and the assumptions in the literature should be tested further via new online methods. The use of deixis and anaphors is much more complex than

has hitherto been appreciated, and the dialects and experiences of the users also play a role in their use. Also, the specifications of deixis and anaphors seemed to change across different cognitive tasks. Therefore, the assumptions of the literature cannot be generalised to all genres and different processes (i.e. writing/listening/speaking/reading). Further studies should take into consideration the functions of these expressions in different cognitive contexts and design experiments including different cognitive domains to understand comprehensively.

7.3 Suggestions for future studies

This study investigated the assumptions in theoretical and computational linguistics regarding the antecedent types that the deictic expressions *this* and *that* and the anaphoric pronoun *it* refer to. These antecedent preferences were controlled by semantic co-specifications (i.e. the words that resolve ambiguities, such as the features of a room, car or trip) and syntactic primings (i.e. the positions and the distance of the antecedents). The role of rhetorical relations between the sentences and the use of deixis or pronouns discussed by Cornish were not investigated. A fertile field for future study would be the use of *that*, *this* and *it* when the sentences are in either contrastive or agreement relations (e.g. ‘*that/this/it* is nonsense’ or ‘*that/this/it* sounds correct’) and to investigate such rhetorical roles in the processing and production of these expressions. Also, such an approach to deixis would seem to be applicable to Turkish deixis too, in order to measure the role of semantic relations as opposed to linear word order on the use of the Turkish deictic *bu* and *o*. It is worth noting for future studies that the Turkish demonstrative system is not easily suited to experimental studies, unlike English. The experiments can be run only if the semantic relations are controlled. Instead of the linear order of information, rhetorical relations should be controlled for the demonstratives in Turkish. Furthermore, delineating regions in Turkish for eye-tracking experiments seemed not to be feasible for this study. In other words, since Turkish is an agglutinating language, the predictive words and semantic disambiguation were given before the critical words under study. Future studies

should take into consideration the particular characteristics of Turkish and design their experiments accordingly.

Alongside the reading paradigm, deixis and its functions in foci establishment should be studied in relation to the visual paradigm. To date, experimental studies have focused on antecedent preferences rather than on the focus they signal in spoken discourse. The first experiment might be to test proximal/distal rule of *this* and *that* among many entities in order to explore how these expressions direct the attention of the listeners. A second experiment might test the distinction between the sentences with and without referential forms, to see how the inferential mechanism works in written and spoken discourse. Such forms of future study will shed more light on demonstrative and anaphoric expressions and their specifications in spoken and written discourse. Examining L2 learners' processing of spoken discourse in the target language will also help us to understand their mental representations regarding spoken discourse and the degree to which they differ from the native speakers of English. As far as the writer knows, the number of studies exploring L2 learners' processing from a visual paradigm is very few. Second language studies to date have focused on their reading but the processing and production of spoken discourse should be of great interest.

In this study the Turkish participants were of an advanced level of English proficiency. In future studies, Turkish L2 learners from different language proficiency levels might be selected for the experiments and their online processing explored. In this way their responses to deixis and anaphora at different levels of proficiency can be seen. Also, since the experimental stimuli in this study could not be translated into Turkish, a comparative study of the processing of Turkish deictic and anaphoric expressions by Turkish monolinguals and Turkish non-native speakers of English was not pursued. Future studies should be run in Turkish with these groups to understand whether monolingual speakers' and Turkish non-native speakers' processing and preferences differ. Some studies have shown that L2 learners' processing is effected not only by L1 but also L2. Studies of the processing of Turkish monolinguals and Turkish non-native speakers will show the extent of L1/L2 effects, the processing strategies in

the mother tongue, and the similarities and differences regarding processing strategies in L1 and L2.

One of the findings of this study is the number of uninterpretable features playing a role in the shallow processing of Turkish non-native speakers and native speakers of English. In the future, studies might list these uninterpretable features from the least to the most frequent or problematic in L1 and L2, and design new experiments where the number of uninterpretable features is controlled. Running such studies will shed light upon the shallow processing of L1 and L2. In order to understand L2 learners' representation and interface hypothesis, future studies should focus on features in the L1 and the L2 which wholly or (especially) partially overlap, as well as other features apart from overt and null anaphors (e.g. ergatives, the determiner *this/that*, accusatives).

Finally, a further fruitful area of study might be a comparison of discourse deixis (*this/that*) with discourse markers (*because of this* or *because*). Joshi (1995) argued that discourse deixis functions like discourse markers and signals the type of inferences that should be made. Future experimental studies will help us to understand whether these expressions have the same role as discourse markers in discourse. Controlling the rhetorical relation and foci states will help us to understand the special functions of discourse deixis, discourse markers and their cognitive roles in language processing. This kind of study will mark a move away from handling deixis from a syntactical and semantic perspective, towards a focus on the interface between semantics, syntax and discourse.

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Appendix A
CURRICULUM VITAE

PERSONAL INFORMATION

Surname, Name: Çokal, Derya

Nationality: Turkish (TC)

Date and Place of Birth: 14 July 1978, Gaziantep

Marital Status: Single

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EDUCATION

Degree	Institution	Year of Graduation
MS	METU Department of Foreign Language Education	2005
BS	Mustafa Kemal University	2001
High School	Bayraktar Lisesi, Ankara	1995

WORK EXPERIENCE

Year	Place	Enrollment
2002- Present	METU Department of Foreign Language Education	Research Assistant
2001-2002	Mustafa Kemal University Department of Foreign Language Education	Research Assistant
2000 July- August	Iktisad Bank	Intern

FOREIGN LANGUAGES

Advanced English

PUBLICATIONS

1- Çokal, D. (2010). *A New Look at Discourse Deixis: A contrastive Analysis*. VDM publisher.

- 2- Çokal, D. (2010). The Pronominal *bu-şu* and *this-that*: Rhetorical Structure Theory. *Dilbilim Araştırmaları*, 1, 15-33. Boğaziçi Üniversitesi Yayınevi, İstanbul.
- 3- Çokal, D. (2009). Conversational Repair in Foreign Language Classrooms: A Case Study in a Turkish Context. *Eurasian Journal of Educational Research*. Issue 38. Winter 2009, 17-3.
- 4- Ruhi, S., Çokal, D. (2009) Features for an internet accessible corpus of spoken Turkish discourse. *Working Papers in Corpus-based Linguistics and Language Education* 3.
- 5- Kiliçkaya, F. & Çokal, D. (2009). The Effect of Note-taking on University Students Listening Comprehension of Lectures. *Kastamonu Eğitim Dergisi* Ocak, 17(1), 47-56
- 6- Çokal, D. (2005). A contrastive analysis of the pronominal usages of *this* and *that* in academic written discourse. *Unpublished M.A. thesis*, Middle East Technical University.

CONFERENCE PROCEEDING PUBLICATIONS

- 1- Ruhi, Ş. & Çokal, D. (2008). Türkçe İçin Sözlü Derlem Oluşturmada Bazı Temel Sorular (Trans. Of the title: Major Questions In Designing A Spoken Corpus of Turkish). *Mersin Sempozyumu Bildiri Kitapçığı*, Mersin.
- 2- Çokal, D. (2007). Konuşma Dilinde İşte'nin Bilişsel Edimbilim Işığında İşlevlerinin Çözümlemesi (Trans. of the title: Analysis of the cognitive pragmatic functions of *işte* in spoken language). *Mersin Üniversitesi 21. Ulusal Dilbilim Kurultay Bildirileri, 10-13 Mayıs 2007, 46-56*.

PAPERS TO BE SUBMITTED FROM THE THESIS

- 1- Çokal, D., Sturt. P. & Ferreira, F. (in preparation for submission to *Discourse Processes*). Discourse Deixis: *This* and *That* in Written Narrative Discourse.
- 2- Çokal, D., Sturt. P. & Ferreira, F. (in preparation). Mental Representations of Frontiers in L1 and L2.
- 3- Çokal, D., Sturt. P. & Ferreira, F. (in preparation). Anaphora Processing of Native and Turkish Non-native Speakers of English: *It, This* and *That*.
- 4- Çokal, D., Sturt. P. & Ferreira, F. (in preparation for *Studies in Second Language Acquisition*). Antecedents of *this, it* and *that* in L1 and L2.

5- Çokal, D & Ruhi, Ş. (under revision). A contrastive analysis of *This* and *That* in Written Academic Discourse. Text.

6- Çokal, D. (in preparation for submission to Dilbilim Araştırmaları). Differences between Turkish and English Deictic System in Written Discourse and Possible Problems in Designing Eye-tracking Reading Experiments.

ACADEMIC PRESENTATIONS

1- Çokal, D., Sturt, P., Ruhi, Ş., Ferreira, F. (2012). Anaphora Processing of Native and Turkish Non-native Speakers of English: *It* and *This*, AMLAP, September, 6-8, Italy.

2- Çokal, D., Sturt, P., Ruhi, Ş., Ferreira, F. (2011). Anaphora Processing: The Foci of *It* and *This*, AMLAP, September 1-3, France.

3- Çokal, D., Sturt, P., Ruhi, Ş., Ferreira, F. (2011). *Anaphora Processing in Written Discourse: 'it' and 'this'* CUNY, March 24-26, Stanford.

4- Çokal, D., Sturt, P., Ferreira, F., Ruhi, Ş. (2010). Discourse Deixis in Narrative Discourse. PIF Conference, Belgium.

5- Çokal, D., Sturt, P., Ruhi, Ş., Ferreira, F. (2010). *This* and *That*: Left and Right Frontier Deictic Access in Written Discourse. AMLAP, September 6-9.

6- Ruhi, Ş. H., Hatipoğlu, Ç., Eröz-Tuğa, B., and Çokal, D. (2010). Achieving Representativeness Through the Parameters of Spoken Language and Discursive Features: The Case of the Spoken Turkish Corpus. *II International Conference on Corpus Linguistics (CILC-10)*, 13-15 May, 2010, Universidade da Coruña, Spain.

7- Ruhi, Ş. Eröz-Tuğa, B., Hatipoğlu, Ç., Işık-Güler, H., Acar, G. C., Eryılmaz, K., Can, H., Karakaş, Ö., Çokal, D. (2010). Sustaining a Corpus for Spoken Turkish Discourse: Accessibility and Corpus Management Issues. *LREC 2010*, 17-23 May, Malta.

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9- Ruhi, Ş. & Çokal, D. (2008). Türkçe İçin Sözlü Derlem Oluşturmada Bazı Temel Sorular .(Trans. Of the title: Major Questions In Designing A Spoken Corpus of Turkish). Mersin Sempozyumu 19-22 October, Mersin.

10- Çokal, D. (2008). The Anaphoric and Cataphoric Functions of "bu" and "şu" and "this" and "that": Rhetorical Structure and Centering Theories". Paper presented at the 14th *International Conference on Turkish Linguistics*, August 6-8, Antalya.

11- Çokal D. (2008). Conversational Repairs of Turkish L2 Users of English. 8th *Uluslararası Dil, Yazın Değişbilim Sempozyumu*, May 14-16, İzmir, Turkey

12- Çokal, D. & Ruhi, Ş. (2006) Discourse deixis in L2 English writing: Implications for Researching Interlanguage Demonstrative Systems. Paper presented at the 16th *Annual Conference of the European Second Language Association*, September 13- 16, Antalya, Turkey.

13- Çokal, D. (2006) The pragmatics of deictic markers as cue phrases for SLA research and second language pedagogy in written academic discourse. 16th *Annual Conference of the European Second Language Association*, September 13-16, Antalya, Turkey.

PROJECTS

1- Research assistant in *METU Turkish Spoken Corpus (ODT-STD)*, Evrana, Tübitak. Oct 2008- January 2009, Project No: 108K283

2- Research assistant in *An Experimental Psycholinguistic Investigation of Discourse Deictic Demonstratives and Discourse Connectives In Turkish And English As Native And Non-Native Languages*, SOBAG, Tübitak. Project No: 108K405

ACADEMIC DUTIES

Conference organizer of *6th Metu Postgraduate Conference in Linguistics and Language Teaching* to be held in Ankara, Turkey, September. 18-19, 2008.

EDITING

Proceeding editors of *6th Metu Postgraduate Conference in Linguistics and Language Teaching* to be held in Ankara, Turkey, September. 18-19, 2008.

Appendix B

TURKISH SUMMARY

Bu çalışma deneysel psikodilbilim yöntemleri ve EyeLink 10002/K göz izleme cihazı ile yazılı metinlerde İngilizce metin işaret adlarının (*it, this, that*) çevrimiçi ortamda nasıl yorumlandıklarını ve metin üretimini nasıl yönlendirdiklerini anadil ve yabancı dil konuşucularında araştırmayı hedeflemiştir. Bu çalışma deneylerinde, iki dil arasındaki adıl kullanımı farklılıkları, eşdeğer deneysel metin oluşturma ve metinlerdeki metin yapısı koşullarını sadeleştirme zorunlulukları nedeniyle Türkçe ve İngilizcedeki adları derlem karşılaştırması olarak incelenmiştir.

Metin işaret adlarının gönderimsel özellikleri nedeniyle, metinlerin retorik yapılarını oluşturmasında ve yorumlanmasını yönlendirmede önemli işlevler yüklenirler (Grosz ve Sidner 1986; Murphy 2001; Turan 1997). Ancak, metin işaret adlarının (kısaca, MIA) daha önce göz izleme yöntemi kullanılarak psikodilbilimsel yöntemlerle araştırılmamıştır. Öte yandan, dil edinimi ve kullanımı araştırmalarının gösterdiği gibi özellikle yabancı dil edinimde MIA'ı anadil kullanıcılarına göre önemli farklılıklar göstermektedir (Ruhi & Çokal, 2006). Bu nedenle, söz konusu bu çalışmanın MIA üzerine yapılan çevrimiçi araştırmaları ve sonuçları dilbilimde gönderim kuramlarının ve anadil/yabancı dil edinimi araştırmalarında psikodilbilimsel geçerliği olan modeller geliştirilmesine önemli girdi sağlayabilmektedir (Fossard 2003). Bu girdileri sağlamak ve metin işaret adlarının anadil ve yabancı dil konuşucularında nasıl işlendiğini araştırmak için 3 farklı grup okuma deneyleri ve üretim deneyleri yapılmıştır.

Mevcut geleneksel dilbilim çalışmaları göz önünde bulundurularak ilk gruptaki okuma deneylerindeki hipotezlerimiz şöyledir:

1- *this/that* birbirlerinden farklı olarak katılımcıların dikkatlerini metnin farklı bölümlerine yönlendirir.

2- *this/that*'in öncüllerini bulmak için katılımcılar farklı bilişsel işleme süreci takip ederler; çünkü bu metin işaretleyicileri birbirinden farklı odak

oluştururlar. Bu hipotezleri sınamak için Deney 1’de (52 İngiliz katılımcı; 40 deney cümlesi: bkz 3.1) olay yapısı ve olayların aldığı zaman süresi kontrol altında tutulmuştur. Olay yapısı uzun süren ve bu uzun zamanla ilişkilendirilen kısa süren olaylardan oluşturulmuştur (örn. *John drove from Edinburgh to Birmingham. this/that took him five hours ya da he filled up his car with petrol this/that took him five minutes*). Webber (1988) ve Lascarides (2003)’ün tanımlamasıyla, uzak olayın bulunduğu cümleyi sol sınır ve yakın olayın bulunduğu cümleyi ise sağ sınır olarak tanımlayabiliriz. Webber’a göre sağ sınır her zaman söylemde yeni oluşturulacak konuyu barındırır ve metin işaretleri (*this-that*) için açıktır. Deney 1’deki deney koşulları ve olay sırası şu şekildeydi:

Koşul 1: *this* söylemin sol sınırında bulunan uzun zaman süren olaya gönderimde bulunuyor.

Örn. “*John drove from Edinburgh to Birmingham, listening to his favourite jazz CDs. When he arrived in Birmingham, he filled up the car with petrol. This took him 5 hours, and afterwards he was happy to have enough time to go to his hotel to have a rest.*”

Koşul 2: *that* söylemin sol sınırında uzun zaman süren olaya gönderimde bulunuyor

Örn. “*John drove from Edinburgh to Birmingham, listening to his favourite jazz CDs. When he arrived in Birmingham, he filled up the car with petrol. This took him 5 hours, and afterwards he was happy to have enough time to go to his hotel to have a rest.*”

Koşul 3: *this* söylemin sağ sınırında bulunan kısa zaman süren olaya gönderimde bulunuyor

Örn. “*John drove from Edinburgh to Birmingham, listening to his favourite jazz CDs. When he arrived in Birmingham, he filled up the car with petrol. This took him 5 minutes, and afterwards he was happy to have enough time for coffee.*”

Koşul 4: *that* söylemin sağ sınırında bulunan kısa zaman süren olaya gönderimde bulunuyor

Örn. “John drove from Edinburgh to Birmingham, listening to his favourite jazz CDs. When he arrived in Birmingham, he *filled up the car with petrol*. That took him 5 minutes, and afterwards he was happy to have enough time for coffee.”

Okuma denetinde Eyelink 1000-2K göz izleme cihazı kullanılmıştır. Sağ göz izlenmiştir. Deneye başlamadan katılımcıları deneye alıştırmak için 8 deneme metni katılımcılara sunulmuştur. Her deney metnini almak için katılımcılardan ekrandaki siyah kare kutucuğa bakmaları istenmiştir. Böylece katılımcının her bir deney metnini okumadan önce göz kalibrasyonu yapılmıştır. Her metni okuduktan sonra kontrol butonundaki X düğmesine basarak soruları ekranda görmüşlerdir. Eğer doğru cevap ekranın sağında ise sağ tuşa ve eğer solunda ise sol tuşa basmışlardır. Veri analizini yapmak için deney metinleri aşağıdaki gibi 9 bölgeye ayrılmıştır. Örneğin,

Diana packed her belongings/ with the help of her best friend. Once she had wrapped everything,/ she put the packages in her small car with great care./ This took her/ 8 minutes,/ and subsequently/ she was/ pleased to/ have fitted them all into her car./

80ms altında ve 1200 ms üstünde olan göz sabitlemeleri (İng. fixations) analizden çıkarılmıştır. Her katılımcının her bir bölgedeki göz hareketlerinin ortalamalarını katılımcı için F1 deney cümleleri için F2 değerleri ANOVA kullanılarak verildi. ANOVA’da metin işaretleri (this/that) ve söylem bölümü (sağ/sol sınırlar) faktör olarak ele alındı. Deney 1’in sonuçlarını özetlemek istersek: *this*’in sağ sınırdaki kısa süren olay yapısına göndergede bulunacağını *that*’in ise sol sınırdaki dikkat odağı dışındaki olay yapısına göndergede bulunacağını tahmin edilmişti. Deneyde bu yönde bir etkileşim gözlemlenmedi. Metin işareti olarak *this* veya *that*’in kullanımı fark etmeden sağ sınırdaki olay örgüsü olay yapısının süreciyle uyumlu olduğu sürece sol sınıra göre daha hızlı okunmuştur. Bu yüzden şunu diyebilir ki anadili İngilizce olan katılımcılar için sol sınır koşullarının okunması daha uzun zaman almıştır. Bu bulgu Webber’in sağ sınır’ın ulaşılabilirliği hipotezini desteklemektedir. Deney bulgusu literatürdeki metin işaret adları üzerine yapılan hipotezlerin doğrultusunda değildir ve bu yüzden hikaye söyleyişi derlem analizi yaparak *this* ve *that*’in metinlerdeki ulaşılabilirliğine bir kez daha bakmak istedik. Hikaye söyleyişi derlem

analizi bize *this* ve *that*'in öncüllerinin söylem bölümleri açısından tekrar değerlendirme olanağı sağlayacaktır. Bu analiz için *İngiliz Ulusal Derlemi*'nden toplam 200 metin seçildi: 100 metin *this* için ve 100 metin *that* için. Deney 1'deki metinler göz önünde bulundurularak metinler hikaye anlatı türünden alındı ve sadece adıl konumunda olan *this* ve *that* seçilmiştir. Bütün derlem bulgularını kısaca özetlersek, *this-that* çoğunlukla kendilerine yakın cümleleri öncül olarak seçmiştir. Fakat bu tür kullanımlarda *that*'in kullanım oranı *this*'e göre daha yüksektir. Diğer taraftan *this* kendisinden önce gelen birden fazla cümleye göndergede bulunurken *that*'in bu kullanımda dağılımı çok düşüktür. Hem *this*-hem *that* kendilerine bitişik-yakın olmayan cümleleri öncül olarak da seçmiştir. Derlem analizi ve Deney 1'deki bulgular ışığında naive katılımcıların metin işaret adıklarını söylemde metnin hangi bölümlerine gönderimde bulunduğunu tespit etmek için Üretim Deney 2'i (30 İngiliz katılımcı; 40 deney cümlesi: bkz 3.3) tasarlandı. Bu deneyde Deney 1'de kullanılan kontrol ve dolgu paragrafları kullanıldı. Birinci deneyden farklı olarak, *this-that*' den sonraki cümleler silindi (bkz. Örnek deney cümlelere).

Örnek deney cümleleri

1- *Davy reorganised the seating plan, considering the PhD students' seating\npreferences. After he arranged the new seating plans in the offices, he went to his office on the first floor to have a strong coffee with whipped\ncream. This.*

2- *Harry flew back from Turkey to Edinburgh, travelling with his wife. When he arrived at Heathrow, he went to the Duty Free Shop to buy whisky for his father-in law. That.*

Sağ ve sol sınıra ulaşılabilirlik orantısını modellemek için ilk önce a logistic mixed effect analizi yapıldı. Logistic mixed effect analizi Deney 1 ve derlem analizinde gözlemlenen yapıyla örtüşmektedir. Hem *this* hem *that* en çok kendilerine en yakın olay yapısını öncül olarak seçmişlerdir. Analiz ayrıca *that*'in sağ sınırdaki olay yapısına ulaşılabilirliğini *this*'e göre daha yüksek olduğunu göstermiştir, $Z = 2.746, p < .05$; *That* = 84%, *This* = 78%. Diğer taraftan *this*'in sol sınıra ulaşılabilirliği *that*'e göre daha yüksektir, *That* = 16%; *This* = 22%. Bu da bize *that*'in değil *this*'in sol sınıra ulaşılabilir olduğunu, bu bulgu derlem

analizi bulgusuyla örtüşmektedir. Bu bulgular göz hareketleriyle de desteklenmektedir. Bir sonraki Deney 3 (40 İngiliz katılımcı; 40 deney cümlesi: bkz 3.4)'deki hipotez olay sırasının, yani kısa süren veya uzun süren olayların, önce veya sonra verilmesi metin işaretlerinin işlemlerinde ve söylem bölümlerine ulaşılabilirliğe etkisi olmadığı. Bu hipotezi test etmek için Deney 1'deki tasarımın aynısı uygulandı fakat metin yapısında değişiklik yapıldı. Deney 1'de uzun zaman süren olay hep söylemin sol sınırında ve ilk cümle olarak katılımcıya verilirken, kısa zaman süren eylem ise söylemin sağ sınırında ve metin işaretlerinden (*this* veya *that*) hemen önceki cümlede verilmiştir. Deney 3'de ise uzun zaman alan olay söylemin sağ sınırında ve kısa zaman alan olay ise söylemin sol sınırında katılımcıya sunulmuştur. Deney 3'de *this* ve *that* hem kısa hem de uzun zaman süren olaya gönderimde bulunmuştur. Diğer deneylerde olduğu gibi, *this* ve *that* sağ sınırdaki olaylara gönderimde bulunduğu göz sabitlemelerinin kısa olduğu bulgusu ortaya çıktı.

Anadili İngilizce olan katılımcılarla yapılan deneylerde sol sınırda kısa veya uzun zaman süren eylemde olsa bu sınırı işlemlerde katılımcıların zorluk çektiğini göstermektedir. Bu bulgumuz Zwaan'nin (1996) öyküleme geçiş modelini (İng. Narrative shift) çürütmektedir. Zwaan'a göre, eğer olaylar birbiriyle bağlantılıysa ve olaylar arasında 1 saatten az zaman farkı varsa, ilk olay katılımcı tarafından ulaşılabilir. Eğer olaylar arasında 1 saat'den fazla zaman farkı varsa katılımcı birinci olayı işlemlerde zorluk çeker. Bizim deney cümlelerimizde olaylar birbirini takip etmektedir ve olaylar arasında herhangi bir zaman aralığı yoktur. Fakat buna rağmen katılımcının ilk olayı işlemleri çok güç olmuştur. Fakat buna rağmen katılımcının ilk olayı işlemleri çok güç olmuştur. Sol sınırın okuyucuya kapalı olmasını Garrod ve Sanford'un (1977) 'odak bellek modeli' (İng. focus memory framework) ile açıklayabiliriz.

Garrod ve Sanford'a göre okuyucu metinleri büyük parçalar (İng. chunk) halinde işlemler. İlk olay örgüsü anlatıya başlayıştır ve bu yüzden okuyucuya sağ sınıra göre daha az ulaşılabilir. Garrod ve Sanford'un modelini deney cümlelerimize uyguladığımızda ilk olay bölümü yani sol sınır 'örtük odak' (İng. Implicit focus) olarak açıklanabilir ve ikinci olayı 'aktif odak' (İng. Explicit focus) olarak tanımlanabilir. Bu tanımlamalar Grosz ve Sidner (1986)'in dikkat

modeli (İng. attentional model) ile de örtüşmektedir. Grosz ve Sidner'a göre öykülemelerde ilk anlatı öncelikli parçadır (İng. higher stack) ve en az ulaşılabilir. Bu demek değildir ki sol sınır işler belleğin (İng. working memory) parçası değildir. Sol sınır işler belleğin içerisinde fakat *this* ve *that* ile çok zayıf bir bağlantısı bulunmaktadır. Bu yüzden örtük odak olan sol sınırın tekrar harekette geçirilmesi çok zordur. Bu da bize neden *this* ve *that* arasında karşılaştırılabilir pragmatik bir fark bulamadığımızı açıklamaktadır. Bu durum ayrıca neden katılımcılar *this* ve *that*'i gördüklerinde güçlü geri dönüşlü okuma yaptıklarını açıklamaktadır. Geleneksel dilbilimcilerin (Ariel 1996; Diessel 2002; Fillmore 1982; Lakoff 1974; Levinson 2003; Webber 1988; McCarthy 1995 varsayımlarının aksine, katılımcılar metin işaretlerini gördüklerinde tekrar geriye dönüşlü bir okuma gerçekleştirmemiştir; çünkü *this* ve *that* genellikle aktif odağı öncül olarak seçmiştir. Sol sınır ise örtük odak olarak işler bellektedir ve *this* veya *that* için güçlü bir öncül olamamıştır.

Deney 3'te sağ sınır ile metin işaretiyle birlikte verilen zaman süresi anlamsal olarak örtüşmese bile (örn. *driving from Edinburgh to Birmingham... This-that took him 5 minutes*), katılımcılar bu koşulda bile sol sınırı işlemede zorluk yaşamışlardır. Bu da Asher ve Lascarides'in (2003) sol sınır ile ilgili hipotezini sorgulamamıza neden olmaktadır. Asher ve Lascarides metin işaretleri ve sol sınır arasında anlamsal bir bağ kurulduğunda sol sınır metin işaretleri için ulaşılabilir olduğunu ileri sürmüştür. Fakat bizim deneylerimiz, yazarın niyet durumuna (İng. intentional state (Grosz and Sidner 1986)) göre ulaşılabilir olsa bile okuyucu için sol sınırın ulaşılabilir olduğunu göstermektedir. Ariel (1996), konuşucunun metin işaretlerini dinleyicinin zihinsel gösterimine göre seçtiğini belirtmiştir; fakat bizim okuma deneylerimiz okuyucunun ve yazarın söylem yapılandırılmasında zihinsel gösterimin farklı olduğunu göstermektedir.

Alanyazındaki araştırmalar, metin işaretlerinin işlevini yazar ve okuyucu açısından aynı anda ve çevrimiçi üretim ve okuma deneyleri ile ele almamıştır (Asher 1996; Ariel 1996; Çokal, 2005; Diessel 2002; Gundel ve diğ. 1988, 1993; Fillmore 1982; Webber 1988; McCarthy 1995). Bizim çevrimiçi üretim deneyimiz ve derlem çalışmamız, yazarın metin işaretlerini kullanmasıyla ilgili bilgi

sunarken, çevrimiçi okuma deneyleri okuyucunun işleme açısından bize veri sağlamıştır.

Bütün bu çalışmalar göz önünde bulundurularak okuyucu veya yazar açısından metin işaretlerinin işleme ile ilgili Asher ve Lacarides'in Segment Söylem Sunum Teorisi (ing. Segmented Discourse Representation Theory (SDRT), Garrod ve Sanford'un 'odak bellek modeli' ve Grosz ve Sidner'in niyet ve odak kavramları birleştirilerek metin işaretlerinin işleme üzerine bir model ortaya sürdük. Okuma anında, örtük ve aktif odak işler belleğin parçalarıdır. Bu iki odak okuma halinde birbiriyle gönderim halindedir. Odağa yeni giren olay örgüsü aktif odakta tutulurken örtük odakta birden fazla bölümler açılmaktadır. Çevrimiçi okuma deneyinde, katılımcılar için sağ sınırı okumak kolay olmuştur; çünkü sağ sınır işler belleğin aktif odak bölgesindedir. Bizim varsayımımıza göre, sol sınır hala bellekte aktif durumda fakat *this* ve *that*'in bulunduğu cümle ile arasında zayıf gönderim mevcuttur. Bu yüzden *this* ve *that*'in sol sınıra gönderimde bulunduğu koşullarda sığ işleme gerçekleşmektedir (İng. shallow processing). Bu da metin işaretlerinin ancak aktif bellekteki olay örgüsünü öncül olarak işaret ettiğini ve okumada odaktaki değişimi güçlü bir şekilde işaret edemediklerini göstermektedir. Bu işaret edememenin sebebi işler belleğin odak yapısından kaynaklanmaktadır. Ayrıca, bu bize geleneksel bakış açısıyla metin işareti metnin öncesindeki bir öncüle gönderimde bulunur fikrinin (İng.co-textual) metin işaretlerini tanımlamada yeterli olmadığını, bu işaretlerin okumadaki zihinsel gösterimde (İng. mental representation) odak-baskın olduğunu (İng. focus-marked) söyleyebiliriz.

Öte yandan yazıda, *this* hem odak-baskın hem de niyet-baskın durumdadır çünkü sağ ve sol sınıra ulaşılabilir olduğu gözlenmiştir. Alex ve Lascaides'in açıkladığı gibi *this* sol sınıra ancak anlamsal bir bağlantı yani yazarın niyetine göre ulaşılabilir. Bir başka açıklama ise, yazar için *this*'in odak değişimi göstermesi *that*'e göre daha doğal olmasıdır. Fakat derlemde *this*'in sol sınıra ulaşılabilirliği % 4 ve üretim deneyinde ise % 23'dür. *That* ise daha çok aktif odak-baskındır (İng. Explicit focused-marked). Ayrıca, yazıda derin işleme (İng. deep processing) oluşmaktadır çünkü katılımcılar göndergede buldukları metnin

bölmelerine tekrar geri dönme ihtiyacı duymuşlardır. Yazıda çoğunlukla *this* ve *that*'in öncüllü aktif odaktır.

Yukarıda bahsedilen deneyler Türkiye bağlamı göz önünde bulundurularak küçük değişiklikler yapılarak yabancı dili İngilizce olan Türk katılımcılara uygulanmıştır (bkz Deney 4 bölüm 3.5; Deney 5 bölüm 3.6; Deney 6 bölüm 3.7). Yabancı dili İngilizce olan Türk katılımcıların anadil konuşucularının aksine yakınlık stratejisini (İng. recency) kullanmayarak metin işaret adlarının işlemlenmesinde konumsal işaret adlarına benzerliği strateji olarak kullandıkları gözlenmiştir. Bir başka deyişle *that*'in *this*'e göre sol sınıra yani uzak cümleye gönderimde bulunduğu koşulda göz sabitlenmeleri kısa sürdüğü gözlenmiştir. Anadil konuşucuları ise hep sağ sınırı yani yakın olan olay örgüsünü öncül olarak seçmişlerdir. Ayrıca okuma deneylerinde örtük ve açık bilginin işlemlenmesinin birbiriyle yarıştığı gözlenmiştir. Açık bilgi konumsal işaret adları bilgisi yani *this*'in yakın nesneye *that*'in ise uzak nesneye göndermeye bulunduğudur. Kapalı bilgi ise *this*'in odak oluşturduğu yani daha önce verilen bir bilgiye tekrar göndergede bulunacağıdır. Bu iki bilginin çevrimiçi işlemlenmede birbiriyle yarıştığı gözlenmiştir. Üretim deneylerinde ise hep anadil konuşucularının hem de yabancı dil konuşucularının asimetric sınır eğilimlerinin olduğu fakat bu öncül tercihlerinin birbirinden farklı olduğu saptanmıştır: anadil konuşucuları *that* ile sağ sınıra, *this* ile sol sınıra göndergede bulunurken yabancı dil konuşucuları *that* ile sol sınıra, *this* ile sağ sınıra göndergede bulunduğu saptandı. Birinci grup deney sonuçları yabancı dil konuşucularının tercihlerinde öğretim metaryellerinin etkisi olduğunu sunmaktadır çünkü katılımcılar okularda öğrendikleri konumsal işaret fonksiyonlarını metin işaretlerini işlemlerken kullanmaktadırlar. Ayrıca, yabancı dil ve anadil konuşucuları arasındaki fark bize kuralcı (İng. prescriptive) ve betimleyici (İng.descriptive) dil bilgisi arasındaki farkıda işaret etmektedir. Bulgular Clahsen ve Felser (2005)'in sığ işleme hipotezini desteklerken yabancı dil konuşucuların sadece grammer işleme yaptıkları bulgusunu sunmuştur.

İkinci grup deneylerde *it*, *this* ve *that*'in öncül seçimlerinin karşılaştırıldığı çevrimiçi okuma ve üretim deneyleri yapılmıştır. *It* ve *this* üzerine yapılan teorik çalışmalara baktığımızda üç temel çalışma ortaya çıkmaktadır. Bunlardan ilki

Webber'in (1988) küçük ölçekli derlem çalışmasıdır. Bu çalışmanın verilerini gazete yazılarından toplamıştır. *It* ve *this* için 177 metin seçerek bu metinlerde *it* ve *this*'in öncül seçimlerini belirlemiştir. Elde edilen bulgulara dayanarak Webber *this*'in genelde bir önermeye, *it*'in ise bir isim öbeğine gönderimde bulunduğunu ileri sürmüştür.

İkinci çalışma Passoneau (1993) tarafından yapılan yine bir derlem çalışmasıdır. Webber'den farklı olarak sözlü derlemdeki *it*, *this* ve *that*'in öncül seçimlerin incelemiştir. 700 konuşma örneği seçmiştir. Bu konuşma örneklerinden %8'inde *this* kullanılmıştır. Bu yüzden çalışmasında *this* kullanımlarını içermemiştir. Fakat *it* bulguları bizim için önem teşkil etmektedir. *It*'in isim öbeğini öncül seçtiği gibi bir önermeyi de öncül olarak seçmekte olduğunu vurgulamıştır. Diğer taraftan *that*'in *it* gibi olmadığını tamamıyla önermeye gönderimde bulunduğunu belirtmiştir.

Üçüncü çalışma McCarthy (1995) tarafından yapılmıştır. *It*'in söylemin devam ettiğini işaret ederek bir isim öbeğine gönderimde bulunduğunu, *this*'in ise söyleme yeni giren bir isim öbeğini öncül olarak seçtiğini belirtmiştir. Bütün bu çalışma bulgularını göz önünde bulundurarak ikinci gruptaki deneylerde anadil ve yabancı dil konuşucularının *it* ve *this* için öncül tercihleri araştırıldı. Literatürdeki çalışmalar göz önünde bulundurularak Deney 1'deki (bkz. 4.1) hipotezler şunlardı:

- 3- Gönderim ifadesi (i.e. referential expression) bir önceki cümledeki isim öbeğine gönderimde bulunduğunda, *it* isim öbeğini öncül olarak seçer.
- 4- Gönderim ifadesi (i.e. referential expression) bir önceki cümledeki önermeye gönderimde bulunduğunda, *this/that* önermeyi öncül olarak seçer.

Bu hipotezleri sınamak için 2 x 2 deseni tasarlanmıştır ve bu yüzden *this* ve *that* birbirinden ayrı olarak *it* ile karşılaştırılmıştır. Deney 1 (40 İngiliz Katılımcı: bkz. 4.1) deki koşulları şu şekildedir:

Koşul 1: *it* - önermeye gönderim

John had to be in London by 3 pm, and all the airports were closed owing to the volcanic ash, so he drove the black Citroen from Glasgow to South London. It was an expensive journey but he was happy to arrive on time

Koşul 2: *this* - önermeye gönderim

John had to be in London by 3 pm, and all the airports were closed owing to the volcanic ash, so he drove the black Citroen from Glasgow to South London. This was an expensive journey but he was happy to arrive on time.

Koşul 3: *it* - isim öbeğine gönderim

John had to be in London by 3 pm, and all the airports were closed owing to the volcanic ash, so he drove the black Citroen from Glasgow to South London. It was an expensive vehicle but he was happy to arrive on time

Koşul 4: *this* - isim öbeğine gönderim

John had to be in London by 3 pm, and all the airports were closed owing to the volcanic ash, so he drove the black Citroen from Glasgow to South London. This was an expensive vehicle but he was happy to arrive on time.

Deney 1'deki sonuçları özetlersek, isim öbeğine gönderim koşullarında önerme koşullarına göre daha uzun göz sabitlenmesi mevcuttur. Bunun muhtemel açıklaması katılımcılar metni bir öbek olarak işlemekte ve detayları dikkat etmemektedir. Bir başka deyişle, metinde ana olayları kısa bellekte tutmakta fakat olaylarla ilgili detayları dikkat etmemektedirler.

Deney metinlerindeki bağlamsal bilginin katılımcıların artgönderim işlemlerini etkilediği sonucuna varıldı. Bağlamsal bölgede birden fazla isim öbeği bulunmaktadır ve bu isim öbekleri artgönderimin öncülü olmak için birbirleriyle rekabet halindedir. Bu katılımcıların metni ana fikri olarak okuduklarını, yani detaylara dikkat etmediklerini bize göstermektedir. Bu sebeplerden dolayı Deney 1'deki bağlamsal bilgi daraltılarak Deney 2 metinleri tasarlanmıştır (40 İngiliz katılımcı: bkz 4.2). Deney 2'deki koşullar şu şekildedir:

Koşul 1: *it* - önermeye gönderim

Charlotte wrote a book. It was a difficult job but the sales were spectacular.

Koşul 2: *this* - önermeye gönderim

Charlotte wrote a book. This was a difficult job but the sales were spectacular.

Koşul 3: *it* - isim öbeğine gönderim

Charlotte wrote a book. It was a difficult read but the sales were spectacular.

Koşul 4: *this* - isim öbeğine gönderim

Charlotte wrote a book. This was a difficult read but the sales were spectacular.

Deney 2’de katılımcıların hem *this* hem de *it* için kesin bir öncül tercihi gözlenmemiştir. Bir sonraki aşamada Deney 3 üretim deneyini (bkz. 4.3) yaparak anadili İngilizce olan katılımcıların *this* ve *it* için hangi öncül türünü tercih ettikleri bir kez daha araştırılmıştır. Deney 1 ve 2’de görülen etkileşim motifinin geçerli olup olmadığını gözlemlenecektir. Çevrimiçi okuma deneyinin aksine üretim deneyinde anadil katılımcıları asimetrik öncül tercihi sergilemişlerdir: *this*’i önermeye gönderimde bulunurken *it*’i isme gönderimde kullanmışlardır.

Yukarıda bahsedilen ikinci grup okuma ve üretim deneyleri yabancı dili Türkçe olan katılımcılarda yapılmıştır (bkz. Göz izleme ve üretim deneyleri sonuçları için bkz. 4.4.1 ve 4.4.2). *This* ve *it*’in önermeye ve isim öbeğine gönderimde bulunduğu deneylerde, anadili İngilizce olan katılımcıların aksine, çevrimiçi okuma deneylerinde yabancı dili Türkçe olan katılımcılar yapı ve fonksiyon ilişkisi kurmuşlardır. Yani belirsizliği çözmeye çalışmışlardır. Fakat bu belirsizliği çözerken literatürün beklentisi dışındaki öncülere gönderimde bulunmayı tercih etmişlerdir. Okuma deneyinde *it*’in öncülü önerme olarak tercih edilirken *this*’in öncülü ise isim öbeğidir. Üretim Deneyinde (bkz. 4.5) katılımcılar *this* için bir öncül tercih etmemişlerdir. Diğer taraftan, *it* için öncül tercihleri değişmiştir. Sorace ve Filiaci (2006) arayüz hipotezi bulgularıyla örtüşmektedir. Yabancı dil katılımcılarında kural bilgisi var fakat bu bilgiyi kullanırken odağın metin işaret adlarının nasıl etilediği konusundaki bilgileri eksik. Bunun sebebi bu konunun söylembilim ve edimbilim arasında kaldığıdır. Ayrıca yabancı dil kullanıcılarının birinci dilden de bazı dilbilimsel kalıntıların olduğu ve bu arayüzün bu faktörlerden etkilendiğidir. Hem çevrimiçi hem de üretim deneyi Sorace ve Filiaci’nin savlarıyla aynı doğrultudadır. Bundan dolayı, yabancı dil konuşucuları *this*’in öncülü için bir tercih göstermemiştir.

Yukarıda ikinci grupta bahsedilen cümlelerde *this that* ile değiştirilerek *it* ile öncül tercihi karşılaştırılmıştır (bkz. Deney 5.1 ve Deney 5.2). Bu karşılaştırma hem anadil hem de yabancı dil katılımcılarıyla yapılmıştır (yabancı dil katılımcılarıyla yapılan deneyleri için bkz. Deney 5.3. ve Deney 5.4). *It* ve *that*'in karşılaştırıldığı deneylerde kullanılan koşullar şöyledir:

Koşul 1: *it* - önermeye gönderim

Charlotte wrote a book. It was a difficult job but the sales were spectacular.

Koşul 2: *that* - önermeye gönderim

Charlotte wrote a book. That was a difficult job but the sales were spectacular.

Koşul 3: *it* - isim öbeğine gönderim

Charlotte wrote a book. It was a difficult read but the sales were spectacular.

Koşul 4: *that* - isim öbeğine gönderim

Charlotte wrote a book. That was a difficult read but the sales were spectacular.

That ile yapılan ikinci grup okuma deneyinde yine anadil konuşucuları *that* için bir öncül tercihi göstermezlerken *it* için öncül tercihleri değişerek önerme olmuştur. Diğer taraftan yabancı dil konuşucuları *it* için yine isim öbeğini tercih ederken *that* için öncül tercihi eğiliminde olduğu görülmüştür. Üretim deneylerinde her iki grupta asimetrik öncül tercihinde bulunmuşlardır ve bu sefer yabancı dil konuşucuları beklentilerin doğrultusunda *that*'i önerme ve *it*'i isimöbeği için kullanmışlardır. Beklentilerin doğrultusunda kullanımda ve işlemlerde Türkçe'nin etkisi olabileceği düşüncesini ortaya çıkarmıştır. *This* ve *it*'in Türkçeye çevirisi *bu*'dur. Hangi durumda *this* hangi durumda *it* kullanıldığını fark etmek ve bunların karşılığında sadece tek bir anadilde ifade olması yabancı dil katılımcıları için fonksiyonları örtüşüyor olabilir. *That*'in Türkçeye çevirisi *o* ve *it*'in çevirisi *bu*'dur. Bu sebepten dolayı yabancı dil katılımcıları *that*'e hedef dilde farklı fonksiyonların karşılık geldiğini biliyor olabilirler.

Üçüncü deney grubunun amacı *this* ve *it*'in göndergesi olarak isim öbeği durumunun incelemek 2×2 (bağımsız değişken $1 \times$ bağımsız değişken 2) deneyini tasarlandı (bkz Deney 6.1) Yine bu deneyde artgönderim için iki

değişken (*it* and *this*) ve isim öbeği için iki değişken (uzak olan ve özne durumunda isim öbeği ve daha yakın nesne durumundaki isim öbeği) bulunmaktadır. *It* ve *this*'in öncüllerini uyumlu/ uyumsuz gönderim ifadeleriyle özne ve nesne konumunda kontrol atında tuttuk. İki öncül kullanıldı: özne konumundaki isim öbeğine gönderim (örn. The room was small and had a large jug in the centre. It/this had a large window and looked stylish) nesne konumundaki isim öbeğine gönderim (The room was small and had a large jug in the centre. It/this had a large handle and looked very stylish.) Literaturdeki varsayımlara dayanarak şu hipotezler test edildi:

- 1- Öncül ifadesiyle özne durumundaki isim aynı nesnel özelliğe sahip olduğunda, *it* özne konumunda bulunan uzaktaki ismi öncül olarak seçer
- 2- Öncül ifadesiyle nesne durumundaki isim aynı nesnel özelliğe sahip olduğunda, *this* nesne konumunda bulunan uzaktaki ismi öncül olarak seçer

Bu hipotezleri test etmek için aşağıdaki koşullar oluşturdu:

Koşul 1: *it* uzaktaki özne durumundaki isim öbeğine göndergede bulunurken

The bedroom was small and had a large bed. It had a walnut wardrobe and looked very posh.

Koşul 2: *this* uzaktaki özne durumundaki isim öbeğine göndergede bulunurken

The bedroom was small and had a large bed. This had a walnut wardrobe and looked very posh.

Koşul 3: *it* yakındaki nesne konumundaki isim öbeğine göndergede bulunurken

The bedroom was small and had a large bed. It had a walnut headboard and looked very posh.

Koşul 4: *this* yakındaki nesne konumundaki isim öbeğine göndergede bulunurken

The bedroom was small and had a large bed. This had a walnut headboard and looked very posh.

This'in uzaktaki özne durumundaki isim öbeğine göndergede bulunduğu koşulda ve *it* yakındaki nesne konumundaki isim öbeğine göndergede bulunduğu koşulda göz sabitlenmelerinin daha uzun olacağını tahmininde bulunuldu. Eğer bu koşullarda uzun göz sabitlenmeleri olursa Gundel et. al (1993) ve McCarthy (1995)

hipotezlerini doğrulamış olacağız. Gundel et. al (1993) ve McCarthy (1995) göre *this* aktif fakat söylemde topik olmayan isim öbeğini öncül olarak seçerken *it* söylemdeki topik durumundaki isim öbeğinin devam ettiğini belirtir. Bu deneyde *this*'in isim öbeği öncül seçiminde bir seçimi olduğunu sonucu alındı. *This* yakın isim öbeğini öncül olara seçmektedir. *It*'in ise isim obegi seçiminde her iki ismi tercih edebileceğini gözlemledik. Bu bulgunun doğrulanması için bir üretim deneyi yapıldı ve katılımcılardan kendilerine verilen boşlukları doldurmaları istediklerinde aynı isim öbeği terchinde bulunup bulunmayacağını araştırıldı. Bu üretim deneyi katılımcıların bir önceki cümlede *this* ve *it*'in göndergesi olarak özne ya da nesne durumdaki isim öbeğini mi gönderge tercih ettiklerini araştırmayı hedeflemiştir. Deney 6.1 sonuçlarına ve literatürdeki hipotezlere dayanarak bu deneydeki hipotez şuydu:

1. Yakın isim öbeği *this 'in* öncülü olarak tercih edilecek
2. *It*'in uzaktaki isim öbeğine göndergesi *this*'e göre daha yüksek olacak

Deneyde kullanılan metinler şu şekildedir:

- 1- The bedroom was small and had a large bed.
It/This.....
- 2- The kitchen was large but had only a small cupboard.
It/This.....

Beklentilerin doğrultusunda, üretim deneyinde *this*'in yakın ismi odak olarak tercihi *it*' e göre daha yüksek. *It'in* uzak ismi öncül olarak seçme yüzdeliği *this*'e göre daha yüksektir.

Üçüncü gruptaki deney metinleri yabancı dili İngilizce olan katılımcılarla da yapılmıştır (bknz. Deney 3 için 6.3; Deney 4 için 6.4). Bu üçüncü gruptaki deneylerin sonucu, yabancı dil ve anadili İngilizce olan katılımcıların *it* ve *this* için isim öbeği öncül tercihi aynıdır. Her iki grup *this*'in kullanımında odakta olan ve baskın olmayan öbeği seçerken *it*'in kullanımı için baskın olan ve konu olan isim öbeğini öncül olarak seçilmiştir. Neden üçüncü grupta her iki grupta benzer öncül tercihi varken daha önceki birinci ve ikinci grup deneylerde anadil ve yabancı dil konuşucularında aynı öncül tercihini görmediğimizin sebebi ölçek ile açıklanabilir. Ölçekte yorumlanabilir öncül seçimi (örn. İsim öbeği) önermeye göre daha belirgin ve anlaşılabilir bir kuraldır. Ayrıca hem anadil hem de yabancı

dil konuşucularında isim öbeği ilk öğrenilen kuraldır. Bütün bunlar göz önünde bulundurulduğunda isim öbeği en yorumlanabilir kuralken önerme öncül olarak en az yorumlanabilir özelliktedir. Önerme öncül olarak okulda da öğretilmeyen bir konudur. Önerme gibi sağ/sol sınır kuralı da öğrenilmeyen ve en az yorumlanabilir/belirgin kurallardandır. Bu yüzden *this*, *that* ve *it* için sınır ve önerme kurallarında net bir öncül tercihi gözlenmezken isim öbeğinde daha açık bir tercih gözlenmiştir.

Kısaca tekrar deney bulgularını özetlenirse, *this*, *that* ve *it* in çevrimiçi işleme yabancı dil ve anadil katılımcıları için farklıdır. Bu farklılık üretim deneylerinde de ortaya çıkmaktadır.

Bu çalışmanın deneysel çalışmalar için çıkarımları bulunmaktadır. Brown-Schmidt, Byron ve Tanenhaus (2005); Kaiser ve Trueswell (2008) tarafından bulunan asimetrik öncül beklentisi deneylerdeki belirgin/yorumlanabilir ve en belirsiz/yorumlanamaz özelliklerden ve dağılımlardan etkilenmektedir. Deney tasarımı yapılırken, bu özelliklerin daha çok kontrol edilmesi gerekmektedir. Bir başka çıkarım yabancı dil konuşucularının tercihleri okuldaki eğitimden etkilenmektedir. Bu bulgu Niimura ve Hayashi (1996) ve Young (1996)'un okul eğitiminin işaret adlarının kullanımını etkilediği savını desteklemektedir. Fossard, Garnham ve Cowles (2011) adlı işlemlerinde erken çözümleme gözlemlerken anadil konuşucularıyla yapılan deneylerde erken işleme gözlemlenmemiştir. Ayrıca, Clahsen ve Felser (2005)'in farklı deney ortamında farklı bilgilere ulaşıldığı hipotezinin sadece yabancı dil kullanıcılarında olmadığı anadil kullanıcılarında da olduğu görülmüştür. Yani anadil kullanıcıları açık bilgiyi üretim deneyinde kullanarak daha net bir öncül tercihi gösterirken kapalı ve örtük bilgi kullanımı çevrimiçi okuma deneylerinde de onlar içinde gözlemlenmiştir.

Bu çalışmanın ikinci dil edinimine çıkarımlardan bir tanesi Sorace ve Filiaci (2006)'nın arayüz hipotezindedir. Arayüz modelinde tahmin edildiği gibi yorumlanması zor özellikler isim öbeği gibi güçlü öncül tercihi göstermemiştir. Ayrıca Türkçe'ye çevrilirken tek karşılığı olan dilbilimsel öge hedef dilde iki ögeye dönüştüğü için katılımcıların hedef dilde kullanımı ve işleme net olmamaktadır. Bu net olmayan kullanımlar opsiyonel kullanım yani kararsız

kullanımı ortaya çıkarmıştır. Ayrıca, bu kararsız kullanım açık ve örtük bilgi farkını da ortaya çıkarmıştır. Yabancı dil kullanıcıları hedef dilin kurallarının farkında fakat literatürün aksine öncül tercih etmektedirler. Witzel, Witzel ve Nicol (2012) Clahsen ve Felser (2005) hipotezine karşı Yabancı dil konuşucularının daha derin işleme yaptıkları bulgusunu ileri sürmüşlerdir. Bu tez çalışması derin ve sığ işlemlerin ne olduğunun tekrar açıklanması gerektiğini göstermiştir: yanlış ama çok çaba sarf edilen bir işleme derin bir işleme mi yoksa sığ işleme olarak mı ele alınmalı. Yoksa yetersiz yani bir tercih yapılmayan işlemleri sığ işleme olarak ele alınmalıdır. Bu konuyla ilgili mevcut literatüre tekrar taranması gerektiğini bu çalışma göstermiştir.

Tüm genel deney bulgularını bir kez daha özetlenirse: 1- anadil konuşucuları çevrimiçi işlemede çoğunlukla öncül tercih etmemişlerdir; 2- yabancı dil konuşucuları çevrimiçi işlemede öncül tercihi yapı-fonksiyonu arasında bağlantı kurarak yapmıştır. Fonksiyon bağlantısını kurmak için kesin ve ilk bildikleri dilbilgisi kurallarını uygulamaya çalışmışlardır; 3- anadil ve yabancı dil konuşucularının işleme stratejileri ve çözümleme bölgeleri birbirinden farklıdır; 4- arayüzdeki hedef dil öğeleri yabancı dil konuşucuları ileri düzeyde İngilizce bilsede sorunludur; 5- asitmerik öncülü belirleyen etkenlerden birisi kuralın yorumlanma ve belirginlik derecesidir.

Appendix C
TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

- Fen Bilimleri Enstitüsü
- Sosyal Bilimler Enstitüsü
- Uygulamalı Matematik Enstitüsü
- Enformatik Enstitüsü
- Deniz Bilimleri Enstitüsü

YAZARIN

Soyadı : Çokal
Adı : Derya
Bölümü : İngiliz Dili Eğitimi

TEZİN ADI (İngilizce) : THE ONLINE AND OFFLINE PROCESSING OF *THIS*, *THAT* AND *IT* BY NATIVE SPEAKERS OF ENGLISH AND BY TURKISH NON-NATIVE SPEAKERS OF ENGLISH

TEZİN TÜRÜ : Yüksek Lisans Doktora

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir.
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir.
3. Tezimden bir bir (1) yıl süreyle fotokopi alınamaz.

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: