

AN INVESTIGATION OF CONDITIONAL PRESUPPOSITIONS IN TURKISH

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## AN INVESTIGATION OF CONDITIONAL PRESUPPOSITIONS IN TURKISH

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## ABSTRACT

### AN INVESTIGATION OF CONDITIONAL PRESUPPOSITIONS IN TURKISH

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Presuppositions embedded in the consequent of a conditional sometimes project as conditional presuppositions. In this thesis, two experiments were conducted to investigate conditional presuppositions in a probabilistic framework and to test whether prior beliefs play a role in the projection of conditional presuppositions. Three types of relationships between different situations and physical objects were established (entailing, related, unrelated). Experiment I measured prior beliefs about owning the object depending on the situation. As expected, when the situations were negated, owning the object was more likely in entailing situations than in unrelated situations, and gradual prior beliefs were observed depending on the situation. Experiment II tested presupposition projection in the same scenarios by adapting them into conditional sentences. Results showed a similar pattern of probabilities when the antecedent was denied and the probability of the presupposition was measured. Experiment II also tested the use of *Modus Tollens* in conditional presuppositions. When the presupposition was denied and the probability of the antecedent was measured, only entailing antecedents received a very low rating, suggesting that participants obtained a conditional presupposition only in conditionals whose antecedent makes the presupposition highly likely.

Keywords: Experimental pragmatics, presupposition, conditionals, presupposition projection

## ÖZ

### TÜRKÇEDEKİ KOŞULLU ÖNSAYILTI LAR ÜZERİNE BİR İNCELEME

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Koşullu bir ifadenin neticesinde içeyerleştirilen önsayıtlar bazen koşullu önsayıtlı olarak yansımaktadır. Bu tezde koşullu önsayıtları olasılıksal bir çerçevede incelemek ve önsel inançların koşullu önsayıtlı yansımada oynadığı rolü test etmek için iki deney yürütülmüştür. Farklı durumlar ve fiziksel nesnelere arasında üç çeşit ilişki tespit edilmiştir (gerektirici, ilişkili, ilişkisiz). 1. deney duruma bağlı olarak nesneye sahip olmayla ilgili önsel inançları ölçmüştür. Beklendiği gibi, durumlar olumsuzlandığında nesneye sahip olmanın gerektirici durumlarda ilişkisiz durumlara göre daha muhtemel olduğu bulunmuştur ve duruma bağlı olarak kademeli önsel inançlar gözlemlenmiştir. 2. deney aynı senaryoları koşullu ifadeler haline getirerek bu durumlardaki önsayıtlı yansımaları test etmiştir. Öncül inkar edilip önsayıtlının olasılığı ölçüldüğünde sonuçlar ilk deneyle benzer bir olasılık örüntüsü göstermiştir. 2. deney koşullu önsayıtlılarda *Modus Tollens* kullanımını da test etmiştir. Önsayıtlı inkar edilip öncülün olasılığı ölçüldüğünde sadece gerektirici öncüller çok düşük bir değerlendirme almıştır ve bu, katılımcıların yalnızca öncülü önsayıtlıyı çok muhtemel bir hale getiren koşullu ifadelerde koşullu önsayıtlı elde ettiğine işaret etmektedir.

Anahtar Kelimeler: Deneysel edimbilim, önsayıtlı, koşullu ifadeler, önsayıtlı yansıtılması

*To my birds, who love pistachios.*



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## LIST OF ABBREVIATIONS

AIC	Akaike Information Criterion
DRT	Discourse Representation Theory
FCS	File Change Semantic
LMM	Linear Mixed Model
METU	Middle East Technical University
RSA	Rational Speech Acts



## CHAPTER 1

### INTRODUCTION

#### 1.1 Presupposing

*Presuppositions* are the backgrounded meaning in our conversations and they are usually previously shared or common knowledge (Beaver et al., 2021). Imagine being asked to pay for your child's ice-cream at a mall, but you do not even have a child! The staff just incorrectly presupposed that the child next to you is your child, maybe because the child was looking at you. Most individuals in such a situation would simply dismiss the presupposition and solve the problem, but an incorrect presupposition may be offensive to some individuals in certain situations. So, in communication, it is important to get our presuppositions right and that is the reason why most individuals try not to presuppose things they were not explicitly told about. *Assertions*, on the other hand, are the foregrounded part of meaning and they are what is "explicitly told" in conversation (Pagin & Marsili, 2021).

Some lexical items relay to our audience what we presuppose in our speech or text. For example, someone who utters the sentence in (1a) presupposes (1b).<sup>1</sup> In this example, the possessive adjective *your* lets us know about what the speaker believes to be true.

1. (a) It's 20 liras for your child's ice-cream.  
(b)  $\rightsquigarrow$  You have a child.

Possessive adjectives are only one example of *presupposition triggers*, and there are many other presupposition triggers, such as definite descriptions, change of state verbs, and cleft sentences. For instance, definite descriptions presuppose the existence of an entity, as in (2).

2. (a) The concierge in Hotel Buffalo helped us find this restaurant.  
(b)  $\rightsquigarrow$  There is a (unique) concierge in Hotel Buffalo.

---

<sup>1</sup> The symbol " $\rightsquigarrow$ " is used throughout this thesis to indicate that the following sentence is a presupposition and not an assertion.

Even if one objects to a sentence containing a presupposition, as in (3), or turns it into a question, as in (4), or even puts it in the antecedent of a conditional, as in (5), the presupposition does not get cancelled.

3. No, the concierge in Hotel Buffalo did not help you find this restaurant.
4. Did the concierge in Hotel Buffalo help you find this restaurant?
5. If the concierge in Hotel Buffalo helped you find this restaurant, he knows where the hotel guests like to eat.

Negation, questions, and antecedents of conditionals are examples of *entailment-cancelling operators* because they cancel the *entailments* that can be obtained from linguistic expressions. For example, (2a) entails that someone helped someone else. However, in (3), the act of helping is negated; so, it does not entail that someone helped someone else. (4) and (5) do not have that entailment, either. Yet, these utterances still presuppose (2b). This phenomenon in which presuppositions do not get affected by entailment-cancelling operators is called *presupposition projection* and it is considered to be the distinguishing characteristic of presuppositions.

## 1.2 Presupposition Projection in Conditionals

When a presupposition trigger is embedded in the antecedent of a conditional structure, the presupposition projects globally, as in (5) presupposing (2b). However, if a presupposition trigger is embedded in a conditional's consequent, the presupposition does not always project globally. Sometimes, the presupposition projects locally by taking the antecedent of the conditional to be its own antecedent and becomes a *conditional presupposition*, as in (6).

6. (a) If Susie is a rock climber, her climbing shoes are durable.  
(b)  $\rightsquigarrow$  If Susie is a rock climber, she has climbing shoes.

There has been considerable theoretical debate on how conditional presuppositions arise (for a recent overview of the debate, please see: Singh, 2020). Mainly, the debate has revolved around two different ways of getting conditional presuppositions. One solution is to generate non-conditional presuppositions for every presupposition that is embedded in the consequent of a conditional and then to make pragmatic considerations to derive conditional presuppositions (Gazdar, 1979; Geurts, 1999). The other solution is to generate conditional presuppositions for every presupposition that is embedded in the consequent of a conditional (Beaver, 2001; Heim, 1988). In the latter approach, non-conditional presuppositions project if they are more plausible than conditional presuppositions, but initially, a conditional presupposition is generated. Even though conditional presuppositions have been discussed in the presupposition literature for more than 50 years (Karttunen, 1973; Langendoen & Savin,

1971), there has not been a solution to it that researchers have agreed upon. The general consensus seems to be that a conditional presupposition projects depending on the type of semantic and pragmatic associations between the lexical items used in the antecedent and the presupposition (Lassiter, 2012; Mandelkern & Rothschild, 2019; Schlenker, 2011; van Rooij, 2007).

Recently, probabilistic approaches have been applied to presupposition projection (Degen & Tonhauser, 2021; Qing et al., 2016; Stevens et al., 2017; Tonhauser et al., 2018; Xue & Onea, 2011) and a probabilistic theory for conditional presuppositions has been proposed (Lassiter, 2012). Lassiter's (2012) theory claims that a conditional presupposition projects when the presupposition's probability is dependent on the antecedent. If it is not dependent on the antecedent, a non-conditional presupposition projects. In Lassiter's (2012) probabilistic theory, conditional or non-conditional presuppositions are not generated based on the syntactic structure. Instead, the probabilities determine what can project, and the presupposition is generated only after that. This thesis experimentally investigates conditional presuppositions projecting out of a conditional's consequent with a probabilistic point of view. Previously, there have been several experimental investigations exploring under what conditions a conditional presupposition is obtained (Chemla & Schlenker, 2012; Domaneschi et al., 2016; Romoli et al., 2011), and very recently, there has been a study investigating the age of acquisition for understanding conditional presuppositions (Chen et al., 2022). The purpose of this thesis is to contribute to the existing literature on conditional presuppositions by experimentation with a probabilistic viewpoint.

### **1.3 Organization of The Thesis**

This thesis consists of 5 chapters. Chapter 1 explains presuppositions and conditional presuppositions briefly and guides the reader into the topic. Chapter 2 gives a detailed theoretical background on conditional presuppositions and presents relevant experimental work. Chapter 3 details the aim and method of Experiment I, and discusses its results while Chapter 4 does the same for Experiment II. Chapter 5 contains the general discussion, which discusses the experimental results in light of the previous chapters, the place of this thesis in cognitive science, and the conclusion of the thesis with further research prospects.



## CHAPTER 2

### BACKGROUND

This chapter gives a theoretical background on presuppositions, the proviso problem, and different theoretical accounts of conditional presuppositions. Previous experimental studies on conditional presuppositions are presented as well.

#### 2.1 Presuppositions

A conversation typically contains a lot of presuppositions that the interlocutors make use of during the conversation. These presuppositions are stored in the *common (back)ground* between the interlocutors (Stalnaker, 1974). While the discourse is built up, new information is added to the common ground. Later, the interlocutors can presuppose what is in the common ground. For example, consider a conversation such as (7). Because speaker A is making an assertion, speaker B accepts it and adds it to the common ground. When speaker B asks the color of the car, they are already presupposing (8). In such circumstances where the presupposition is in the common ground, the presupposition is *satisfied* by the context.

7. A: Jack has a car.  
   B: What color is Jack's car?
8.  $\rightsquigarrow$  Jack has a car.

If a presupposition is not in the common ground but it is still uttered, *presupposition failure* takes place. Presupposition failure may occur either because there is contradictory information in the common ground or because the presupposition has not previously been asserted. Even though a piece of new information is usually presented in the form of assertions, presuppositions can provide the new information, too. So, if presupposition failure occurs because the presupposed content is new information, the hearer may *accommodate* the presupposition into the common ground (Lewis, 1979; von Stechow, 2008). Presupposition accommodation takes place in order to ensure successful communication (Grice, 1975) and maintaining the common ground is important for future conversations.

What gets accommodated into the common ground is the speaker's presuppositions, which is to say, what the speaker believes to be true, and not necessarily what is

triggered by certain lexical items or syntactic constructions. Speaker presuppositions were first discussed by Stalnaker (1970) as anything the speaker believes to be true, even if it does not have a linguistic trigger. In this sense, they are *pragmatic presuppositions* because the triggered presuppositions are evaluated with pragmatic principles to really understand what speaker is trying to convey. For example, someone uttering (9) does not presuppose anything even though the word "his" is a presupposition trigger. This is because the presupposition is evaluated with pragmatic principles and to presuppose that Jack has a car would contradict the first conjunct. Because the question under discussion (QUD), which is the main topic being discussed (Roberts, 2012), in (9) is whether Jack has a car or not, "his car" is *at-issue* and cannot be presupposed (Chierchia, 1995; Simons et al., 2010; Tonhauser et al., 2018). So, for both presupposition projection and presupposition accommodation to proceed, the presupposition should be *not-at-issue*.

9. Either Jack does not have a car, or his car is pink.

In simple sentences with unembedded presuppositions, the presupposition trigger reflects the pragmatic presupposition of the speaker. For example, in (10), the possessive presupposition trigger yields (11) and that is also what the speaker presupposes.

10. Jack's car is red.

11.  $\rightsquigarrow$  Jack has a car.

However, when projection is involved in the process, which means that there is at least one embedding under an entailment-cancelling operator<sup>2</sup> in the sentence, pragmatic presuppositions of the speaker sometimes differ from what the presupposition triggers yield in some linguistic environments. This is known as *the projection problem for presuppositions* (Beaver, 2001; Gazdar, 1979; Geurts, 1999; Heim, 1988; Karttunen, 1973). The linguistic environments that cause a projection problem either do not allow the projection of any presuppositions or they lead to a conditional presupposition.<sup>3</sup> The disjunction in (9) had no presuppositions while the disjunction in (12) has the conditional presupposition given in (13). The projection problem is similar for conjunctions as well, as exemplified in (14-16).

12. Either Jack is not a rock climber, or his climbing shoes are pink.

13.  $\rightsquigarrow$  If Jack is a rock climber, he has climbing shoes.

---

<sup>2</sup> As explained in Chapter 1, entailment-cancelling operators cancel the entailments of linguistic expressions. For instance, a sentence like "The movie theater closes at midnight." has the presupposition "There exists a (unique) movie theater," triggered by "the" at the beginning of the sentence. It entails that the movie theater has a closing time. However, if this were a question, such as "Does the movie theater close at midnight?", the speaker would not be claiming that the movie theater has a closing time because the question does not entail that. Still, the presupposition that there exists a movie theater remains.

<sup>3</sup> In the rest of the thesis, for the sake of brevity, instead of saying "someone who utters a sentence like..." I will say "a sentence has/yields/leads to a presupposition" to refer to what the speaker presupposes.

14. Jack possibly has a car and may have gone to get his car washed.
15. Jack is possibly married and may want to bring his wife to the party.
16.  $\rightsquigarrow$  If Jack is married, he has a wife.

In conditionals, the problem might be easier to see. A conditional like (17) presupposes (18), which is the same as what (12) presupposes, namely (13). On the other hand, (19) does not presuppose anything because the antecedent of the conditional is at-issue and it cannot be presupposed even as a conditional presupposition.

17. If Jack is a rock climber, his climbing shoes are pink.
18.  $\rightsquigarrow$  If Jack is a rock climber, he has climbing shoes.
19. If Jack has climbing shoes, his climbing shoes are pink.

One thing to note about the projection problem for presuppositions is that for a presupposition to project or not to project as a conditional presupposition, the presupposed content must provide some new information. If it is not new information and has been previously asserted, there is not a problem because the previous context already disambiguates the speaker's presuppositions. Theorists are mainly concerned with predicting presupposition projection based on what the parts of an utterance presuppose because *compositionality*<sup>4</sup> is a crucial part of semantics and it is theoretically important that this principle is preserved (Katz & Fodor, 1963).

## 2.2 Processing of Presuppositions

Psycholinguistic research on sentence processing, especially sentence comprehension, has largely been focused on syntax (Traxler et al., 2018; van Gompel, 2013). Even though there have been quite a lot of research in semantic processing as well (Schumacher, 2018), how presuppositions are processed have only recently started to be investigated experimentally (Schwarz, 2019).

One of the ongoing debates on presupposition processing is whether it is costlier to process presuppositions compared to processing assertions. A number of studies found that individuals take longer to process refutations of presupposed content compared to refutations of asserted content (Bill et al., 2018; Cummins et al., 2012; Kim, 2008; Schwarz, 2016). This finding was argued by Cummins et al. (2012) as presupposed information being costlier to retrieve than asserted information. On the other hand, appropriate and felicitous utterances of presuppositions were found to elicit the same event-related potential as assertions (Reinecke, 2020). So, processing presuppositions was argued, by Reinecke (2020), to not be any costlier than processing assertions. In another study, Reinecke et al. (2022) found that complements of factives

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<sup>4</sup> The principle of compositionality refers to the idea that the meanings of the parts and the way they are combined constitute the meaning of the whole.

with action verbs produce as much sensorimotor activation in the brain as asserted content with action verbs. However, complements of non-factives with action verbs produced less sensorimotor activation than asserted content with action verbs. Vallauri and Masia (2018) cited various experimental studies providing evidence for the the uncostly processing of presuppositions and argued that presupposed content must be processed with automatic processing mechanisms, rather than controlled processing mechanisms<sup>5</sup>, to free up attentional resources. Recently, however, Schneider et al. (2020b) and Schneider and Janczyk (2020) provided evidence for non-automatic, capacity-limited, controlled processing of presuppositions by using the psychological refractory period<sup>6</sup> approach.

When comparing the processing of presuppositions to the processing of assertions, whether the presupposition is satisfied or unsatisfied should be taken into consideration since many researchers found that processing unsatisfied presuppositions is slower and costlier than processing satisfied presuppositions (Di Paola & Domaneschi, 2017; Domaneschi & Di Paola, 2018; Hirsch et al., 2018; Schneider et al., 2019; Schwarz, 2007; Schwarz & Tiemann, 2017). In fact, instead of accommodating a new presupposition and using it to obtain the preferred syntactic parse of a globally ambiguous sentence, individuals seem to choose the parse that satisfies the presupposition, even though that leads to the dispreferred parse (Crain & Steedman, 1985; Schneider et al., 2020a; Schwarz, 2007). In a mouse-tracking study, Schneider et al. (2020a) found that individuals start using presupposed information to disambiguate sentences as soon as they can. Therefore, it can be said that presupposition satisfaction is the preferred strategy in processing, rather than presupposition accommodation.

Processing embedded presuppositions is another matter in the processing of presuppositions. A study comparing global and local accommodation found that global accommodation is faster when individuals are computing the scope of negation (Chemla & Bott, 2013). However, another study by Schwarz and Tiemann (2017) found longer reading times for embedded presuppositions and this finding was interpreted as global presuppositions not being immediately available. In addition, Goebel and Schwarz (2022) found evidence for the ease of local accommodation compared to global accommodation in the antecedent of conditionals. Findings on global and local accommodation concern studies on conditional presuppositions as well because conditional presuppositions are thought to be the result of local accommodation in some theories. If local accommodation is the initial strategy for accommodation, conditional presuppositions must be generated by default. In such a model, non-conditional presuppositions must be obtained at the second stage of the model. However, it is worth noting that Chemla and Bott (2013) argued in their paper that they interpret their findings as being against a two-stage model. So, not having two stages for global or local accommodation is an option that has yet to be falsified as well.

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<sup>5</sup> Automatic processing is largely parallel and fast processing that does not use many resources, such as attention and working memory. Controlled processing is largely serial and slow processing that is effortful and depends on the capacities of resources (Vallauri & Masia, 2018).

<sup>6</sup> Psychological refractory period is the time between executing two consecutive tasks that causes the second task to be executed more slowly because cognitive resources are still in the process of recovering from the first task.



Another topic concerning accommodation is whether individuals accommodate unsatisfied presuppositions or ignore them. In the theoretical literature, a distinction between *soft* and *hard* presupposition triggers was made (Abrusán, 2011, 2016; Abusch, 2002, 2010). Soft presupposition triggers were argued to lead to presupposition projection only in some circumstances while hard presupposition triggers were argued to lead to presupposition projection in any case, making projection mandatory. An experimental study employing the visual world eye tracking paradigm found that participants start using any type of presupposed information to find the target as soon as possible, indicating that there is no time difference in the processing of soft or hard presupposition triggers (Schwarz, 2014). On the other hand, another study found that accuracy levels in comprehension questions were lower for some presuppositions after participants listened to audio recordings containing different presupposition triggers (Domaneschi et al., 2014). However, in a later study using a self-paced reading paradigm, Domaneschi and Di Paola (2018) found higher accuracy levels in responses to comprehension questions, suggesting that participants accommodated the unsatisfied presuppositions, independently of presupposition types. A picture selection experiment conducted by Bacovcin et al. (2019) also found that participants gave accurate responses for two different types of triggers (*again* and *continue*), suggesting that participants do not ignore unsatisfied presuppositions. Bacovcin et al. (2019) interpreted these results as individuals accommodating presuppositions even when it is not necessary. If presupposition accommodation proceeds even when it is not required, implausible presuppositions must be accommodated as well. To test the effects of plausibility on accommodation, Singh et al. (2016) conducted two self-paced reading experiments and asked the participants to give stops-making-sense judgements. They found that participants think implausible assertions make more sense than implausible presuppositions and implausible presuppositions make less sense than plausible presuppositions, suggesting that individuals are hesitant to accommodate implausible presuppositions.

For accommodation to take place, presupposed content must project first. Presupposition projection is shown to interact with prosody (Stevens et al., 2017; Tonhauser, 2016), at-issueness (Tonhauser et al., 2018), focus (Goebel, 2020), and prior beliefs (Degen & Tonhauser, 2021; Mahler, 2020). The idea that presupposition projection is influenced by whether the presupposition conforms to prior beliefs or not goes back to at least Gazdar (1979) and Heim (1983). In an offline experiment, Lorson (2018) collected ratings on utterances violating implicit gender biases to measure projectivity and found that prior beliefs do not affect presupposition processing. They interpreted this result as individuals revising their prior beliefs based on the utterances they encounter. Lorson's (2018) finding is the only counter evidence for the effects of prior beliefs on presupposition projection so far. Mahler (2020) collected ratings on the projection of politically-charged clausal complements and found that higher probability content received higher ratings than lower probability content. Mahler's (2020) finding indicates that prior beliefs about political inclinations influenced the variability in presupposition projection.

In order to test the variability in the projection of different types of triggers, Degen and Tonhauser (2021) used 20 different clause embedding predicates in a series of

rating studies. In the prior beliefs block, participants were provided with a fact about someone, such as (20), and they were asked to rate how likely that is for the person in question, as in (21), by rating their response on a scale from *impossible* to *definitely*. The fact could make the response to the question (*dancing salsa*) either highly probable (such as *being Cuban*) or less probable (such as *being German*).

20. **Fact:** Julian is German.

21. How likely is it that Julian dances salsa?

(Degen & Tonhauser, 2021)

In the projection block, participants were provided with a fact about someone, such as (22), and an utterance by someone else, such as (23). Then, participants were asked to rate how certain the speaker is in the presupposition of their utterance, as in (24), by rating their response on a scale from *no* to *yes*.

22. **Fact (which Nancy knows):** Julian is German.

23. Nancy asks: "*Did Cole discover that Julian dances salsa?*"

24. Is Nancy certain that Julian dances salsa?

(Degen & Tonhauser, 2021)

Degen and Tonhauser (2021) found that there is greater projection when prior beliefs make the presupposition highly likely. This finding provides evidence for the hypothesis that prior beliefs modulate projection across different presupposition triggers.

### 2.3 Conditional Presuppositions

Knowing the presuppositions of the antecedent and the consequent of a conditional sentence is not always enough to predict the presuppositions of that conditional. While a simple sentence like (25a) presupposes (25b), a complex sentence like (26a) is usually taken to presuppose (26b).

25. (a) Susie's climbing shoes are durable.

(b)  $\rightsquigarrow$  Susie has climbing shoes.

26. (a) If Susie is a rock climber, her climbing shoes are durable.

(b)  $\rightsquigarrow$  If Susie is a rock climber, she has climbing shoes.

In such cases, presuppositions of the consequent are not accommodated into the common ground as non-conditional presuppositions. This is part of the projection problem for presuppositions, which was dubbed the 'Proviso Problem' by Geurts (1996).

Karttunen (1973) introduced the terminology of *holes*, *filters*, and *plugs* to categorize the projection behavior of potential presuppositions in different types of expressions. Holes, most famously the negation operator, let the presuppositions escape to the global context<sup>7</sup>. This is exemplified in (27a), where the possessive adjective "her" triggers the presupposition in (27b). Plugs block any presupposition projection. This is exemplified in (28), where the presupposition triggered by the possessive adjective "her" leads to a conflict with the antecedent of the conditional and nothing projects. Filters, on the other hand, let the presupposition project, but in a conditional form. This might be because the presupposition gets stuck in its local context or it gets conditionalized. There could be a different mechanism for the projection of conditional presuppositions as well. (The relevant theories are discussed in Section 2.2.) An example has already been given in (26), where the possessive adjective triggers the presupposition in (26b) by taking the antecedent of the conditional as its own antecedent.

27. (a) If Susie is older than us, her climbing shoes are durable.  
 (b)  $\rightsquigarrow$  Susie has climbing shoes.
28. (a) If Susie has climbing shoes, her climbing shoes are durable.  
 (b)  $\rightsquigarrow \emptyset$

In some expressions, the projection behavior of presuppositions varies depending on the semantic content of the sentence. One example of this type of expression is the conditional operator. In (26-28), the conditional operator acts as a filter, a hole, and a plug, respectively. What determines the projection behavior of the conditional operator is the lexico-semantic relationship between the antecedent and the presupposition in the consequent, as pointed out by different authors before (e.g., Lassiter, 2012; Mandelkern & Rothschild, 2019; Schlenker, 2011; van Rooij, 2007). In this thesis, it is conjectured that a gradual manipulation of the relationship between the antecedent and the presupposition in the consequent would affect presupposition projection gradually (Degen & Tonhauser, 2021; Mahler, 2020). If the antecedent makes the presupposition highly likely to be true, projection should be highly likely as well. If the antecedent makes the presupposition less likely to be true, projection should be less likely. Lastly, if the antecedent makes the presupposition unlikely, projection should be unlikely, too.

The conditional operator becomes a hole when the antecedent is irrelevant to the presupposition in the consequent. In those cases, either presupposition satisfaction or presupposition accommodation proceeds globally. The conditional operator becomes a plug when the presupposition itself is directly entailed by the antecedent. Since what is *at-issue* cannot project (Chierchia & McConnell-Ginet, 1990; Simons et al., 2010; Tonhauser et al., 2018), and the presuppositional content in the consequent is *at-issue* in the antecedent, the presupposition in the consequent cannot project in those cases. For the conditional operator to become a filter, three conditions must

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<sup>7</sup> The global context refers to the main clause level of an expression. Embedded clauses constitute the local context.

be fulfilled at the same time. The important condition is that the hearer should not know the truth or falsity of the presupposition. So, this means that the conditional can become a filter only when there is a presupposition in the consequent that needs to be accommodated. The second condition is that the hearer should think that the speaker is uncertain about the truth of the presupposition. The third condition is that the truth of the presupposition in the consequent should depend on the truth of the antecedent. So, in those situations, the truth of the antecedent would suggest the truth of the presupposition, resulting in a conditional presupposition.

There have been some experimental studies that tried to investigate how conditional presuppositions are selected and processed (Chemla & Schlenker, 2012; Chen et al., 2022; Domaneschi et al., 2016; Romoli et al., 2011). However, they have not considered the possibility of gradual projection in their experiments. That is, the extent to which the presupposition projects as a conditional presupposition increases depending on the semantic relatedness between the lexical items in the antecedent and the presupposition (i.e., lexico-semantic associations; e.g., climber-having climbing shoes, knowledge about sports equipment-having climbing shoes, being good at maths-having climbing shoes). This thesis proposes that gradual projection is important for accounting for the projection problem for presuppositions and for how conditional presuppositions are processed. Hence, it should be at the center of experiments investigating the proviso problem in a probabilistic point of view. For this reason, the current study aims to uncover how presuppositions are processed in the consequent of a conditional if the gradual component is taken into consideration.

## 2.4 Theoretical Accounts on Conditional Presuppositions

### 2.4.1 File Change Semantics

Heim (1988) introduced File Change Semantics (FCS) to provide a dynamic theory of presupposition projection and the theory became probably the most popular theory of presupposition projection because of its simple account of formalizing the problem. According to this theory, context update takes place dynamically by adding simple propositions one by one to the previous context. So, if we add a new proposition  $p$  to a context  $c$ , the new context becomes  $c+p=c'$ . If there is a presupposition  $r$  in  $p$ , it must be either satisfied by  $c$  or accommodated to  $c$  before  $p$  is interpreted. This is the definedness condition that must be satisfied for context updates with simple sentences with presupposition triggers. Context updates for the logical connectives require more complex definedness conditions and the presuppositions in them have to follow those rules as well. When there is a conjunction, a presupposition in the second conjunct can be satisfied even if it is asserted for the first time in the first conjunct. This is because the definedness conditions for such a context update requires the presupposition to be satisfied in the context that is already updated by the first conjunct. Let  $p$  and  $q_r$  be (29). When someone utters  $p$  and  $q_r$ ,  $p$  is first added to  $c$  and it yields  $c'$ , as in (30). Then, the presupposition in  $q$  is checked in  $c'$ . Since  $c'$

already entails that someone other than Polly has a cat, the presupposition is satisfied. Then,  $c'$  can be updated with  $q_r$  and become  $c''$ , as in (31).

29. Matt has a cat and Polly also has a cat.

30.  $c + p = c'$

31.  $c' + q_r = c''$

A context update with a conditional, on the other hand, requires a presupposition in the consequent of that conditional to be satisfied in the context that is already updated with the antecedent. This means that the non-updated previous context must satisfy the conditional (or conditionalized) presupposition. This is called *local satisfaction* and it can be easily proven with propositional logic if we accept that context updates and presupposition satisfaction follow these definedness conditions (for a detailed explanation, see: Geurts (1996)). Therefore, FCS predicts conditional presuppositions to be projected when the presupposition trigger is in the consequent. To illustrate how local satisfaction works, let's say that we have a conditional sentence like (32), which is of the form  $p \rightarrow q_r$ . First, it must be possible to update  $c$  with  $p$ , as in (34). Then, it must also be possible to update  $c'$  with  $q$ , as in (35). However, to do that, the presupposition  $r$ , which is (33) in this case, must be satisfied in its local context first. This means that  $p \rightarrow r$ , which is given as a sentence in (36), must be satisfied in  $c$ . If it cannot be satisfied, it is accommodated to  $c$ . So, it is important to underline that the theory predicts that every presupposition in the consequent of a conditional is a conditional presupposition, at least initially. It can get strengthened to a non-conditional presupposition if the hearer finds it contextually more plausible than a conditional presupposition (Schlenker, 2011; van Rooij, 2007). However, there is currently no discussion on gradual projection in any version of FCS.

32. If Dan is a soccer player, his soccer jerseys are breathable.

33.  $\rightsquigarrow$  Dan has soccer jerseys.

34.  $c + p = c'$

35.  $c' + q = c'$

36. If Dan is a soccer player, he has soccer jerseys.

## 2.4.2 Discourse Representation Theory

Discourse Representation Theory (DRT) has different versions that deal with presupposition projection, but this thesis focuses on a theory by Geurts (1999), which is the binding theory of presupposition projection, because it makes the opposite prediction to FCS. In DRT, discourse is represented and updated with discourse representation structures (DRSs). DRSs are structures that contain discourse referents and anaphoric

links. These anaphoric links are indicated within the relevant DRS. For example, a simple sentence like (37) can be represented as (38). Since there is no previous context, (38) is both the initial DRS and the main DRS of (37). If (37) is continued with (39), the initial DRS of (39), which is shown in (40), is merged with (38) and becomes (41). After the DRSs are merged, the pronouns are bound to their antecedents, as in (42), so that it is apparent what the pronouns refer to. The resulting DRS is shown in (43).

37. Dustin likes Ada.

38. [x, y: Dustin x, Ada y, x likes y]

39. He invited her to the party.

40. [m, n: m invited n to the party]<sup>8</sup>

41. [x, y, m, n: Dustin x, Ada y, x likes y, m invited n to the party]

42. [x, y, m, n: m = x, n = y, Dustin x, Ada y, x likes y, m invited n to the party]

43. [x, y: Dustin x, Ada y, x likes y, x invited y to the party]

When there is a free anaphor<sup>9</sup>, it moves up from its initial DRS and reaches the next DRS in order to bind to a suitable antecedent. According to DRT, anaphora are types of presupposition, but they are not the same. While an anaphor starts looking for an antecedent in its initial DRS, a presupposition is first projected to the main DRS. Then, it may move down<sup>10</sup> to a lower DRS in order to obey the general constraints on interpretation, which are consistency, informativeness, and well-formedness.

One way for DRT to explain how conditional presuppositions occur is by adding an antecedent for the presupposition to the antecedent of the conditional via *bridging*, an example of which is given in (44). This can only happen if the antecedent of the conditional entails the presupposition. However, this does not mean that the presupposition will bind to the bridging inference every time. Since presuppositions are always projected to the main DRS first, there must be a reason for it to move down to its initial DRS and bind to the bridging inference. Geurts (1999) argues that the reason for this is *remarkability*. What he means by remarkability is that remarkable things are uncommon and unusual. For example, having climbing shoes is uncommon if one is not a rock climber, but having sneakers is not uncommon, no matter what. So, it is much easier to globally accommodate that someone has sneakers, rather than climbing shoes. To sum, DRT predicts that non-conditional presuppositions are generated first, and then some of them become conditional presuppositions if the need arises. FCS, on the other hand, assumes that conditional presuppositions are generated first, and then some of them become non-conditional presuppositions with regards to their plausibility.

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<sup>8</sup> Underlined reference markers indicate that they must find an antecedent.

<sup>9</sup> Free anaphors are anaphors that have not yet found an antecedent.

<sup>10</sup> Geurts' (1999) theory does not specify how this affects online processing.

44. (a) If Dan is a soccer player, his soccer jerseys are breathable.  
(b) If Dan is a soccer player and has soccer jerseys, his soccer jerseys are breathable.

Other theories of presupposition projection from dynamic semantics are either one version of FCS (Beaver, 2001; Romoli, 2012; Singh, 2008, 2020) or another version of DRT (Garcia-Odon, 2016; Mandelkern, 2016; van der Sandt, 1992). So, these theories will not be described in this thesis.

### 2.4.3 Probabilistic Accounts

Lassiter's (2012) probabilistic account of presupposition projection takes individuals' epistemic states as probabilistic. This means that there are not *satisfied* or *unsatisfied* presuppositions, but there are *highly probable* or *less probable* presuppositions. According to this account, there is a certain threshold for uttering a presupposition felicitously in each context. In simple sentences, if the threshold is reached by the speaker's epistemic state and the speaker expects the audience's epistemic state to also reach the threshold, the presupposition projects. In complex sentences, the same thing happens but within the presupposition's local context. Then, what determines whether a conditional or a non-conditional presupposition projects is independence, which is defined as the probability of a proposition being the same as that proposition's probability given another proposition. So, independence, calculated from conditional probabilities, determines what projects as a conditional or non-conditional presupposition. If a speaker utters a presupposition without expecting the projection threshold to be reached by the audience's epistemic state, whether presupposition accommodation proceeds depends on the *surprisal* brought about by the presupposition. If there is not a great degree of surprisal, the presupposition is accommodated. Whether a conditional or a non-conditional presupposition is accommodated is again determined by independence. Somewhat crucially, Lassiter (2012) claims that only simple sentences have semantic presuppositions. According to this probabilistic account, presuppositions of complex sentences have to be pragmatic presuppositions because what projects completely depends on the context and the probabilities associated with that context.

Even though all accounts of presupposition projection make the same predictions regarding what projects, Lassiter's (2012) account makes it easier to experimentally measure greater detail that could potentially reveal how presuppositions are processed. Choosing probability distributions over truth-values allow one to predict presupposition projection without having two stages of processing. In this viewpoint, the emphasis is not on whether the presupposition is evaluated in a local context or a global context, but it is on what determines and affects probability distributions. Moreover, a probabilistic account can be useful in developing a computational model of how conditional presuppositions arise. There have been two computational models that implemented a probabilistic approach to presupposition projection (Qing et al., 2016; Stevens et al., 2017). Both of these models made use of the Rational Speech

Acts (RSA) framework of Goodman and Frank (2016). The RSA framework assumes that interlocutors are rational individuals who have prior beliefs about the world with varying degrees and that affects how they process language. So, utilizing Bayes' rule under such circumstances allows researchers to model pragmatic language and meaning in the RSA framework.

## 2.5 Previous Experimental Work on Conditional Presuppositions

Chemla and Schlenker (2012) tested conditionals, disjunctions, and *unless* in five experiments with inferential judgements and acceptability judgements. The presupposition trigger that was used in the experiments was *too* in French and it was embedded in the consequent of a conditional in one condition of the experiment. In another condition, the presupposition was embedded in the antecedent of a conditional, which was the contraposition of the conditional in the other condition. They found that participants rated conditional inferences as more robust than non-conditional inferences in both environments. This goes against the traditional *hole* standing ascribed to antecedents of conditionals and it is interpreted as projection out of conditionals being symmetric<sup>11</sup>. Chemla and Schlenker (2012) found the higher robustness ratings for conditional presuppositions in disjunctions and *unless* conditionals as well. Acceptability judgments for conditional and non-conditional inferences, on the other hand, did not differ from each other in any test condition. Schwarz (2015) used a covered box paradigm to test whether conditional presuppositions can be obtained out of the antecedent of a conditional when the conditional has a final *if*-clause. He found that conditional presuppositions can indeed be obtained in that environment, which supports accounts of symmetric projection in conditionals and is in line with Chemla and Schlenker's (2012) previous results.

Romoli et al. (2011) made use of a picture-matching task, asking participants to choose the picture that matches the sentences they read. The sentences consisted of a conditional and an affirmation or a denial of the antecedent. For example, the sentence "*If Googlemorph is flying, then his wings are big and strong.*" was either continued with "*And Googlemorph is flying.*" in the control condition or continued with "*But Googlemorph is not flying.*" in the experimental condition. The antecedent was manipulated as dependent (*If Googlemorph is flying...*) and independent (*If Googlemorph is drinking orange juice...*). In the dependent condition, the pictures depicted a flying monster with big wings, a flying monster with small wings, a non-flying monster with small wings, and a non-flying monster with no wings. The picture with a non-flying monster with small wings were compatible with both conditional presupposition interpretations (*If Googlemorph is flying, he has wings. But Googlemorph is not flying. He may still have wings.*) and non-conditional presupposition interpretations (*Googlemorph has wings.*). The results showed that this picture was chosen the most in both dependent and independent conditions. If participants had chosen the

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<sup>11</sup> Obtaining conditional presuppositions out of both the antecedent and the consequent of a conditional is symmetric projection. Obtaining non-conditional presuppositions out of both the antecedent and the consequent is also an instance of symmetric projection. Obtaining a conditional presupposition out of the consequent while obtaining a non-conditional presupposition out of the antecedent (or vice versa) is asymmetric projection.



non-flying monster with no wings, it could have proven that they obtained the conditional presupposition. That is why Romoli et al. (2011) compared the selection of the non-flying monster with no wings across dependent and independent conditions, and they found that this monster was chosen significantly more often in the dependent condition.

In a second experiment, Romoli et al. (2011) used a covered-box paradigm and covered the non-flying monster with small wings. They instructed the participants to choose the covered picture only if they are certain that the other pictures are incompatible. The results showed that the non-flying monster with no wings was chosen more often this time. They interpreted these results in favor of accounts that generate conditional presuppositions first. However, this study does not necessarily separate the predictions of different theories in their experimental materials. Since the most often chosen picture in the first experiment was compatible with both theories, and covering that box in the second experiment forced participants to choose the other picture, it can be said that the results are not conclusive.

Domaneschi et al. (2016) replicated Romoli et al.'s (Romoli et al., 2011) results in a spoken language interpretation test. In the experiment, participants listened to audio recordings and selected the matching presupposition on the screen. While doing that, participants' cognitive load was increased with a memorization task so that the effects of cognitive load on conditional presupposition processing could be tested. When participants had to do memorization tasks before and after hearing the audio recording, they selected the non-conditional presupposition significantly more often compared to the conditions without memorization tasks. When the presupposition was dependent on the antecedent, conditional presuppositions were selected significantly more often than non-conditional presuppositions.

Recently, Chen et al. (2022) conducted a language acquisition study with presuppositions in conditionals. They compared presuppositions in the antecedent of a conditional to presuppositions in the consequent of a conditional. They used relative clauses as the presupposition trigger, such as "*the scarf you put on.*" Child data showed that when this presupposition trigger was in the antecedent of a conditional, 6-year-old children did not interpret it as a non-conditional presupposition, even though the antecedent of a conditional is known to be a presuppositional hole (Holes always lead to projecting a global presupposition, such as "*You have a brother.*" projecting out of "*If you are here to see your brother, he is not here.*"). A separate picture selection experiment showed that adults did not obtain a non-conditional presupposition from the antecedent of a conditional, either. This was interpreted as the participants using local accommodation to interpret the *if*-clause as "*If you put on a scarf and the scarf you put on is...*" Data from 5-year-olds revealed that the acquisition of local accommodation in the consequent of a conditional takes place before the acquisition of local accommodation in the antecedent of a conditional. 4-year-olds' performance for both the antecedent and the consequent was similar to 5-year-olds' performance for the antecedent condition. Adults' reaction times revealed that individuals took longer to use local accommodation in the antecedent than using local accommodation in the consequent.

## 2.6 Aim of the Study

In two of these studies that investigated conditional presuppositions in conditional structures (Domaneschi et al., 2016; Romoli et al., 2011), the lexico-semantic associations were manipulated between filter (climber-having climbing shoes) and hole (knowledge about sports equipment-having climbing shoes) environments. As mentioned above, in the case of presuppositional filters, the relationship between these two lexical items are entailment-like. That is, the probability of having climbing shoes is quite high if someone is a climber (i.e., being a climber almost always entails having climbing shoes). In the case of the presuppositional hole used in these studies, although the semantic association between the lexical items diminishes, one can still establish some relationship between these lexical items. That is, although the probability of having climbing shoes for someone knowing about sports equipment is somewhat less likely than the probability of having climbing shoes for a climber, one cannot argue that these lexical items are conventionally irrelevant/unrelated. In other words, one can reason that someone who knows about sports equipment might have a slightly higher chance of having climbing shoes compared to someone who is not interested in sports equipment at all. Therefore, one can still derive conditional presuppositions both in the case of filter and in such hole conditions where the semantic relatedness can be recovered on the basis of world knowledge. This may be one reason why the previous studies have found conditional presuppositions in all conditions that they have tested. To address how these lexical associations impact presupposition processing in conditional structures, one should have context where the lexical items are not conventionally related at all.

When a hearer is processing an unsatisfied presupposition, prior beliefs about the likelihood of the presupposition influence projection (Degen & Tonhauser, 2021). This means that what gets accommodated can also be correlated with prior beliefs. Other researchers have touched upon this issue by calling it plausibility (Beaver, 2001; Singh et al., 2016; von Stechow, 2008) or remarkability (Geurts, 1996), but they did not have a way of measuring it; so, it could not be tested empirically. This thesis aims to fill this gap.

The claim of this thesis is that presupposition projection for presuppositions embedded in the consequent of a conditional is gradual and probabilistic. Two experiments are designed to investigate how presuppositions are interpreted in conditional structures where the lexico-semantic relationship between the antecedent and the presupposition is gradually manipulated as entailing (filter: climber-having climbing shoes), related (hole: knowledge about sports equipment-having climbing shoes), and unrelated (hole: being good at math-having climbing shoes). Experiment I aims to collect prior beliefs about the lexico-semantic relatedness of the items that we use in Experiment II. Experiment II measures the interpretation of presuppositions in conditional structures where the lexico-semantic relatedness between the antecedent and the presupposition is gradually manipulated. We predict that the projection of conditional presuppositions should gradually decrease when the lexico-semantic relatedness gradually decreases in a manner reflecting the real-life conditional probabilities of these two lexical items/situations appearing together.

## CHAPTER 3

### EXPERIMENT I

#### 3.1 Aim

The aim of Experiment I was to measure individuals' prior beliefs about the likelihood that a particular individual would own a particular uncommon object. The objective behind collecting these beliefs was to test whether these likelihoods will be reflected in the test conditions that will be used in Experiment II.

#### 3.2 Method

##### 3.2.1 Probability Ratings

Probability ratings are subjective measures of individuals' ratings on a scale without directly categorizing their responses. They can be used to quantify and test the effects of prior beliefs on other behavioral data, which can be collected in the same or a separate experiment. In this method, participants read a question and indicate their response on a scale from 0 to 100. Intuitively, 0 corresponds to "certainty about the event **not** occurring" and 100 corresponds to "certainty about the event occurring." Since individuals are rarely completely certain of their yes/no responses, this method is better suited to measuring prior beliefs than getting binary responses. It is easy to respond to a rating task on a computer because all one needs to do is read the question and click on the scale. It is also easy for researchers to turn these ratings into numeric values on a computer, which makes it quite convenient.

##### 3.2.2 Participants

75 Turkish-speaking adults participated in the first experiment. One participant's data were excluded from the final analysis due to responding too fast. Of the final sample, 49 participants identified their gender as woman; 23 participants identified their gender as man; one participant identified their gender as non-binary; and one participant did not want to disclose their gender. These participants' ages ranged from 18 years to 60 years while the mean age was 32 years. One participant indicated that they were a

Turkish-Arabic bilingual and another participant indicated that their native language was Kurdish. The remaining 72 participants were Turkish monolinguals, though 66 of them indicated that they had learned at least one more language later in life.

Out of the 74 participants in the final sample, three participants were born outside of Turkey while the others were born and raised in Turkey. 38 participants held a Bachelor's degree; 16 participants held a high school degree; 15 participants held a Master's degree; 3 participants held a doctorate; one participant held a secondary school degree; and one participant held an Associate's degree. 38 participants majored in social sciences or education; 19 participants majored in a STEM field; 6 participants majored in business or law; and 4 participants majored in health sciences. 27 participants were still students while the remaining 47 participants worked in different fields or were retired.

Participation was solely voluntary and there was no compensation. All participants saw the informed consent form before the experiment and accepted it. When they were asked about the purpose of the study at the end of the experiment, only 20% of the participants were close to the correct answer, which shows that most participants were naive to the experimental manipulation. Since the experimental items were divided into four lists in order for them to not affect each other, participants were randomly assigned to only one list. 19 participants responded to List 1; 20 participants responded to List 2; 16 participants responded to List 3; and 19 participants responded to List 4.

### 3.2.3 Materials & Design

To test individuals' prior beliefs about the situations that will be used in Experiment II, we created questions asking the likelihood that a particular individual would own a particular uncommon object. 16 uncommon objects, such as *climbing shoes*, *surfboard* and *saxophone*, were selected. The criterion was that these objects can elicit conditional presuppositions when they are embedded in the consequent of a conditional. They had to be uncommon because it is harder to elicit conditional presuppositions when a possessive adjective modifies a common object that most individuals have. Therefore, participants' probability ratings were expected to reflect the conditional probabilities for owning the objects.

There were three within-subject factors. First, we manipulated the situation in three levels such that prior beliefs would be gradual. One level of this manipulation was entailing<sup>12</sup> situations, such as the situation of *being a surfer* almost entailing *owning a sturdy surfboard*. Such situations were used so that the truth of that situation would strongly suggest a high probability for what is asked in the question. So, high probability ratings were expected for questions with entailing situations. The second level

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<sup>12</sup> In the presupposition projection literature, the word "entailing" can be used for *plugs*, such as in *If John has a wife, his wife is blond*. However, in this thesis, "entailing" is used to refer to high-probability situations that make the truth of the situation almost entail owning a particular object, such as *a dentist having a mouth mirror*. High-probability situations in conditionals that presuppose the possession of an uncommon object in its consequent usually cause the conditional to be classified as a *filter*.

of the situation factor was related situations, such as the situations of *being an adventurous individual* being related to *owning a sturdy surfboard*. The truth of the related situation does not necessarily suggest a high probability for what is asked in this case. However, there is still some relationship between the situation and the question. For example, being adventurous is related to owning a surfboard because individuals who like surfing are usually adventurous, and being an adventurous individual who likes to surf makes it more likely that the surfboard is sturdy. So, probability ratings for questions with related situations were expected to be lower than the ratings for questions with entailing situations, but higher than the ratings for questions with unrelated situations. Unrelated situations were the third level of the situation factor, such as *liking plain coffee* not being directly related to *owning a sturdy surfboard*. One could establish a relationship between these in an imaginary world, but it would not be an obvious and meaningful relationship for the majority of individuals. So, the expectation for these situations was that they would get lower probability ratings.

Another factor that was manipulated was the question type. It had two levels such that either owning an object, such as a *surfboard*, or the quality of an object that an individual already has, such as a *surfboard's sturdiness*, was asked. Questions about owning an object correspond to prior beliefs about antecedent-presupposition relationships in Experiment II while questions about the quality of an object correspond to prior beliefs about antecedent-consequent relationships in Experiment II. Two samples of questions with entailing situations are given in (45-46).

45. Entailing, questioning owning object  
Bir sörfçünün sörf tahtasına sahip olma olasılığı nedir?  
*What is the probability of a surfer owning a surfboard?*
46. Entailing, questioning object's quality  
Bir sörfçünün sörf tahtasının dayanıklı olma olasılığı nedir?  
*What is the probability of a surfer's surfboard being sturdy?*

Two samples of questions with related situations are given in (47-48).

47. Related, questioning owning object  
Maceraperest birinin sörf tahtasına sahip olma olasılığı nedir?  
*What is the probability of an adventurous individual owning a surfboard?*
48. Related, questioning object's quality  
Maceraperest birinin sörf tahtasının sağlam olma olasılığı nedir?  
*What is the probability of an adventurous individual's surfboard being sturdy?*

Two samples of questions with unrelated situations are given in (49-50).

49. Unrelated, questioning owning object  
Sade kahveyi seven birinin sörf tahtasına sahip olma olasılığı nedir?  
*What is the probability of a plain-coffee-liking individual owning a surfboard?*

50. Unrelated, questioning object's quality  
Sade kahveyi seven birinin sörf tahtasının sağlam olma olasılığı nedir?  
*What is the probability of a plain-coffee-liking individual's surfboard being sturdy?*

The third factor manipulated in the experiment was the polarity of the structure designating the relationship between the individual and the object because prior beliefs for situations with negative relationship are expected to correspond to the ratings for the experimental items in Experiment II. Essentially, after a dialogue and a question like (51), individuals' ratings should be parallel to the ratings for (52). Two more samples of negated situations are given in (53-54). (For all questions, please see Appendix A.1)

51. Berrak: Lale sörfçüyse, sörf tahtası sağlamdır.  
*Berrak: If Lale is a surfer, her surfboard is sturdy.*  
Tuğba: Lale sörfçü değil.  
*Tuğba: Lale is not a surfer.*  
Lale'nin sörf tahtasına sahip olma olasılığı nedir?  
*What is the probability of Lale having a surfboard?*
52. Sörfçü olmayan birinin sörf tahtasına sahip olma olasılığı nedir?  
*What is the probability of a non-surfer owning a surfboard?*
53. Maceraperest olmayan birinin sörf tahtasına sahip olma olasılığı nedir?  
*What is the probability of a non-adventurous individual owning a surfboard?*
54. Sade kahveyi sevmeyen birinin sörf tahtasına sahip olma olasılığı nedir?  
*What is the probability of a plain-coffee-disliking individual owning a surfboard?*

The design was influenced by Degen and Tonhauser (2021) because they also used a scale to measure prior beliefs and projection levels with a probabilistic viewpoint. However, the current study separated prior beliefs and projection into two separate experiments with somewhat different designs so that the ratings for prior beliefs had no way of affecting the ratings for presupposition projection. Another difference is that, in the experiments conducted for this study, the probability percentages are asked directly on a scale from 0% to 100% instead of using a scale ranging from "impossible" to "definitely" to measure prior beliefs and a scale ranging from "yes" to "no" to measure projection. The reason behind directly asking the probability percentage was to use the same scale in both experiments, and since putting "yes" and "no" on the scale may drive individuals to choose only those ends of the scale, this method was preferred.

In Experiment I, 192 questions were divided into 4 lists, which means that each list consisted of 48 questions. Since the object is always the same in one question set, participants only saw three questions from each set. These three questions differed only in the situation factor. Out of the 48 questions a participant saw, only 4 question

sets had the same levels of positivity and question type. The other question sets had different levels of positivity and question type so that one participant sees all conditions.

There were 6 practice questions before the experiment in order to get the participants used to giving ratings. Out of these 6 questions, 3 of them, given in (55-57), were asked again at the end of the experiment and participants were told to explain their reasoning for their re-ratings. The reason behind this was that some questions about owning objects could be rated differently depending on the participant's reasoning style. Specifically, when the first event is negated in entailing and related questions, and also when the first event is unrelated, the object in question can be rated both as 50% (chance) and as lower than 35% or so depending on how one thinks about the situation. Because the object is uncommon in the population, one individual could say that someone either has it or not, which means 50%, while another individual could say that it is unlikely that someone has it, which means less than 35%. By putting these open-ended questions at the end of the experiment, it was hoped that participants could be separated into two groups.

55. Unrelated, positive, questioning owning object

Lütfen 'Kısa boylu birinin kulak içi monitöre sahip olma olasılığı nedir?' sorusunu tekrar cevaplayıp neden bu cevabı verdiğinizi açıklayın.

*Please re-rate the question 'What is the probability of a short individual owning an in-ear monitor?' and explain the reasons behind your rating.*

56. Entailing, negative, questioning owning object

Lütfen 'Kasap olmayan birinin kıyma makinesine sahip olma olasılığı nedir?' sorusunu tekrar cevaplayıp neden bu cevabı verdiğinizi açıklayın.

*Please re-rate the question 'What is the probability of someone, who is not a butcher, owning a meat grinder?' and explain the reasons behind your rating.*

57. Related, negative, questioning owning object

Lütfen 'Spor yapmayı sevmeyen birinin okçuluk ekipmanına sahip olma olasılığı nedir?' sorusunu tekrar cevaplayıp neden bu cevabı verdiğinizi açıklayın.

*Please re-rate the question 'What is the probability of someone, who does not like doing sports, owning archery equipment?' and explain the reasons behind your rating.*

### 3.2.4 Procedure

Data collection was carried out over the internet, via the PCIBex website (Zehr & Schwarz, 2018). First, a pilot experiment was conducted with only the experimental questions and open-ended questions. 7 individuals provided feedback for the pilot. A practice session and a personal questionnaire were added, and some items were slightly changed after the pilot experiment. For the actual data collection, participants received a link to the data collection website through various social media and

messaging applications. Then, they read the informed consent form and participated on their own device, which could be a personal computer, a smartphone, or a tablet. Before the practice session started, participants read a warning advising them to be in a quiet environment and finish the experiment in one sitting. Being fast to respond was not a requirement. In the practice session, participants read that there were no correct answers and that they should respond intuitively. All instructions and questions were written, and there were no pictures.

The presentation order of the questions was pseudo-randomized. The participants never saw questions of the same situation factor in a row. If they saw a question with an entailing situation first, they then saw a question with an unrelated situation, and then a question with a related situation. This order was preserved until the end of the experiment. However, which question set they encountered was completely randomized. Throughout the experiment, questions were always centered on the screen and the scale button was positioned at 0% in the beginning. Participants dragged the button to where they wanted on the scale. Then, they clicked the “Continue” button to proceed to the next question. They saw a progress bar at the top of the web page. After 6 practice questions and 48 experimental questions, they wrote their answers for 3 open-ended questions and filled a questionnaire about themselves. If a participant did not fill out everything, their results were not received. They were allowed to stop the experiment at any time, and no data was received if they closed the experiment page. Data collection took 12 days. A demonstration of the whole experiment can be found via this link: <https://farm.pcibex.net/r/MbCFqf/>

### 3.2.5 Analysis & Data Exclusion Criteria

Average time (in milliseconds) for responses were calculated for every participant. One participant was excluded from the analysis for responding under 2500 milliseconds on average. 18 observations from various other participants were removed because the scale button was not moved and the whole response took less than 2000 milliseconds. Those observations are thought to be mistakes. Question Set 12 was significantly different from 11 other question sets; so, it was removed from the final analysis. Overall, data loss was 8%. Data exclusions and statistical analyses were conducted in R and RStudio (R Core Team, 2022; RStudio Team, 2022). The *dplyr* (Wickham et al., 2022) package was used for data manipulation and the *lme4* (Bates et al., 2015), *lmerTest* (Kuznetsova et al., 2017), and *lsmeans* (Lenth, 2016) packages were used for linear mixed models (LMMs) and pairwise comparisons.

In the analysis of Experiment I, LMMs were built by adding fixed effects and interaction effects one by one. Random effects were participant and item in every model. The models with minimal differences were compared with each other to find out which effects make a significant difference. The one with the lowest AIC score was selected as the better model. For instance, the model with a fixed effect of question type was compared with the model with fixed effects of question type and situation. There was a significant difference between these two models, which suggested that situation is a significant fixed effect. Checking the AIC scores confirmed this



since the model with question type and situation had a lower score, which means that this model fit the data better. Models with interaction effects were compared with models without those interactions. In the end, the best-fitting model comprised of a three-way interaction effect between situation, positivity, and question type. Pairwise comparisons for the three-way interaction effect was carried out in order to compare experimental groups with each other. Additionally, another model was built by adding question set as a fixed effect in order to see whether any question set was significantly different from the others.

### 3.3 Results

#### 3.3.1 Results of Probability Ratings

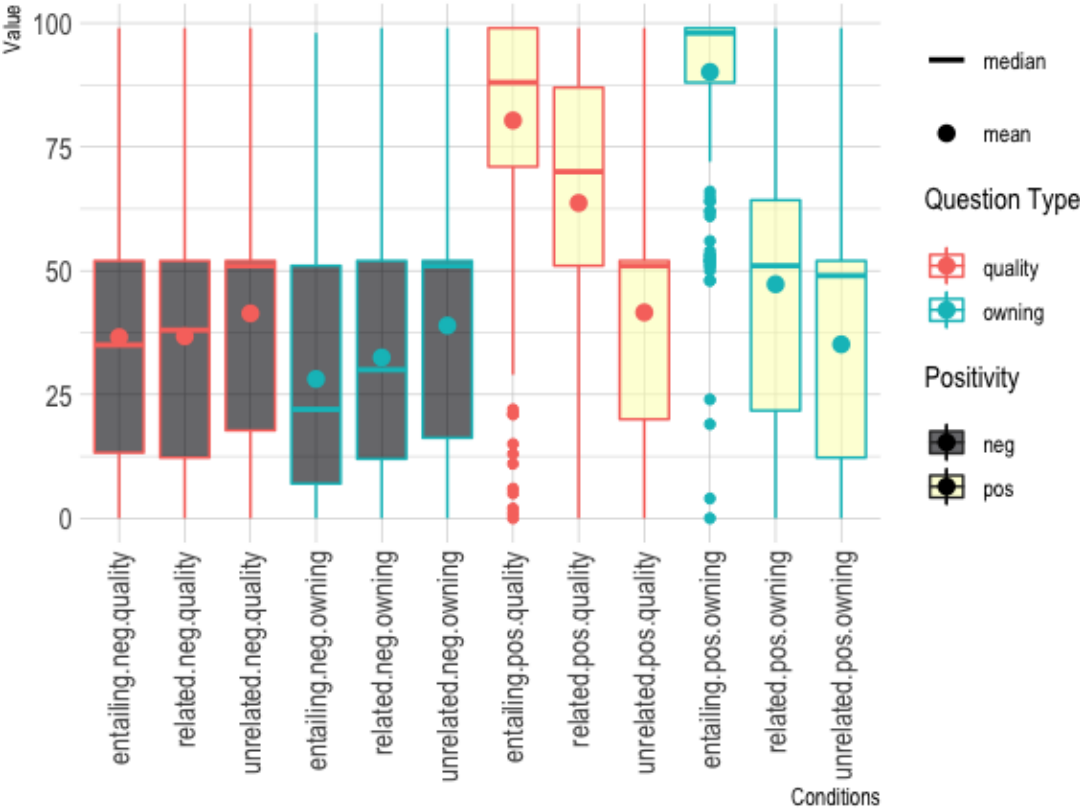


Figure 1: Results of Experiment I

A boxplot of the results of Experiment I is given in Figure 1. Pairwise comparisons of the three-way interaction effect revealed that participants rated the probability of someone owning an object significantly differently for each of the three situation

types (with positive relations between the condition and the question). Entailing situations were rated significantly higher than both related and unrelated situations. When related and unrelated situations were compared, related situations were rated significantly higher than unrelated situations. Negating the relation between the condition and the question resulted in entailing situations being rated significantly lower than unrelated situations. However, related situations were not rated significantly differently from entailing or unrelated situations. When positivity was compared within each situation, entailing situations with a negative relation was rated significantly lower than entailing situations with a positive relation. The same was true for related situations as well. However, ratings for unrelated situations did not differ when the relation between the condition and the question was negated. Results regarding these pairwise comparisons are given in Table 1.

Table 1: Pairwise comparisons of ratings for the probability of owning an object in Experiment I

situation.positivity	Estimate	SE	df	t.ratio	p.value
entailing.pos - related.pos	-43.0662	3.21	188	-13.405	<.0001***
entailing.pos - unrelated.pos	-55.4453	3.22	189	-17.245	<.0001***
related.pos - unrelated.pos	-12.3791	3.22	189	-3.850	<.01**
entailing.neg - related.neg	4.3231	3.21	187	1.348	<i>ns</i>
entailing.neg - unrelated.neg	10.8623	3.21	187	3.386	<.05 *
related.neg - unrelated.neg	6.5392	3.21	187	2.038	<i>ns</i>
entailing.pos - entailing.neg	62.4455	3.21	188	19.442	<.0001***
related.pos - related.neg	15.0561	3.21	188	4.687	<.001***
unrelated.pos - unrelated.neg	-3.8622	3.22	188	-1.201	<i>ns</i>

When question type was the quality of the object and owning the object was given as a presupposition, which can be considered as a second condition, entailing situations were rated significantly higher than related and unrelated situations. Related situations were rated significantly higher than unrelated situations under those circumstances as well. However, when the relation between the condition and the question was negated, none of these three pairs were significantly different from each other. Like the other question type, entailing and related situations had significantly lower ratings for their negative relations than the ratings for their positive relations while ratings for unrelated situations did not differ based on the positivity of the relation between the condition and the question. Results regarding these pairwise comparisons are given in Table 2.

Table 2: Pairwise comparisons of ratings for the probability of the quality of an object in Experiment I

situation.positivity	Estimate	SE	df	t.ratio	p.value
entailing.pos - related.pos	-16.5010	3.21	189	-5.133	<.0001***
entailing.pos - unrelated.pos	-38.6358	3.21	189	-12.022	<.0001***
related.pos - unrelated.pos	-22.1349	3.21	189	-6.887	<.001***
entailing.neg - related.neg	0.0358	3.22	189	0.011	<i>ns</i>
entailing.neg - unrelated.neg	4.8304	3.21	189	1.503	<i>ns</i>
related.neg - unrelated.neg	4.7946	3.21	189	2.038	<i>ns</i>
entailing.pos - entailing.neg	43.5028	3.22	189	13.521	<.0001***
related.pos - related.neg	26.9661	3.22	189	8.381	<.0001***
unrelated.pos - unrelated.neg	0.0366	3.21	188	0.011	<i>ns</i>

### 3.3.2 Responses to Open-Ended Questions

As explained in Section 3.2.3, some questions could be rated with two different reasoning styles and that is why three open-ended questions were asked at the end of Experiment I. Among the participants who wrote their ratings in percentages to these open-ended questions, some of them were clearly using the "they either have it or not, so 50%" reasoning. An example of this type of response is given in (58).

58. "Yüzde elli. Kasap değilse kıyma makinesi ola da bilir. Olmaya da bilir."  
*"Fifty percent. If they are not a butcher, they may have a meat grinder or they may not."*

Participants also differed in what they deemed a low rating. For example, one participant gave the response in (59) while another gave the response in (60).

59. "%30 civari. Kıyma makinesine sahip olmak genel olarak gordugum bir durum degil."  
*"About 30%. Owning a meat grinder is not a situation that I find common."*
60. "%5 olabilir.Kıyma makinesi çoğu insanın evinde bulunmaz."  
*"It could be 5%. Most people don't have a meat grinder in their home."*

There were a few higher ratings due to individual differences in prior beliefs as well. An example of this type of response is given in (61).

61. "%75. Kasap olmayan biri yemek yapmak icin edinmis olabilir. babamda vardi. anneannemde de vardi. ikisi de kasap degildi o yuzden % 75 dedim"  
*"75%. Someone who is not a butcher may have acquired it in order to cook. My father had it. My grandmother had it, too. Neither of them were butchers; so, that's why I say 75%."*

The responses to the archery equipment question were similar to the mean grinder questions. However, some participants seem have misunderstood the in-ear monitor as earphones. For example, there were a couple of responses such as (62).

62. "%50'den fazladir. Kulakliga sahip olup olmamak boyla alakali degildir, genel olarak insanlarin kulak ici monitoru vardir."  
*"More than 50%. Having earphones is not related to one's height. In general, people have in-ear monitors."*

For the question with an unrelated situation, some participants seem to have had a hard time making sense of the question. For example, one response is given in (63). This participant seems to have given a rating based on whether they could find a relationship between the individual and the object in the question.

63. "%2 olasılık arasında iliski yok %0"  
*"There is no relation between the 2 probabilities, so 0%"*

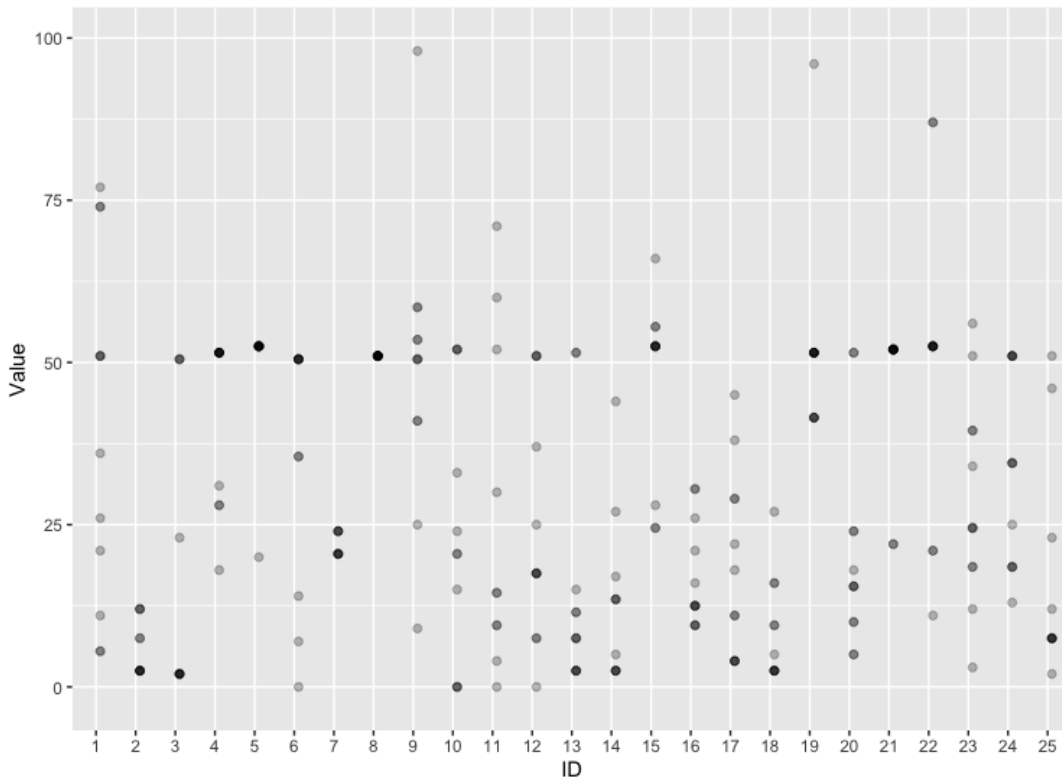


Figure 2: 25 participants' probability ratings to the questions that could be rated with two different reasoning styles.

Even though there were a couple of unexpected responses, the responses to the open-ended questions indicate that there were mainly two reasoning styles. The open-ended questions were not matched with the previously collected probability ratings. However, 25 participants' probability ratings to the questions that could be rated with these two reasoning styles, given in Figure 2 as a dot plot, still provide a visual explanation for the distinction. For example, participant-18 always gave ratings lower than 35% for these questions while participant-19 mostly gave ratings around 50%. Most participants, though, seem to have used both reasoning styles, possibly depending on their prior beliefs about the object in the question. As a result, we were not able to put the participants into two separate groups. The responses to the open-ended questions corroborate this result.

### 3.4 Discussion

In Experiment I, the questions about owning an object were asked to measure the relationship between the presuppositions and the antecedents of the conditionals that would be asked in Experiment II. These questions about owning an object, with a positive condition, received gradual responses, which means that the results confirm that the situations picked for the experiment were gradual in terms of prior beliefs. Entailing situations received the highest ratings; related situations received ratings around 50%; and, unrelated situations received ratings around 35%. The questions with a negative relation, however, received ratings in the opposite direction. Entailing situations received ratings around 28% when the relation was negated; related situations received ratings around 33% with negative relations; and, unrelated situations received ratings around 38% when negated. These ratings show a gradual pattern as expected. Because the conditional's antecedent is denied in Experiment II, as in (64), the corresponding ratings in Experiment I are the ratings given for questions with negative relations, such as (65). So, a similar gradual pattern is expected in Experiment II.

64. Berrak: Lale sörfçüyse sörf tahtası sağlamdır.  
*Berrak: If Lale is a surfer, her surfboard is sturdy.*  
Tuğba: Lale sörfçü değil.  
*Tuğba: Lale is not a surfer.*  
Lale'nin sörf tahtasına sahip olma olasılığı nedir?  
*What is the probability of Lale owning a surfboard?*
65. Sörfçü olmayan birinin sörf tahtasına sahip olma olasılığı nedir?  
*What is the probability of a non-surfer owning a surfboard?*

Before data collection, it was realized that two different reasoning styles can be employed in rating some questions with a negative relation, such as (66). In one type of reasoning, which will be called logical reasoning in this thesis, individuals respond to questions in terms of whether they can confidently say yes or no. So, if they decide that they cannot confidently say yes or no to questions like (66), they choose 50%. In

the other type of reasoning, called probabilistic reasoning in this thesis, individuals think what percentage of individuals in the world owns the object in question. Since the relation between the situations and the object is negated in some questions, those individuals with a positive relation to owning the object must be subtracted from the final probability percentage, which leaves a very low percentage for questions with entailing situations and no difference for questions with unrelated situations. For example, in response to questions like (67), one needs to first think of what percentage of individuals own a surfboard in the world. Let's say that it is 20%. Then, one has to think of how much of the 20% are surfers and subtract that percentage from the 20%, which could leave, let's say, 8% of individuals in the world.

66. Maceraperest olmayan birinin sörf tahtasına sahip olma olasılığı nedir?

*What is the probability of a non-adventurous individual owning a surfboard?*

67. Sörfçü olmayan birinin sörf tahtasına sahip olma olasılığı nedir?

*What is the probability of a non-surfer owning a surfboard?*

Different reasoning styles do not affect the ratings for questions with positive relations because individuals use the positive relation in questions with entailing and related situations to increase their probability ratings. For example, entailing situations make it highly likely that the individual in question owns the object. So, in those cases, both types of reasoners give rather high ratings. However, when the question bears a negative relation between the situation and the object, different reasoning styles start making a distinction. For logical reasoners, the probability of owning an object is always 50% in the absence of any information that might increase this probability. For probabilistic reasoners, the probability of owning the object is affected by the negation of the relation between the situation and the object when the relation gives relevant information about the ownership. Irrelevant information, as in unrelated situations in the experiment, would not have the same effect, though. So, a difference between the positive and negative counterparts was expected only for the questions with entailing and related situations. Even though the ratings from different types of reasoners are averaged out in comparing the ratings with statistical tests, the difference should remain. Indeed, this was exactly what was found in Experiment I.

The ratings by themselves do not clearly show the difference between reasoning styles. However, the responses to the open-ended questions provide evidence for the fact that the majority of the participants employed logical or probabilistic reasoning strategies, or a mix of both. This could have been controlled with training the participants with feedback before the experiment, but we did not want to influence the natural process behind the ratings. We anticipated that there would be different reasoning strategies available to the participant, but we did not anticipate that most participants would use both of these strategies. In the end, the participants could not be separated into two groups as logical reasoners and probabilistic reasoners. Since the expected statistical differences are observed with these results, we decided to leave this matter on reasoning styles to further studies and proceed with Experiment II.

Questions about the quality of the object were asked to verify the relationship between the antecedent and the consequent of conditionals that would be used in Experiment

II. The results showed that the questions with a positive relation showed a gradual pattern. However, the questions about the object's quality with a negative relation did not significantly differ from each other, which means they cannot be interpreted as gradual. The important finding here is that ratings for questions with a positive relation were gradual and the corresponding conditional sentences in Experiment II will have a gradual relationship between its antecedent and consequent as well. For example, ratings for questions like (68) will correspond to conditionals like (69). This shows us how related these situations are. Even though their negative counterparts did not differ from each other, they differed from ratings for questions with positive relations when the situation was entailing or related. This shows us that entailing and related situations were meaningful in judging whether there is a higher probability of an object having a certain quality when these situations are present.

68. Bir sörfçünün sörf tahtasının sağlam olma olasılığı nedir?  
*What is the probability of a surfer's surfboard being sturdy?*
69. Lale sörfçüyse sörf tahtası sağlamdır.  
*If Lale is a surfer, her surfboard is sturdy.*

Overall, ratings were as expected and that confirmed and informed the material choices for Experiment II. Because gradual ratings were found, it can be said that conditionals adapted from these questions are likely to have a gradual relationship between their antecedent and consequent. Most importantly, gradual ratings were given for owning an object with both positive and negative relations, which suggests that there may be gradual presupposition projection out of a conditional's consequent when the antecedent is denied.





## CHAPTER 4

### EXPERIMENT II

#### 4.1 Aim

The aim of Experiment II was to test presupposition projection out of a conditional's consequent when the degree of the relationship between the antecedent and the presupposition is manipulated. Probability ratings were used to measure presupposition projection in order to detect subtle differences in projection. The objective behind collecting these probability ratings was to test whether presupposition projection is gradual and influenced by prior beliefs.

#### 4.2 Method

##### 4.2.1 Probability Ratings & Reaction Times

The same type of probability ratings as the ones in Experiment I were used in Experiment II to measure belief updates. So, on a scale from 0 to 100, 0% is "certainty about the falsity of the event" and 100% is "certainty about the truth of the event." In an imaginary scenario, participants are told to imagine themselves being in a party and overhearing two individuals' conversation, which is the same scenario used in previous experiments by Tonhauser et al. (2018) and Degen & Tonhauser (2021). After that context is given, participants first read an individual's statement, which is a conditional sentence with a presupposition in its consequent. Then, another individual's statement is given and that statement denies the antecedent of the conditional or the global presupposition that is triggered in the consequent of the conditional. Participants rate the probability of the event given in the question that comes after the denial. Because Experiment I collected data on prior beliefs, Experiment II collected data on how these beliefs are updated when the antecedent of a conditional or the global presupposition projecting out of the consequent of a conditional is denied. Experiment II also collected data on reaction times, which is a measure on how long it takes for a participant to respond. Since the statements and the question appear on the screen with a key press, reading times were collected as well. Reaction time data (in milliseconds) were collected in Experiment II because a significant difference in re-

action times may suggest a difference in processing difficulty or a re-analysis during processing.

#### **4.2.2 Participants**

93 adults participated in Experiment II. 6 participants' data had to be excluded from the final analysis due to various reasons. Three of them were excluded due to not being proficient in Turkish. Another participant's data were excluded because they indicated having participated in the previous experiment. Lastly, two participants' data were excluded due to responding too fast. Of the final sample of 87 participants, 53 participants identified their gender as woman; 33 participants identified their gender as man; and one participant identified their gender as agender. These participants' ages ranged from 19 years to 41 years while the mean age was 25 years. One participant indicated that they were a Turkish-German bilingual and another participant indicated that they were a Turkish-English bilingual. Another participant indicated that their native language was Kurdish, but that their Turkish is also at a native language level. The remaining 84 participants were Turkish monolinguals, though 83 of them indicated that they had learned at least one more language later in life.

One participant in the final sample was born outside of Turkey while the others were born and raised in Turkey. 27 participants held a Bachelor's degree; 51 participants held a high school degree; 7 participants held a Master's degree; one participant held a doctorate; and one participant held an Associate's degree. 62 participants were still students while the remaining 25 participants worked in different fields. Only 11 participants had taken both linguistics and logic courses before. 53 participants had taken only linguistics courses while 6 participants had taken only logic courses. 17 participants had not taken any linguistics or logic courses before. Having taken both linguistics and logic courses may indicate familiarity with the research topic, but it seems that this was not the case in this study.

Participation was voluntary. 60 undergraduate students who were enrolled in a linguistics course at METU received extra credit for their participation, but there was no compensation for the other 33 participants. All participants saw the informed consent form before the experiment and accepted it. Since the experiment was between-subjects with 6 groups, participants were randomly assigned to a group and did not see the other conditions in the experiment. In the final sample, 15 participants were in Group 1; 13 participants were in Group 2; 13 participants were in Group 3; 14 participants were in Group 4; 17 participants were in Group 5; and 15 participants were in Group 6.

#### **4.2.3 Materials & Design**

10 objects from Experiment I were selected to be embedded in the consequents of conditional sentences. The same three types of situations, as the ones in Experiment

I, were used as the antecedents of the conditionals.<sup>13</sup> Therefore, the relatedness factor had 3 levels. However, Experiment II was designed to be between-subjects so that participants saw only one level of each factor. The negative relations in Experiment I were adapted into Experiment II as the denial of the antecedent. The second level of the denial factor was the denial of the presupposition; so, the denial factor had 2 levels. In total, there were 6 between-subject groups in Experiment II.

The probability ratings given after the denial of the antecedent were predicted to be similar to the probability ratings given for questions about owning an object with negative relations in Experiment I. It was expected that there would be a similar gradual pattern in those ratings, which could provide evidence for the effects of prior beliefs on the projection of conditional presuppositions. That is why the materials from Experiment I were adapted into conditional sentences to be used in Experiment II. Entailing situations were adapted into conditionals that were filters for presuppositions embedded in their consequent. For example, questions such as (70) and (71) were turned into conditionals such as (72). The conditional in (72) would be considered a filter because in such contexts, it is easy for a conditional presupposition, such as (73), to project.

70. Bir sörfçünün sörf tahtasının sağlam olma olasılığı nedir?  
*What is the probability of a surfer's surfboard being sturdy?*
71. Sörfçü olmayan birinin sörf tahtasının sağlam olma olasılığı nedir?  
*What is the probability of a non-surfer's surfboard being sturdy?*
72. Lale sörfçüyse, sörf tahtası sağlamdır.  
*If Lale is a surfer, her surfboard is sturdy.*
73.  $\rightsquigarrow$  Lale sörfçüyse, sörf tahtasına sahiptir.  
 $\rightsquigarrow$  *If Lale is a surfer, she has/owns a surfboard.*

Related and unrelated situations were adapted into conditionals that were holes for presuppositions embedded in their consequent. For example, questions with related situations such as (74) and (75) were turned into conditionals such as (76). The conditional in (76) would be considered a hole because in such contexts, it is easy for a non-conditional presupposition, such as (77), to project. However, it might be argued that conditionals with related antecedents are not only holes, but that they are ambiguous between holes and filters because different interpretations are possible depending on the discourse and the speaker's prior beliefs. If the speaker utters a conditional like (76) and believes that adventurous individuals are very likely to own surfboards, they may presuppose a conditional presupposition like (78).

74. Maceraperest birinin sörf tahtasının sağlam olma olasılığı nedir?  
*What is the probability of an adventurous individual's surfboard being sturdy?*

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<sup>13</sup> Some situations were modified based on the data obtained from Experiment I. The motivation behind these modifications was to create more similar items since how related the antecedent is to the consequent and the presupposition is important for the purposes of Experiment II.

75. Maceraperest olmayan birinin sörf tahtasının sağlam olma olasılığı nedir?  
*What is the probability of a non-adventurous individual's surfboard being sturdy?*
76. Lale maceraperestse, sörf tahtası sağlamdır.  
*If Lale is adventurous, her surfboard is sturdy.*
77.  $\rightsquigarrow$  Lale sörf tahtasına sahiptir.  
 $\rightsquigarrow$  *Lale has/owns a surfboard.*
78.  $\rightsquigarrow$  Lale maceraperestse, sörf tahtasına sahiptir.  
 $\rightsquigarrow$  *If Lale is adventurous, she has/owns a surfboard.*

Unrelated antecedents, on the other hand, may not allow conditional presuppositions to project at all because there is not enough lexico-semantic association between the antecedent and the presupposition. For example, a conditional like (79) may only allow a non-conditional presupposition like (80) to project while disallowing the projection of a conditional presupposition like (81).

79. Lale sade kahveyi seviyorsa, sörf tahtası sağlamdır.  
*If Lale like plain coffee, her surfboard is sturdy.*
80.  $\rightsquigarrow$  Lale sörf tahtasına sahiptir.  
 $\rightsquigarrow$  *Lale has/owns a surfboard.*
81.  $\not\rightsquigarrow$  Lale sade kahveyi seviyorsa, sörf tahtasına sahiptir.  
 $\not\rightsquigarrow$  *If Lale likes plain coffee, she has/owns a surfboard.*

Experiment II made use of dialogues in testing presupposition projection. That was because of the fact that participants have no way of inferring what is presupposed without a second statement for updating their beliefs. That is also the reason why either the antecedent or the presupposition was denied in experimental dialogues, as in (82) and (83), respectively. If the antecedent was denied, the probability of the presupposition was asked. The prediction was that ratings for the probability of the presupposition would be low if a conditional presupposition projects. That is because the antecedent of the conditional is also the antecedent of the conditional presupposition and denying that would prompt participants to make use of *denial of the antecedent*<sup>14</sup>. If a conditional presupposition does not project, ratings were expected to be high because the denial of the antecedent should not affect a non-conditional presupposition. When the (non-conditional) presupposition was denied, participants were expected to make use of *Modus Tollens*<sup>15</sup>. The reason behind this is that this

<sup>14</sup> *Denial of the antecedent* is the logical fallacy in which individuals falsely infer the denial of the consequent when the antecedent is denied. For instance, if a sentence such as "If Lale is a surfer, her surfboard is sturdy." is given as the first premise, and then, the antecedent is denied in the second premise, as in "Lale is not a surfer.", individuals infer "Lale's surfboard is not sturdy." This is probably due to *conditional perfection*, which strengthens the conditional to a biconditional, such as "If and only if Lale is a surfer, her surfboard is sturdy." (Horn, 2000).

<sup>15</sup> *Modus Tollens* is a rule of inference that shows the falsity of the antecedent when the consequent is denied. For instance, if a sentence such as "If Lale is a surfer, her surfboard is sturdy." is given as the first premise, and then, the consequent is denied in the second premise, as in "Lale's surfboard is not sturdy.", it is logical and valid

is possible only if a conditional presupposition is obtained from the conditional. If a non-conditional presupposition is obtained, ratings for the antecedent should not be low.

82. Berrak: Lale sörfçüyse, sörf tahtası sağlamdır.  
*Berrak: If Lale is a surfer, her surfboard is sturdy.*  
Tuğba: Lale sörfçü değil.  
*Tuğba: Lale is not a surfer.*  
Lale'nin sörf tahtasına sahip olma olasılığı nedir?  
*What is the probability of Lale having a surfboard?*
83. Berrak: Lale sörfçüyse, sörf tahtası sağlamdır.  
*Berrak: If Lale is a surfer, her surfboard is sturdy.*  
Tuğba: Lale'nin sörf tahtası yok.  
*Tuğba: Lale does not have a surfboard.*  
Lale'nin sörfçü olma olasılığı nedir?  
*What is the probability that Lale is a surfer?*

The same 20 filler items were used in every condition. Control items, on the other hand, had two lists, and each group saw only one list of control items, which consisted of 10 dialogues. Control items and filler items were randomly divided into 3 lists due to software requirements for randomization. A random experimental item was presented after three items from the control/filler lists every time. Every participant saw every list of control and filler items; however, the control items came from either one of the control item lists based on which condition a participant was randomly assigned to. In total, one participant saw 40 dialogues in the main part of the experiment. Sample experimental dialogues for each condition are given in (84-89) (For all dialogues, please see Appendix B.1). There were 4 practice questions before the experiment in order to get the participants used to reading the dialogues and giving ratings. Out of these 4 questions, only one of them was similar to the experimental questions.

84. Entailing, denial of the antecedent  
Berrak: Lale sörfçüyse, sörf tahtası sağlamdır.  
*Berrak: If Lale is a surfer, her surfboard is sturdy.*  
Tuğba: Lale sörfçü değil.  
*Tuğba: Lale is not a surfer.*  
Lale'nin sörf tahtasına sahip olma olasılığı nedir?  
*What is the probability of Lale having a surfboard?*
85. Related, denial of the antecedent  
Berrak: Lale maceraperest biriye, sörf tahtası sağlamdır.  
*Berrak: If Lale is adventurous, her surfboard is sturdy.*

---

to infer "Lale is not a surfer." In classical bivalent logic, an implication whose consequent is false can be true if and only if the antecedent is false. That is why *Modus Tollens* is a valid argument. In reasoning, hearers assume that the speaker conforms to the *maxim of quality*, which is the maxim that says "be truthful," (Grice, 1975) and that is why individuals think that the conditional is true in such cases.

Tuğba: Lale maceraperest biri değil.

*Tuğba: Lale is not adventurous.*

Lale'nin sörf tahtasına sahip olma olasılığı nedir?

*What is the probability of Lale having a surfboard?*

86. Unrelated, denial of the antecedent

Berrak: Lale sade kahveyi seviyorsa, sörf tahtası sağlamdır.

*Berrak: If Lale likes plain coffee, her surfboard is sturdy.*

Tuğba: Lale sade kahveyi sevmiyor.

*Tuğba: Lale does not like plain coffee.*

Lale'nin sörf tahtasına sahip olma olasılığı nedir?

*What is the probability of Lale having a surfboard?*

87. Entailing, denial of the presupposition

Berrak: Lale sörfçüyse, sörf tahtası sağlamdır.

*Berrak: If Lale is a surfer, her surfboard is sturdy.*

Tuğba: Lale'nin sörf tahtası yok.

*Tuğba: Lale does not have a surfboard.*

Lale'nin sörfçü olma olasılığı nedir?

*What is the probability that Lale is a surfer?*

88. Related, denial of the presupposition

Berrak: Lale maceraperest biriyse, sörf tahtası sağlamdır.

*Berrak: If Lale is adventurous, her surfboard is sturdy.*

Tuğba: Lale'nin sörf tahtası yok.

*Tuğba: Lale does not have a surfboard.*

Lale'nin maceraperest biri olma olasılığı nedir?

*What is the probability that Lale is adventurous?*

89. Unrelated, denial of the presupposition

Berrak: Lale sade kahveyi seviyorsa, sörf tahtası sağlamdır.

*Berrak: If Lale likes plain coffee, her surfboard is sturdy.*

Tuğba: Lale'nin sörf tahtası yok.

*Tuğba: Lale does not have a surfboard.*

Lale'nin sade kahveyi sevme olasılığı nedir?

*What is the probability that Lale likes plain coffee?*

#### 4.2.4 Procedure

Data collection for Experiment II was carried out over the internet, the same way as Experiment I, via the PCIBex website (Zehr & Schwarz, 2018). First, a pilot experiment was conducted with 6 individuals, and their feedback showed that no change was needed. Participants received a link to the data collection website through various social media and messaging applications. It was important that they had not participated in Experiment I because the items for Experiment II were derived from the items for Experiment I. After the participants read and accepted the informed consent form, they participated on their own personal computer. Key presses on a physical

keyboard were required in this experiment; so, participation on a smartphone or a tablet was not possible. Before the practice session started, participants were warned that they could only make one choice on the scale and that they could not change it later. They were also advised to be in a quiet environment and finish the experiment in one sitting. They read that their reaction times would be collected and that they needed to focus on the experiment. In the practice session, participants learned that they needed to press the “space” key on their keyboard to see the sentences. They were told to imagine themselves in a party, overhearing two party-goers’ conversation. All instructions, dialogues, and questions were written, and there were no pictures.

The presentation order of the dialogues was pseudo-randomized. The participants never saw experimental dialogues one after the other. An experimental dialogue was given every 4 dialogues in random order. Since there were 3 lists of filler and control dialogues, and a random dialogue from each of these lists was shown to the participant between the experimental dialogues. This order was preserved until the end of the experiment. Dialogues and questions were placed in a box (with no visible edges) that was centered on the screen and had a width of 40em. They were left-aligned within this box. The scale was centered on the screen and the scale button was positioned at 0% in the beginning. Participants either dragged the button to where they wanted on the scale or clicked on the point they wanted to. The next trial started immediately after a drag or click was detected. They saw a progress bar at the top of the web page. After rating 40 questions about 40 dialogues, they filled a questionnaire about themselves. If a participant did not fill out everything in the questionnaire or closed the experiment page at any time before sending the results, their results were not received. Data collection took 17 days. A demonstration of the whole experiment can be found via this link: <https://farm.pcibex.net/r/HOdmzB/>

#### **4.2.5 Analysis & Data Exclusion Criteria**

As it was also explained in Subsection 4.2.2, 6 participants’ data were removed from the final analysis. 3 of them were not native speakers of Turkish and also not proficient in Turkish. 1 of them participated in Experiment I as well as Experiment II; so, their responses could be influenced by what they read in Experiment I. That is why their data were excluded. The last two of these 6 participants, finished responding to all questions in less than 3 minutes. Average time to complete the experiment was 7.3 minutes while these two participants took 2.2 minutes and 2.95 minutes. The closest finishing times to these were 3.6 minutes and 4.1 minutes. Therefore, it was concluded that those who finished under 3 minutes could not have paid enough attention. No other data was removed. Overall, data loss was 6.45%. Data exclusions and statistical analyses were conducted in R and RStudio (R Core Team, 2022; RStudio Team, 2022). The *dplyr* (Wickham et al., 2022) package was used for data manipulation and the *lme4* (Bates et al., 2015), *lmerTest* (Kuznetsova et al., 2017), and *lsmeans* (Lenth, 2016) packages were used for LMMs and pairwise comparisons.

For the analysis of the ratings for experimental items, two separate LMMs with a fixed effect of relatedness were built because the two levels of the denial factor measured different variables. Since one model consisted only of the denial of the antecedent data and the other model consisted only of the denial of the presupposition data, there was no other factor to add into the model. Items and participants were coded as random effects. For the analysis of all the ratings, including the ratings for control and filler items, fixed effects of relatedness and denial were added to the model one by one and they were compared with a model with a minimal change. The model with an interaction between relatedness and denial had the lowest AIC score and it was selected as the better model. Linear mixed models were used for reaction time data with the same method as well. Pairwise comparisons were conducted in order to compare experimental groups with each other.

### 4.3 Results

#### 4.3.1 Results of Probability Ratings

A barplot of the mean ratings for the experimental items is given in Figure 3.

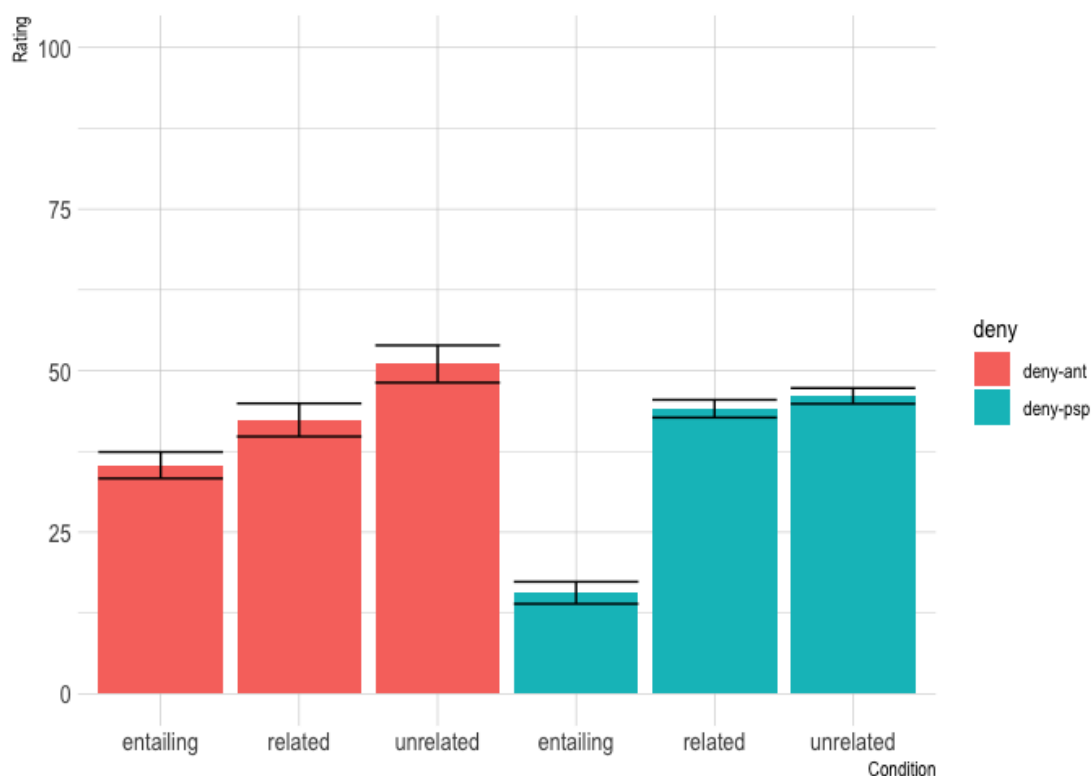


Figure 3: Mean ratings for the experimental items in Experiment II. Error bars indicate the standard error of the mean.



Pairwise comparisons of the fixed effect showed that ratings for the probability of the presupposition (after the antecedent of the conditional is denied) were marginally significantly lower in conditionals with entailing antecedent than conditionals with unrelated antecedents. However, ratings for someone owning an object in conditionals with related antecedents did not significantly differ from ratings for someone owning an object in conditionals with entailing or unrelated antecedents. Results regarding these pairwise comparisons are given in Table 3.

Table 3: Pairwise comparisons for the probability of the presupposition after the antecedent is denied in Experiment II

relatedness	Estimate	SE	df	t.ratio	p.value
entailing - related	7.003	7.9	44.0	0.886	<i>ns</i>
entailing - unrelated	15.664	7.9	44.0	1.983	$p=0.0536$
related - unrelated	8.662	8.2	44.0	1.061	<i>ns</i>

Ratings for the probability of the antecedent of the conditional (after the presupposition is denied) were significantly lower in conditionals with entailing antecedents than conditionals with related or unrelated antecedents. The pairwise comparisons for these results are given in Table 4.

Table 4: Pairwise comparisons for the probability of the antecedent after the presupposition is denied in Experiment II

relatedness	Estimate	SE	df	t.ratio	p.value
entailing - related	28.490	4.3	48.0	6.642	<.001***
entailing - unrelated	30.465	4.4	48.1	6.909	<.001***
related - unrelated	1.975	4.2	48.0	0.469	<i>ns</i>

In control trials, a presupposition was embedded in the antecedent, which should make the conditional a filter for the presupposition. Denying or affirming the consequent should not change the projection of the non-conditional presupposition. However, pairwise comparisons for the interaction effect in the model that included all the ratings showed that the consequent-denying control items were rated significantly lower than the consequent-affirming control items. Consequent-affirming control items were rated significantly higher than every experimental condition. The ratings for the consequent-denying control items were also significantly different from 5 of the experimental groups. Unrelated antecedent-denying experimental items were not rated differently from consequent-denying control items. Antecedent-affirming and consequent-affirming filler items were rated significantly differently from every experimental condition. However, consequent-denying filler items were not rated differently from both types of entailing conditions. A barplot of the mean ratings for all items is given in Figure 4.

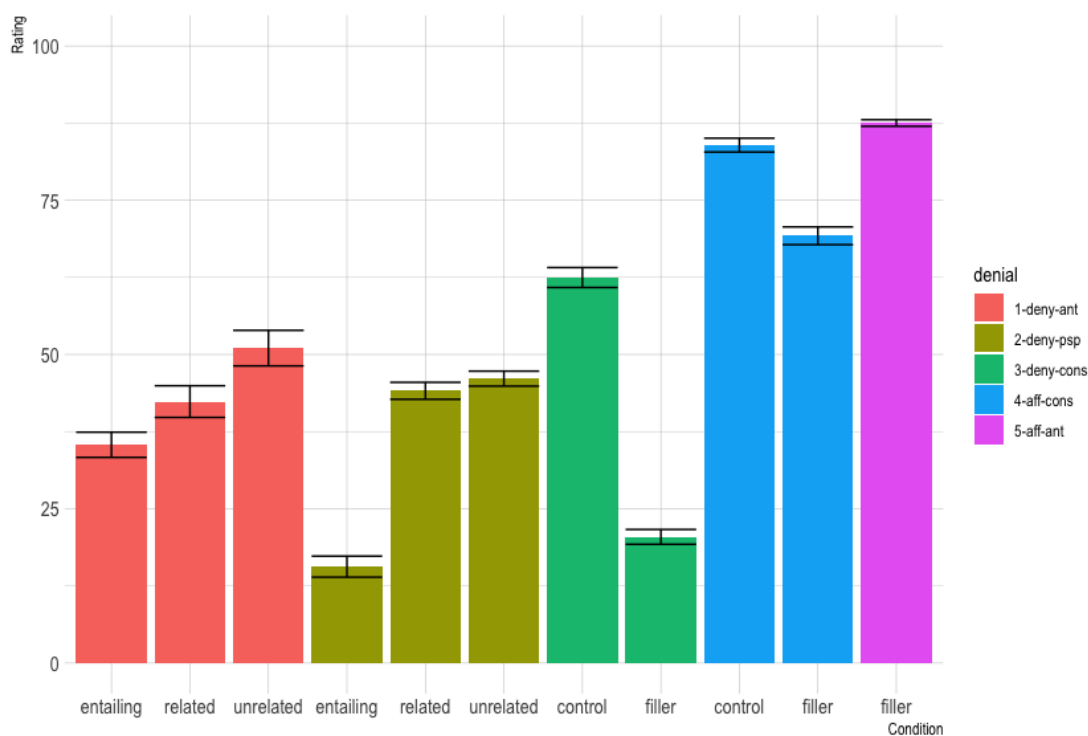


Figure 4: Mean ratings for all items in Experiment II. Error bars indicate the standard error of the mean.

### 4.3.2 Results of Reaction Times

Reaction times of Experiment II were also analyzed with linear mixed models. Reading time data for the conditional and the denying statement were collected separately. The final reaction time data included the time for reading the question as well. That is why the reaction times were quite long. Two separate models for the reaction times of experimental items showed no differences between the conditions. Total reading and reaction times also did not differ from each other for the experimental conditions. The model which included reaction times of the control and filler trials were comprised of fixed effects of relatedness and denial. Pairwise comparisons showed that only the reaction times of filler items that ask participants to do *Modus Ponens*<sup>16</sup> had significantly different reaction times from the rest. When the reaction times of filler items were removed from the dataset, reaction times for the control items did not significantly differ from the reaction times for the experimental trials. A barplot

<sup>16</sup> *Modus Ponens* is a rule of inference that shows the truth of the consequent when the antecedent is affirmed. For instance, if a sentence such as "If Lale is a surfer, her surfboard is sturdy." is given as the first premise, and then, the antecedent is affirmed in the second premise, as in "Lale is a surfer.", it is logical and valid to infer "Lale's surfboard is sturdy."

of the mean reaction times for all reaction times (of reading the question and moving the scale button) is given in Figure 5.

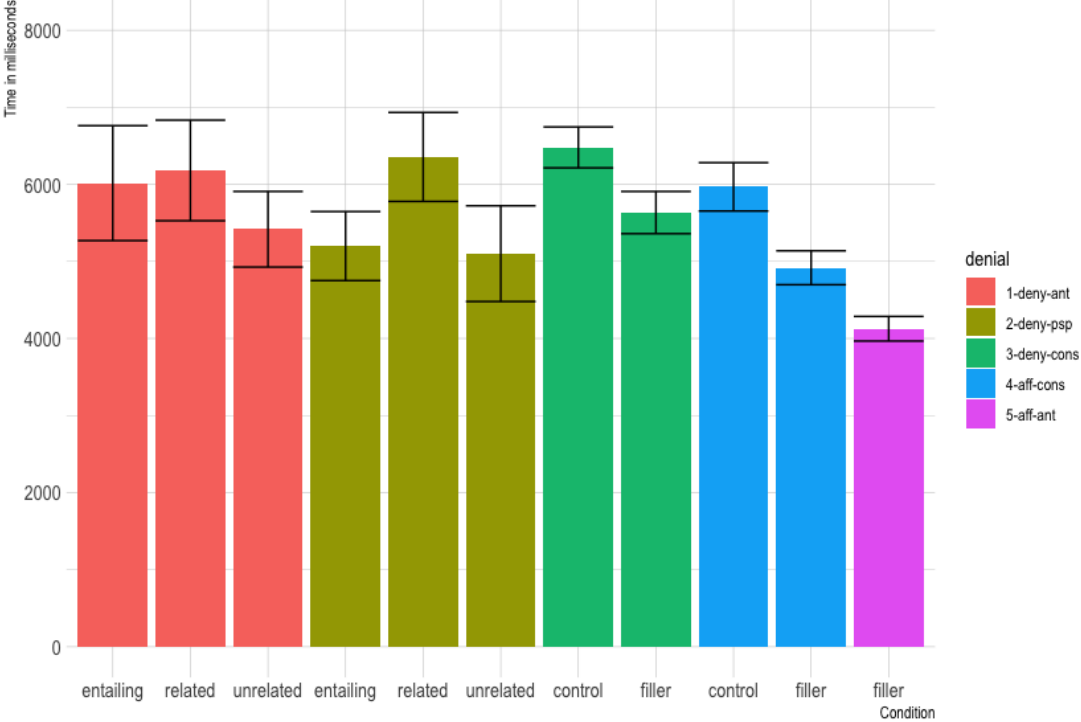


Figure 5: Mean reaction times (in milliseconds) of reading the question and moving the scale button in Experiment II. Error bars indicate the standard error of the mean.

#### 4.4 Discussion

Since the ratings for presuppositions in conditionals with an entailing antecedent marginally significantly differed from the ratings for presuppositions in conditionals with an unrelated antecedent, it can be said that the conditionals with entailing antecedents were filters and the conditionals with unrelated antecedents were holes. So, Experiment II confirms the characteristic projection behavior of filters and holes, and that conditionals can be both filters and holes depending on the context. In terms of gradual projection, the ratings were similar to the corresponding ratings in Experiment I. Even though the ratings for presuppositions in conditionals with related antecedents did not significantly differ from the others and the difference between ratings for presuppositions in conditionals with entailing and unrelated antecedent differed only marginally, this pattern is similar to the pattern observed in Experiment I. It is possible that there were not enough participants in both experiments to detect

a difference between the ratings for presuppositions in conditionals with related antecedents and the ratings for the other conditions. The ratings in Experiment I were lower, but the claim was only that they would show a similar pattern, and they do. So, we have some support in claiming that prior beliefs affect presupposition projection out of the consequent of a conditional.

In the presupposition-denying conditions of Experiment II, participants in the filter condition seem to have used *Modus Tollens* for the conditional presupposition to rate the probability of the antecedent. However, participants in the other presupposition-denying conditions seem to have not used *Modus Tollens* reasoning in their ratings. This is because, if the participants accommodated a conditional presupposition and used *Modus Tollens* reasoning for it, which is the inference that the consequent's falsity implies the antecedent's falsity, they would rate the probability of the antecedent as very low. Indeed, participants did that only for the entailing antecedent condition. This suggests that participants did not accommodate conditional presuppositions in the related or unrelated antecedent conditions. They may have accommodated non-conditional presuppositions in those conditions, but it is also possible that they ignored the presupposition altogether because it was not *at-issue*.

The presupposition-denying part of the experiment tested only whether a conditional presupposition was accommodated. When the antecedent of a conditional is denied, the logic for the material implication allows the consequent to have any truth-value. So, in the antecedent-denying conditions, what influences the ratings may only be prior beliefs and the ratings may not change depending on whether a conditional presupposition is produced or not. However, in the presupposition-denying conditions, the logic for the material implication makes it obligatory to give low ratings for the antecedent when a conditional presupposition is obtained. Overall, these results seem to suggest that prior beliefs indeed have a role in presupposition projection and that only entailing antecedents give rise to conditional presuppositions.

Another point to note is that participants seem to have rated probabilities based on their own confidence levels, rather than what the speaker believes. Ratings for the control items, which included presuppositions in the antecedent of conditionals, were not close to 100%, either. Moreover, ratings for the control items in consequent-denying and consequent-affirming conditions were significantly different from each other. This suggests that the mere presence of negation lowered the participants' confidence in the presupposition, even though negation is a presuppositional hole. In conclusion, the results of Experiment II should be taken as indications regarding what the participants could confidently infer from the dialogues, which seem to be influenced by prior beliefs.

## CHAPTER 5

### GENERAL DISCUSSION AND CONCLUSION

#### 5.1 General Discussion

We set out to investigate the effects of prior beliefs on presupposition projection in conditionals. Theories about plausibility (Beaver, 2001; Singh et al., 2016; von Stechow, 2008) or remarkability (Geurts, 1996) have been put forth as what determines the projection of conditional presuppositions. Previous experimental studies made use of highly related and less related conditional antecedents in their experiments, but not conventionally unrelated ones. This study was conducted in order to provide empirical observations about conditional presuppositions by manipulating the relationship between the antecedent and the presupposition as highly related (entailment-like), (less) related, and unrelated. The aim of the study was to fill the gap about unrelated antecedent-presupposition relationships. Formulating the predictions of the study in terms of prior beliefs allowed us to empirically measure the relationship between the antecedent and the presupposition in Experiment I. Then, we tested what projects out of the consequent of a conditional in Experiment II. The rest of this chapter reviews the findings and discusses their significance and contribution for the presupposition literature.

Experiment I collected ratings on the probability of owning a particular uncommon object and the probability of a particular quality of that object under three different circumstances. It was found that there is a gradual increase in the probability ratings of owning an object as the situation's relation to owning the object increases (*owning an object* while 1) *being a surfer*, 2) *being adventurous*, 3) liking plain coffee). It was also found there was a decrease in the probability ratings of owning an object when the situation's relation to owning the object was negated (*owning an object* while 1) *being a non-surfer*, 2) *being nonadventurous*, 3) disliking plain coffee). These results show that the probability of owning a particular uncommon object depends on the situation. As the difference in the degree of prior beliefs may affect presupposition projection (Degen & Tonhauser, 2021; Mahler, 2020), these probability ratings establish a lower and a higher probability point for owning an uncommon object under different circumstances. Adapting the situations in Experiment I as antecedents of conditionals in Experiment II ensures that the relationship between the antecedent and the presupposition in the consequent is gradual.

In the probability ratings for a particular quality of an object, it was found that there is a gradual increase in the probability ratings of owning an object as the situation's relation to the quality of the object increases (*the owned surfboard being sturdy* while 1) *being a surfer*, 2) *being adventurous*, 3) *liking plain coffee*). However, the negation of the situation's relation to the quality of the object eliminates the differences between ratings (*the owned surfboard being sturdy* while 1) *being a non-surfer*, 2) *being nonadventurous*, 3) *disliking plain coffee*). Because the situations in Experiment I were adapted as antecedents of conditionals in Experiment II, this result suggests that the relationship between the antecedent and the consequent is gradual only when the antecedent is affirmed.

In Experiment I, it was expected that individuals would differ in how they reason about probabilities for their ratings. Recall that logical reasoners were predicted to give 50% ratings while probabilistic reasoners were predicted to give below 40% ratings to questions about owning an uncommon object with negative relations. The responses to the open-ended questions revealed that individuals do use these reasoning styles, but their use do not neatly fall into two categories and they alternate their reasoning styles depending on the question. Therefore, reasoning styles were not included in the quantitative analysis of Experiment I. However, we do not simply dismiss this matter, rather we point out that this could potentially have affected the results of Experiment I.

To measure the projection levels of presuppositions embedded in the consequent of a conditional, Experiment II collected probability ratings for the presupposition after the antecedent was denied (e.g., *If Lale is a surfer/If Lale is adventurous/If Lale likes plain coffee, her surfboard is sturdy. Lale is not a surfer/is not adventurous/does not like plain coffee. What is the probability of Lale owning a surfboard?*). The results showed that the ratings for the presupposition when the conditional had entailing and unrelated antecedents were marginally different from each. This suggests a difference in the obtained presupposition, such that participants obtained a conditional presupposition from conditionals with entailing antecedents while obtaining a non-conditional presupposition from conditionals with unrelated antecedents. This finding shows that the consequent of a conditional can be a presuppositional hole or a presuppositional filter depending on the antecedent, confirming the characteristic distinction between holes and filters in the literature (Karttunen, 1973).

The ratings for the presupposition after the denial of the presupposition show a gradual pattern, suggesting that they were influenced by prior beliefs. For comparison, two figures are given in Figure 6. This finding is in line with the results on projection variability depending on high or low probability prior beliefs reported in Degen and Tonhauser (2021) and Mahler (2020). Gradual projection can be taken as an indication that there are not only subcategories of presuppositions that behave in the same way in every environment, but that projection is gradient (Tonhauser et al., 2018). In investigating the projection behavior of conditional presuppositions, the gradient nature of presuppositions is influenced by the content of the antecedent to determine what may project. Considering this in terms of Lassiter's (Lassiter, 2012) probabilistic account of presupposition projection, in which there are projection thresholds determining the projection of a conditional or a non-conditional presupposition, it can

be said that the gradience of presupposition projection interacts with the projection threshold depending on the content of the antecedent.

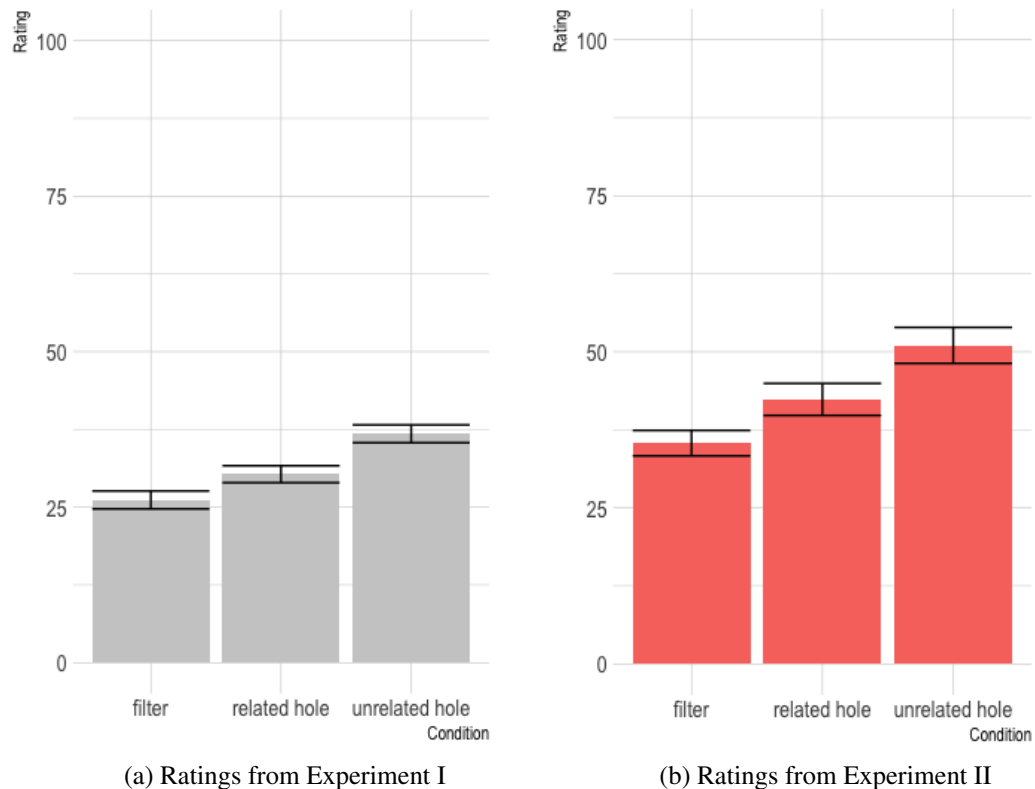


Figure 6: (a) mean ratings for questions about owning an object with negative relations between the situation and the object in Experiment I, (b) mean ratings for the presupposition after the denial of the antecedent in Experiment II. Error bars indicate the standard error of the mean.

To test whether a conditional or a non-conditional presupposition projects out of the consequent of a conditional, Experiment II collected probability ratings for the antecedent after the presupposition was denied (e.g., *If Lale is a surfer/If Lale is adventurous/If Lale likes plain coffee, her surfboard is sturdy. Lale does not own a surfboard. What is the probability of Lale being a surfer/being adventurous/liking plain coffee?*). The results showed that the ratings for the antecedent were significantly lower when the conditional had an entailing antecedent (i.e., making the presupposition highly likely), compared to when the conditional had a related or unrelated antecedent. This suggests that participants made use of *Modus Tollens* reasoning only in conditionals with an entailing antecedent, such that they inferred the falsity of the antecedent (e.g., *Lale is not a surfer*) upon reading the falsity of the presupposition

(e.g. *Lale does not own a surfboard.*) because they had obtained a conditional presupposition (e.g. *If Lale is a surfer, she owns a surfboard.*). However, ratings for the antecedent in related and unrelated conditions were around 50%, suggesting that the participants could not have obtained a conditional presupposition.

These results differ from the results of Domaneschi et al. (2016) and Romoli et al. (2011). While they found conditional presuppositions in conditionals with non-entailing antecedents as well as conditionals with entailing antecedents, Experiment II of this thesis found that a conditional presupposition did not project when the truth of the antecedent did not entail the presupposition (i.e., not making the presupposition highly probable). However, our results are not incompatible with any of the theoretical accounts mentioned in Section 2.4. Within FCS, it could be argued that a conditional presupposition is generated first in all conditions, and strengthening takes place to produce the non-conditional presuppositions unless there is an entailing antecedent (Heim, 1988). DRT would posit the reversed process, such that a non-conditional presupposition would be generated first in all conditions, and a conditional presupposition would be considered only if the antecedent of the conditional entails the presupposition (Geurts, 1999). Lassiter's (2012) probabilistic account, on the other hand, does not suggest a two-stage process, and would explain the projection behavior with probabilistic projection thresholds. According to this account, the results could be explained as only the conditionals with an entailing antecedent reaching the projection threshold for conditional presuppositions. Presuppositions embedded in the consequents of conditionals with related or unrelated antecedents could not have reached this threshold for conditional presupposition projection.

Experiment II also collected reaction times of reading the question and giving a rating. However, no significant differences between the experimental conditions were found. This could be due to the low number of participants or a lack of power. Moreover, reading dialogues give the participants more points to consider, which could lead to longer reaction times. The filler items that required the participants to use *Modus Ponens* in Experiment II were rated significantly more quickly, pointing to the possibility that reasoning about conditional presuppositions by using *Modus Tollens* is more complex than reasoning about conditionals by using *Modus Ponens*. To say anything more about the online processing of conditional presuppositions, an online experiment must be conducted.

The control items in Experiment II showed that the presuppositions embedded in the antecedent of a conditional were rated lower when the consequent was denied, compared to when the consequent was affirmed. The fact that the same presuppositions were used in both consequent-denying and consequent-affirming conditions suggests that negation by itself may have caused any presupposition rating to be lower than they actually would be. However, there was a denial in every experimental condition. Therefore, negation could not have affected the differences found in the experimental conditions.

This study provides experimental evidence for the thesis that the projection of conditional presuppositions can be gradual and affected by prior beliefs. When taken together with a probabilistic account of conditionals, such as Lassiter's (2012), the



findings of this study can be used to model presupposition projection in conditionals (Qing et al., 2016; Stevens et al., 2017). Our results are in line with Degen and Tonhauser's (2021) results and build on them by using conditional structures. As the structure becomes more complex, additional considerations come into play in deciding what projects. A gradual and probabilistic view of presupposition projection can account for not only the syntactic and semantic components of presupposition projection but also the pragmatic and subjective components. In order to untangle how presuppositions are processed, we need to unpack how these cognitive components influence individuals' reasoning with presuppositions.

## 5.2 Limitations and Further Directions

Experiment I did not train the participants to respond a certain way to not influence their natural reasoning processes. However, individual differences in reasoning styles were not clear-cut and participants could not be divided into two groups based on their reasoning styles. This could be considered a limitation of the current thesis. That is why, further investigations collecting prior probabilities could make use of probability elicitation training.

It is worth noting that Experiment II tested only indicative conditionals. No claim is made for presuppositions in subjunctive or counterfactual conditionals. Presuppositions in those environments require a proper investigation of their own.

Another limitation of the current study is that the dialogues were somewhat unnatural on purpose. Under natural circumstances, in denying an individual's beliefs (such as a presupposition), a sentence final *ki* particle is uttered to indicate that the individual's belief is wrong. Experiment II did not make use of this particle because it was natural only in related and unrelated conditions, but not in entailing conditions. Moreover, adding *ki* would suggest that the presupposition is false, which could be a confound. That is why this particle was not used in the experimental dialogues. However, it is an important point for designing future experiment.

Perhaps the most important limitation of Experiment II is the lack of confirmation the projection of non-conditional presuppositions in related and unrelated conditions. Considering that, in Experiment II, participants are asked to make judgements on a small discourse with only two individuals, the second interlocutor's epistemic state conflicts with the first interlocutor's epistemic state in related and unrelated conditions. The denial of the presupposition updates the context in entailing conditions because the falsity of the presupposition directly falsifies the antecedent due to the conditional presupposition. In related or unrelated conditions, the lack of a conditional presupposition interpretation may have caused the participants to rate the antecedent based on either the second interlocutor's beliefs or their own prior beliefs about the probability of the situation. Our experiment does not rule out these possibilities. Therefore, it could be said that the participants may not have projected any presuppositions in related and unrelated conditions. This also suggests that the ratings in the denial of the antecedent condition could only be the result of prior beliefs. We

acknowledge this as a limitation of the current study. Further experimentation indicating the projection of non-conditional presuppositions in the related and unrelated conditions is needed.

### **5.3 Conclusion**

The results of the experiments conducted for this thesis suggest that the projection of conditional presuppositions is influenced by prior beliefs. Moreover, only the antecedents that made the truth of the presupposition highly likely resulted in conditional presupposition interpretations. These results provide evidence for a probabilistic theory of presupposition projection which supports a projection threshold for conditional and non-conditional presuppositions and which can be computationally modeled.

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## APPENDIX A

### EXPERIMENT I

#### A.1 Materials

16 types of object and quality pairs were used with 3 types of situations for each object.

Positive ownership questions were in the form of: "Bir (kişi)nin (nesne)ye sahip olma olasılığı nedir?" (*"What is the probability of (individual) owning (object)?"*)

Negative ownership questions were in the form of: "(kişi özelliği) olmayan birinin (nesne)ye sahip olma olasılığı nedir?" (*"What is the probability of someone who is not (particular individual) owning (object)?"*)

Positive object quality questions were in the form of: "Bir (kişi)nin (nesne)sinin (belli bir özelliği) olma olasılığı nedir?" (*"What is the probability of (individual's) (object) being (a certain quality)?"*)

Negative object quality questions were in the form of: "(kişi özelliği) olmayan birinin (nesne)sinin (belli bir özelliği) olma olasılığı nedir?" (*"What is the probability of (object) of someone who is not (particular individual) being (a certain quality)?"*)

#### 1. individual - object - quality:

kaya tırmanışçısı - tırmanış ayakkabısı - dayanıklı (*rock climber - climbing shoes - durable*)

yaşça büyük biri - tırmanış ayakkabısı - dayanıklı (*an older individual - climbing shoes - durable*)

şapka takan biri - tırmanış ayakkabısı - dayanıklı (*someone wearing a hat - climbing shoes - durable*)

#### 2. individual - object - quality:

müziyen - müzik enstrümanı - bakımlı (*musician - musical instrument - well-maintained*)

temizlik yapmayı seven biri - müzik enstrümanı - bakımlı (*someone who likes cleaning - musical instrument - well-maintained*)

yemek yapmayı seven biri - müzik enstrümanı - bakımlı (*someone who likes cooking - musical instrument - well-maintained*)

3. individual - object - quality:  
sörfçü - sörf tahtası - sağlam (*surfer - surfboard - sturdy*)  
maceraperest biri - sörf tahtası - sağlam (*adventurous individual - surfboard - sturdy*)  
sade kahveyi seven biri - sörf tahtası - sağlam (*individual who likes plain coffee - surfboard - sturdy*)
4. individual - object - quality:  
şef - gıda termometresi - hassas (*chef - food thermometer - precise*)  
özenli biri - gıda termometresi - hassas (*meticulous individual - food thermometer - precise*)  
uzun saçlı biri - gıda termometresi - hassas (*individual with long hair - food thermometer - precise*)
5. individual - object - quality:  
beyzbol oyuncusu - beyzbol sopası - yıpranmış (*baseball player - baseball bat - scuffed*)  
çocuklarıyla beyzbol oynayan biri - beyzbol sopası - yıpranmış (*individual playing baseball with their kids - baseball bat - scuffed*)  
makarna seven biri - beyzbol sopası - yıpranmış (*individual who likes pasta - baseball bat - scuffed*)
6. individual - object - quality:  
çiftçi - tırpan - büyük (*farmer - scythe - large*)  
verimli biri - tırpan - büyük (*productive individual - scythe - large*)  
mor rengini seven biri - tırpan - büyük (*someone who likes the color purple - scythe - large*)
7. individual - object - quality:  
kuaför - saç inceltme makası - dezenfekte edilmiş (*hairdresser - hair thinning scissors - disinfected*)  
titiz biri - saç inceltme makası - dezenfekte edilmiş (*neat individual - hair thinning scissors - disinfected*)  
yeşil çay seven biri - saç inceltme makası - dezenfekte edilmiş (*someone who likes green tea - hair thinning scissors - disinfected*)
8. individual - object - quality:  
cerrah - neşter - tek kullanımlık bıçakları olan (*surgeon - scalpel - with disposable blades*)  
zengin biri - neşter - tek kullanımlık bıçakları olan (*someone who is rich - scalpel - with disposable blades*)  
yazı yazmayı seven biri - neşter - tek kullanımlık bıçakları olan (*someone who likes writing - scalpel - with disposable blades*)
9. individual - object - quality:  
kemancı - keman - akortlu (*violinist - violin - tuned*)  
yetenekli biri - keman - akortlu (*talented individual - violin - tuned*)  
esmer biri - keman - akortlu (*brunette - violin - tuned*)

10. individual - object - quality:  
piyanist - piyano - onun için çok önemli olan (*pianist - piano - very important for him*)  
klasik müzikten hoşlanan biri - piyano - onun için çok önemli olan (*someone who enjoys classical music - piano - very important for him*)  
gözlük takan biri - piyano - onun için çok önemli olan (*someone who wears glasses - piano - very important for him*)
11. individual - object - quality:  
saksofoncu - saksofon - kaliteli (*saxophonist - saxophone - of high quality*)  
varlıklı bir ailesi olan biri - saksofon - kaliteli (*someone who has a wealthy family - saxophone - of high quality*)  
mavi rengini seven biri - saksofon - kaliteli (*someone who likes the color blue - saxophone - of high quality*)
12. individual - object - quality:  
astronot - uzay giysisi - gerçek (*astronaut - spacesuit - real*)  
şaka yapmayan biri - uzay giysisi - gerçek (*someone who does not joke - spacesuit - real*)  
koşmayı seven biri - uzay giysisi - gerçek (*someone who likes running*)
13. individual - object - quality:  
diş hekimi - ağız aynası - her zaman temiz (*dentist - mouth mirror - always clean*)  
asistanı olan biri - ağız aynası - her zaman temiz (*someone who has an assistant - mouth mirror - always clean*)  
perşembeleri seven biri - ağız aynası - her zaman temiz (*someone who likes Thursdays - mouth mirror - always clean*)
14. individual - object - quality:  
madenci - kafa lambası - baretine bağlı (*miner - headlamp - attached to his hardhat*)  
dikkatli biri - kafa lambası - baretine bağlı (*cautious individual - headlamp - attached to his hardhat*)  
tek çocuk olan biri - kafa lambası - baretine bağlı (*someone who is an only child - headlamp - attached to his hardhat*)
15. individual - object - quality:  
doktor - stetoskop - masasının üzerinde (*doctor - stethoscope - on her desk*)  
hipertansiyonu olan biri - stetoskop - masasının üzerinde (*someone with hypertension - stethoscope - on her desk*)  
telefon konuşmalarını seven biri - stetoskop - masasının üzerinde (*someone who likes phone calls - stethoscope - on her desk*)
16. individual - object - quality:  
fotoğrafçı - film banyosu solüsyonu - pahalı (*photographer - photographic developer - expensive*)  
yüksek kaliteli fotoğrafları tercih eden biri - film banyosu solüsyonu - pahalı (*someone who prefers high quality photos - photographic developer - expensive*)

papatyaları seven biri - film banyosu solüsyonu - pahalı (*someone who likes daisies - photographic developer - expensive*)

## APPENDIX B

### EXPERIMENT II

#### B.1 Materials

##### B.1.1 Group 1

The antecedent is entailing. The antecedent is denied and the presupposition is asked.

1. Berrak: Ceren kaya tırmanışçısıysa, tırmanış ayakkabısı dayanıklıdır.  
*Berrak: If Ceren is a rock climber, her climbing shoes are durable.*  
Tuğba: Ceren kaya tırmanışçısı değil.  
*Tuğba: Ceren is not a rock climber.*  
Ceren'in tırmanış ayakkabısına sahip olma olasılığı nedir?  
*What is the probability of Ceren owning climbing shoes?*
2. Berrak: Lale sörfçüyse, sörf tahtası sağlamdır.  
*Berrak: If Lale is a surfer, her surfboard is sturdy.*  
Tuğba: Lale sörfçü değil.  
*Tuğba: Lale is not a surfer.*  
Lale'nin sörf tahtasına sahip olma olasılığı nedir?  
*What is the probability of Lale owning a surfboard?*
3. Berrak: Damla şefse, gıda termometresi hassastır.  
*Berrak: If Damla is a chef, her food thermometer is precise.*  
Tuğba: Damla şef değil.  
*Tuğba: Damla is not a chef.*  
Damla'nın gıda termometresine sahip olma olasılığı nedir?  
*What is the probability of Damla owning a food thermometer?*
4. Berrak: Hasan beyzbol oyuncusuysa, beyzbol sopası yıpranmıştır.  
*Berrak: If Hasan is a baseball player, his baseball bat is scuffed.*  
Tuğba: Hasan beyzbol oyuncusu değil.  
*Tuğba: Hasan is not a baseball player.*  
Hasan'ın beyzbol sopasına sahip olma olasılığı nedir?  
*What is the probability of Hasan owning a baseball bat?*
5. Berrak: Burak çiftçiyse, tırpanı motorludur.  
*Berrak: If Burak is a farmer, his scythe is mechanical.*

- Tuğba: Burak çiftçi değil.  
*Tuğba: Burak is not a farmer.*  
Burak'ın tırpana sahip olma olasılığı nedir?  
*What is the probability of Burak owning a scythe?*
6. Berrak: Ceyda kuaförse, saç inceltme makası kullanıma hazırdır.  
*Berrak: If Ceyda is a hairdresser, her hair thinning scissors are ready for use.*  
Tuğba: Ceyda kuaför değil.  
*Tuğba: Ceyda is not a hairdresser.*  
Ceyda'nın saç inceltme makasına sahip olma olasılığı nedir?  
*What is the probability of Ceyda owning hair thinning scissors?*
7. Berrak: Haluk kemancıysa, kemanı pahalıdır.  
*Berrak: If Haluk is a violinist, his violin is expensive.*  
Tuğba: Haluk kemancı değil.  
*Tuğba: Haluk is not a violinist.*  
Haluk'un kemana sahip olma olasılığı nedir?  
*What is the probability of Haluk owning a violin?*
8. Berrak: Buğra piyanistse, piyanosu bakımlıdır.  
*Berrak: If Buğra is a pianist, his piano is well-maintained.*  
Tuğba: Buğra piyanist değil.  
*Tuğba: Buğra is not a pianist.*  
Buğra'nın piyanoya sahip olma olasılığı nedir?  
*What is the probability of Buğra owning a piano?*
9. Berrak: Merve saksofoncuysa, saksofonu kalitelidir.  
*Berrak: If Merve is a saxophonist, her saxophone is of high quality.*  
Tuğba: Merve saksofoncu değil.  
*Tuğba: Merve is not a saxophonist.*  
Merve'nin saksofona sahip olma olasılığı nedir?  
*What is the probability of Merve owning a saxophone?*
10. Berrak: Serhat madenciye, kafa lambası baretine bağlıdır.  
*Berrak: If Serhat is a miner, his headlamp is attached to his hardhat.*  
Tuğba: Serhat madenci değil.  
*Tuğba: Serhat is not miner.*  
Serhat'ın kafa lambasına sahip olma olasılığı nedir?  
*What is the probability of Serhat owning a headlamp?*

## B.1.2 Group 2

The antecedent is related. The antecedent is denied and the presupposition is asked.

1. Berrak: Ceren spor ekipmanından iyi anlıyorsa, tırmanış ayakkabısı dayanıklıdır.  
*Berrak: If Ceren knows a lot about sports equipment, her climbing shoes are*



*durable.*

Tuğba: Ceren spor ekipmanından iyi anlamıyor.

*Tuğba: Ceren does not know about sports equipment.*

Ceren'in tırmanış ayakkabısına sahip olma olasılığı nedir?

*What is the probability of Ceren owning climbing shoes?*

2. Berrak: Lale maceraperest biriyse, sörf tahtası sağlamdır.

*Berrak: If Lale is adventurous, her surfboard is sturdy.*

Tuğba: Lale maceraperest biri değil.

*Tuğba: Lale is not adventurous.*

Lale'nin sörf tahtasına sahip olma olasılığı nedir?

*What is the probability of Lale owning a surfboard?*

3. Berrak: Damla gurme lezzetleri seviyorsa, gıda termometresi hassastır.

*Berrak: If Damla enjoys gourmet food, her food thermometer is precise.*

Tuğba: Damla gurme lezzetleri sevmiyor.

*Tuğba: Damla does not enjoy gourmet food.*

Damla'nın gıda termometresine sahip olma olasılığı nedir?

*What is the probability of Damla owning a food thermometer?*

4. Berrak: Hasan takım sporları yapmayı seviyorsa, beyzbol sopası yıpranmıştır.

*Berrak: If Hasan likes playing team sports, his baseball bat is scuffed.*

Tuğba: Hasan takım sporları yapmayı sevmiyor.

*Tuğba: Hasan does not like playing team sports.*

Hasan'ın beyzbol sopasına sahip olma olasılığı nedir?

*What is the probability of Hasan owning a baseball bat?*

5. Berrak: Burak'ın bahçesi büyükse, tırpanı motorludur.

*Berrak: If Burak's garden is big, his scythe is mechanical.*

Tuğba: Burak'ın bahçesi büyük değil.

*Tuğba: Burak's garden is not big.*

Burak'ın tırpana sahip olma olasılığı nedir?

*What is the probability of Burak owning a scythe?*

6. Berrak: Ceyda tedbirliyse, saç inceltme makası kullanıma hazırdır.

*Berrak: If Ceyda is prepared, her hair thinning scissors are ready for use.*

Tuğba: Ceyda tedbirliyse değil.

*Tuğba: Ceyda is not prepared.*

Ceyda'nın saç inceltme makasına sahip olma olasılığı nedir?

*What is the probability of Ceyda owning hair thinning scissors?*

7. Berrak: Haluk zenginse, kemanı pahalıdır.

*Berrak: If Haluk is rich, his violin is expensive.*

Tuğba: Haluk zengin değil.

*Tuğba: Haluk is not rich.*

Haluk'un kemana sahip olma olasılığı nedir?

*What is the probability of Haluk owning a violin?*

8. Berrak: Buğra titizse, piyanosu bakımlıdır.

*Berrak: If Buğra is neat, his piano is well-maintained.*

Tuğba: Buğra titiz değil.

*Tuğba: Buğra is not neat.*

Buğra'nın piyanoya sahip olma olasılığı nedir?

*What is the probability of Buğra owning a piano?*

9. Berrak: Merve'nin varlıklı bir ailesi varsa, saksofonu kalitelidir.

*Berrak: If Merve has a wealthy family, her saxophone is of high quality.*

Tuğba: Merve'nin varlıklı bir ailesi yok.

*Tuğba: Merve does not have a wealthy family.*

Merve'nin saksofona sahip olma olasılığı nedir?

*What is the probability of Merve owning a saxophone?*

10. Berrak: Serhat'ın elleri doluysa, kafa lambası baretine bağlıdır.

*Berrak: If Serhat's hands are full, his headlamp is attached to his hardhat.*

Tuğba: Serhat'ın elleri dolu değil.

*Tuğba: Serhat's hands are not full.*

Serhat'ın kafa lambasına sahip olma olasılığı nedir?

*What is the probability of Serhat owning a headlamp?*

### B.1.3 Group 3

The antecedent is unrelated. The antecedent is denied and the presupposition is asked.

1. Berrak: Ceren matematiği seviyorsa, tırmanış ayakkabısı dayanıklıdır.

*Berrak: If Ceren likes maths, her climbing shoes are durable.*

Tuğba: Ceren matematiği sevmiyor.

*Tuğba: Ceren does not like maths.*

Ceren'in tırmanış ayakkabısına sahip olma olasılığı nedir?

*What is the probability of Ceren owning climbing shoes?*

2. Berrak: Lale sade kahveyi seviyorsa, sörf tahtası sağlamdır.

*Berrak: If Lale likes plain coffee, her surfboard is sturdy.*

Tuğba: Lale sade kahveyi sevmiyor.

*Tuğba: Lale does not like plain coffee.*

Lale'nin sörf tahtasına sahip olma olasılığı nedir?

*What is the probability of Lale owning a surfboard?*

3. Berrak: Damla uzun saçlıysa, gıda termometresi hassastır.

*Berrak: If Damla has long hair, her food thermometer is precise.*

Tuğba: Damla uzun saçlı değil.

*Tuğba: Damla does not have long hair.*

Damla'nın gıda termometresine sahip olma olasılığı nedir?

*What is the probability of Damla owning a food thermometer?*

4. Berrak: Hasan makarna seviyorsa, beyzbol sopası yıpranmıştır.

*Berrak: If Hasan likes pasta, his baseball bat is scuffed.*

Tuğba: Hasan makarna sevmiyor.

*Tuğba: Hasan does not like pasta.*

Hasan'ın beyzbol sopasına sahip olma olasılığı nedir?

*What is the probability of Hasan owning a baseball bat?*

5. Berrak: Burak mor rengini seviyorsa, tırpanı motorludur.

*Berrak: If Burak likes the color purple, his scythe is mechanical.*

Tuğba: Burak mor rengini sevmiyor.

*Tuğba: Burak does not like the color purple.*

Burak'ın tırpana sahip olma olasılığı nedir?

*What is the probability of Burak owning a scythe?*

6. Berrak: Ceyda yeşil çay seviyorsa, saç inceltme makası kullanıma hazırdır.

*Berrak: If Ceyda likes green tea, her hair thinning scissors are ready for use.*

Tuğba: Ceyda yeşil çay sevmiyor.

*Tuğba: Ceyda does not like green tea.*

Ceyda'nın saç inceltme makasına sahip olma olasılığı nedir?

*What is the probability of Ceyda owning hair thinning scissors?*

7. Berrak: Haluk esmerse, kemanı pahalıdır.

*Berrak: If Haluk is a brunette, his violin is expensive.*

Tuğba: Haluk esmer değil.

*Tuğba: Haluk is not a brunette.*

Haluk'un kemana sahip olma olasılığı nedir?

*What is the probability of Haluk owning a violin?*

8. Berrak: Buğra dondurma seviyorsa, piyanosu bakımlıdır.

*Berrak: If Buğra likes ice cream, his piano is well-maintained.*

Tuğba: Buğra dondurma sevmiyor.

*Tuğba: Buğra does not like ice cream.*

Buğra'nın piyanoya sahip olma olasılığı nedir?

*What is the probability of Buğra owning a piano?*

9. Berrak: Merve yüzmeyi seviyorsa, saksofonu kaliteli dir.

*Berrak: If Merve likes swimming, her saxophone is of high quality.*

Tuğba: Merve yüzmeyi sevmiyor.

*Tuğba: Merve does not like swimming.*

Merve'nin saksofona sahip olma olasılığı nedir?

*What is the probability of Merve owning a saxophone?*

10. Berrak: Serhat tek çocuksa, kafa lambası baretine bağlıdır.

*Berrak: If Serhat is an only child, his headlamp is attached to his hardhat.*

Tuğba: Serhat tek çocuk değil.

*Tuğba: Serhat is not an only child.*

Serhat'ın kafa lambasına sahip olma olasılığı nedir?

*What is the probability of Serhat owning a headlamp?*

#### B.1.4 Group 4

The antecedent is entailing. The presupposition is denied and the antecedent is asked.

1. Berrak: Ceren kaya tırmanışçısıysa, tırmanış ayakkabısı dayanıklıdır.  
*Berrak: If Ceren is a rock climber, her climbing shoes are durable.*  
Tuğba: Ceren'in tırmanış ayakkabısı yok.  
*Tuğba: Ceren does not own climbing shoes.*  
Ceren'in kaya tırmanışçısı olma olasılığı nedir?  
*What is the probability of Ceren being a rock climber?*
2. Berrak: Lale sörfçüyse, sörf tahtası sağlamdır.  
*Berrak: If Lale is a surfer, her surfboard is sturdy.*  
Tuğba: Lale'nin sörf tahtası yok.  
*Tuğba: Lale does not own a surfboard.*  
Lale'nin sörfçü olma olasılığı nedir?  
*What is the probability of Lale being a surfer?*
3. Berrak: Damla şefse, gıda termometresi hassastır.  
*Berrak: If Damla is a chef, her food thermometer is precise.*  
Tuğba: Damla'nın gıda termometresi yok.  
*Tuğba: Damla does not own a food thermometer.*  
Damla'nın şef olma olasılığı nedir?  
*What is the probability of Damla being a chef?*
4. Berrak: Hasan beyzbol oyuncusuysa, beyzbol sopası yıpranmıştır.  
*Berrak: If Hasan is a baseball player, his baseball bat is scuffed.*  
Tuğba: Hasan'ın beyzbol sopası yok.  
*Tuğba: Hasan does not own a baseball bat.*  
Hasan'ın beyzbol oyuncusu olma olasılığı nedir?  
*What is the probability of Hasan being a baseball player?*
5. Berrak: Burak çiftçiyse, tırpanı motorludur.  
*Berrak: If Burak is a farmer, his scythe is mechanical.*  
Tuğba: Burak'ın tırpanı yok.  
*Tuğba: Burak does not own a scythe.*  
Burak'ın çiftçi olma olasılığı nedir?  
*What is the probability of Burak being a farmer?*
6. Berrak: Ceyda kuaförse, saç inceltme makası kullanıma hazırdır.  
*Berrak: If Ceyda is a hairdresser, her hair thinning scissors are ready for use.*  
Tuğba: Ceyda'nın saç inceltme makası yok.  
*Tuğba: Ceyda does not own hair thinning scissors.*  
Ceyda'nın kuaför olma olasılığı nedir?  
*What is the probability of Ceyda being a hairdresser?*
7. Berrak: Haluk kemancıysa, kemanı pahalıdır.  
*Berrak: If Haluk is a violinist, his violin is expensive.*

Tuğba: Haluk'un kemanı yok.  
*Tuğba: Haluk does not own a violin.*  
Haluk'un kemancı olma olasılığı nedir?  
*What is the probability of Haluk being a violinist?*

8. Berrak: Buğra piyanistse, piyanosu bakımlıdır.  
*Berrak: If Buğra is a pianist, his piano is well-maintained.*  
Tuğba: Buğra'nın piyanosu yok.  
*Tuğba: Buğra does not own a piano.*  
Buğra'nın piyanist olma olasılığı nedir?  
*What is the probability of Buğra being a pianist?*

9. Berrak: Merve saksofoncuysa, saksofonu kalitelidir.  
*Berrak: If Merve is a saxophonist, her saxophone is of high quality.*  
Tuğba: Merve'nin saksofonu yok.  
*Tuğba: Merve does not own a saxophone.*  
Merve'nin saksofoncu olma olasılığı nedir?  
*What is the probability of Merve being a saxophonist?*

10. Berrak: Serhat madenciye, kafa lambası baretine bağlıdır.  
*Berrak: If Serhat is a miner, his headlamp is attached to his hardhat.*  
Tuğba: Serhat'ın kafa lambası yok.  
*Tuğba: Serhat does not own a headlamp.*  
Serhat'ın madenci olma olasılığı nedir?  
*What is the probability of Serhat being a miner?*

### **B.1.5 Group 5**

The antecedent is related. The presupposition is denied and the antecedent is asked.

1. Berrak: Ceren spor ekipmanından iyi anlıyorsa, tırmanış ayakkabısı dayanıklıdır.  
*Berrak: If Ceren knows a lot about sports equipment, her climbing shoes are durable.*  
Tuğba: Ceren'in tırmanış ayakkabısı yok.  
*Tuğba: Ceren does not own climbing shoes.*  
Ceren'in spor ekipmanından iyi anlama olasılığı nedir?  
*What is the probability of Ceren knowing a lot about sports equipment?*
2. Berrak: Lale maceraperest biriye, sörf tahtası sağlamdır.  
*Berrak: If Lale is adventurous, her surfboard is sturdy.*  
Tuğba: Lale'nin sörf tahtası yok.  
*Tuğba: Lale does not own a surfboard.*  
Lale'nin maceraperest biri olma olasılığı nedir?  
*What is the probability of Lale being adventurous?*

3. Berrak: Damla gurme lezzetleri seviyorsa, gıda termometresi hassastır.  
*Berrak: If Damla likes gourmet food, her food thermometer is precise.*  
Tuğba: Damla'nın gıda termometresi yok.  
*Tuğba: Damla does not own a food thermometer.*  
Damla'nın gurme lezzetleri sevmeye olasılığı nedir?  
*What is the probability of Damla enjoying gourmet food?*
4. Berrak: Hasan takım sporları yapmayı seviyorsa, beyzbol sopası yıpranmıştır.  
*Berrak: If Hasan likes playing team sports, his baseball bat is scuffed.*  
Tuğba: Hasan'ın beyzbol sopası yok.  
*Tuğba: Hasan does not own a baseball bat.*  
Hasan'ın takım sporları yapmayı sevmeye olasılığı nedir?  
*What is the probability of Hasan liking playing team sports?*
5. Berrak: Burak'ın bahçesi büyükse, tırpanı motorludur.  
*Berrak: If Burak's garden is big, his scythe is mechanical.*  
Tuğba: Burak'ın tırpanı yok.  
*Tuğba: Burak does not own a scythe.*  
Burak'ın bahçesinin büyük olma olasılığı nedir?  
*What is the probability of Burak's garden being big?*
6. Berrak: Ceyda tedbirliyse, saç inceltme makası kullanıma hazırdır.  
*Berrak: If Ceyda is prepared, her hair thinning scissors are ready for use.*  
Tuğba: Ceyda'nın saç inceltme makası yok.  
*Tuğba: Ceyda does not own hair thinning scissors.*  
Ceyda'nın tedbirli olma olasılığı nedir?  
*What is the probability of Ceyda being prepared?*
7. Berrak: Haluk zenginse, kemanı pahalıdır.  
*Berrak: If Haluk is rich, his violin is expensive.*  
Tuğba: Haluk'un kemanı yok.  
*Tuğba: Haluk does not own a violin.*  
Haluk'un zengin olma olasılığı nedir?  
*What is the probability of Haluk being rich?*
8. Berrak: Buğra titizse, piyanosu bakımlıdır.  
*Berrak: If Buğra is neat, his piano is well-maintained.*  
Tuğba: Buğra'nın piyanosu yok.  
*Tuğba: Buğra does not own a piano.*  
Buğra'nın titiz olma olasılığı nedir?  
*What is the probability of Buğra being neat?*
9. Berrak: Merve'nin varlıklı bir ailesi varsa, saksofonu kalitelidir.  
*Berrak: If Merve has a wealthy family, her saxophone is of high quality.*  
Tuğba: Merve'nin saksofonu yok.  
*Tuğba: Merve does not own a saxophone.*  
Merve'nin varlıklı bir ailesi olması olasılığı nedir?  
*What is the probability of Merve having a wealthy family?*

10. Berrak: Serhat'ın elleri doluyorsa, kafa lambası baretime bağlıdır.  
*Berrak: If Serhat's hands are full, his headlamp is attached to his hardhat.*  
Tuğba: Serhat'ın kafa lambası yok.  
*Tuğba: Serhat does not own a headlamp.*  
Serhat'ın ellerinin dolu olma olasılığı nedir?  
*What is the probability of Serhat's hands being full?*

### B.1.6 Group 6

The antecedent is unrelated. The presupposition is denied and the antecedent is asked.

1. Berrak: Ceren matematiği seviyorsa, tırmanış ayakkabısı dayanıklıdır.  
*Berrak: If Ceren likes maths, her climbing shoes are durable.*  
Tuğba: Ceren'in tırmanış ayakkabısı yok.  
*Tuğba: Ceren does not own climbing shoes.*  
Ceren'in matematiği sevmeye olasılığı nedir?  
*What is the probability of Ceren liking maths?*
2. Berrak: Lale sade kahveyi seviyorsa, sörf tahtası sağlamdır.  
*Berrak: If Lale likes plain coffee, her surfboard is sturdy.*  
Tuğba: Lale'nin sörf tahtası yok.  
*Tuğba: Lale does not own a surfboard.*  
Lale'nin sade kahveyi sevmeye olasılığı nedir?  
*What is the probability of Lale liking plain coffee?*
3. Berrak: Damla uzun saçlıysa, gıda termometresi hassastır.  
*Berrak: If Damla has long hair, her food thermometer is precise.*  
Tuğba: Damla'nın gıda termometresi yok.  
*Tuğba: Damla does not own a food thermometer.*  
Damla'nın uzun saçlı olma olasılığı nedir?  
*What is the probability of Damla having long hair?*
4. Berrak: Hasan makarna seviyorsa, beyzbol sopası yıpranmıştır.  
*Berrak: If Hasan likes pasta, his baseball bat is scuffed.*  
Tuğba: Hasan'ın beyzbol sopası yok.  
*Tuğba: Hasan does not own a baseball bat.*  
Hasan'ın makarna sevmeye olasılığı nedir?  
*What is the probability of Hasan liking pasta?*
5. Berrak: Burak mor rengini seviyorsa, tırpanı motorludur.  
*Berrak: If Burak likes the color purple, his scythe is mechanical.*  
Tuğba: Burak'ın tırpanı yok.  
*Tuğba: Burak does not own a scythe.*  
Burak'ın mor rengini sevmeye olasılığı nedir?  
*What is the probability of Burak liking the color purple?*

6. Berrak: Ceyda yeşil çay seviyorsa, saç inceltme makası kullanıma hazırdır.  
*Berrak: If Ceyda likes green tea, her hair thinning scissors are ready for use.*  
Tuğba: Ceyda'nın saç inceltme makası yok.  
*Tuğba: Ceyda does not own hair thinning scissors.*  
Ceyda'nın yeşil çay sevmeye olasılığı nedir?  
*What is the probability of Ceyda liking green tea?*
7. Berrak: Haluk esmerse, kemanı pahalıdır.  
*Berrak: If Haluk is a brunette, his violin is expensive.*  
Tuğba: Haluk'un kemanı yok.  
*Tuğba: Haluk does not own a violin.*  
Haluk'un esmer olma olasılığı nedir?  
*What is the probability of Haluk being a brunette?*
8. Berrak: Buğra dondurma seviyorsa, piyanosu bakımlıdır.  
*Berrak: If Buğra likes ice cream, his piano is well-maintained.*  
Tuğba: Buğra'nın piyanosu yok.  
*Tuğba: Buğra does not own a piano.*  
Buğra'nın dondurma sevmeye olasılığı nedir?  
*What is the probability of Buğra liking ice cream?*
9. Berrak: Merve yüzmeyi seviyorsa, saksofonu kalitelidir.  
*Berrak: If Merve likes swimming, her saxophone is of high quality.*  
Tuğba: Merve'nin saksofonu yok.  
*Tuğba: Merve does not own a saxophone.*  
Merve'nin yüzmeyi sevmeye olasılığı nedir?  
*What is the probability of Merve liking swimming?*
10. Berrak: Serhat tek çocuksa, kafa lambası baretine bağlıdır.  
*Berrak: If Serhat is an only child, his headlamp is attached to his hardhat.*  
Tuğba: Serhat'ın kafa lambası yok.  
*Tuğba: Serhat does not own a headlamp.*  
Serhat'ın tek çocuk olma olasılığı nedir?  
*What is the probability of Serhat being an only child?*

### **B.1.7 Control Items - List 1**

1. Berrak: Ayşe kedisini veterinerine götürdüyse, işten izin almıştır.  
*Berrak: If Ayşe took her cat to the vet, she must have taken a day off from work.*  
Tuğba: Ayşe işten izin almadı.  
*Tuğba: Ayşe did not take a day off from work.*  
Ayşe'nin kedi sahibi olma olasılığı nedir?  
*What is the probability of Ayşe being a cat owner?*
2. Berrak: Nehir arabasını temizlediysen, tatile çıkmaya hazırdır.  
*Berrak: If Nehir cleaned her car, she is ready to take a vacation.*  
Tuğba: Nehir arabasını temizlemedi.  
*Tuğba: Nehir did not clean her car.*



Nehir'in arabaya sahip olma olasılığı nedir?  
*What is the probability of Nehir owning a car?*

3. Berrak: Cemal şemsiyesini aldıysa, yağmurdan korunuyordur.  
*Berrak: If Cemal took his umbrella with him, he is protected from the rain.*  
Tuğba: Cemal yağmurdan korunmuyor.  
*Tuğba: Cemal is not protected from the rain.*  
Cemal'in şemsiyeye sahip olma olasılığı nedir?  
*What is the probability of Cemal owning an umbrella?*
4. Berrak: Ali fenerini yanına aldıysa, gece kampta rahat etmiştir.  
*Berrak: If Ali took his flashlight with him, he must have been comfortable at the campsite at night.*  
Tuğba: Ali gece kampta rahat etmiş.  
*Tuğba: Ali was comfortable at the campsite at night.*  
Ali'nin fenere sahip olma olasılığı nedir?  
*What is the probability of Ali owning a flashlight?*
5. Berrak: Leyla köpeğini yürüyüşe çıkardıysa, ofiste çalışıyordur.  
*Berrak: If Leyla took her dog for a walk, she must be working in the office.*  
Tuğba: Leyla ofiste çalışmıyor.  
*Tuğba: Leyla is not working in the office.*  
Leyla'nın köpek sahibi olma olasılığı nedir?  
*What is the probability of Leyla being a dog owner?*
6. Berrak: Enver gitarını yanında getirdiyse, piyanoya eşlik edecektir.  
*Berrak: If Enver took his guitar with him, he will play along with the piano.*  
Tuğba: Enver piyanoya eşlik edecek.  
*Tuğba: Enver will play along with the piano.*  
Enver'in gitara sahip olma olasılığı nedir?  
*What is the probability of Enver owning a guitar?*
7. Berrak: Doruk koşumunu taktıysa, birazdan kaya tırmanışı yapacaktır.  
*Berrak: If Doruk put on his harness, he will rock climb very soon.*  
Tuğba: Doruk birazdan kaya tırmanışı yapacak.  
*Tuğba: Doruk will rock climb very soon.*  
Doruk'un koşuma sahip olma olasılığı nedir?  
*What is the probability of Doruk owning a harness?*
8. Berrak: İlke şnorkelini yenilediyse, su altında birçok detayı fark etmiştir.  
*Berrak: If İlke renewed her snorkel, she must have noticed a lot of details underwater.*  
Tuğba: İlke su altında birçok detayı fark etmiş.  
*Tuğba: İlke noticed a lot of details underwater.*  
İlke'nin şnorkele sahip olma olasılığı nedir?  
*What is the probability of İlke owning a snorkel?*
9. Berrak: Sevim gözlüğünü unuttuysa, tahtayı görmekte zorlanıyordur.  
*Berrak: If Sevim forgot his glasses, he must be having trouble seeing the blackboard.*

Tuğba: Sevim tahtayı görmekte zorlanmıyor.  
*Tuğba: Sevim is not having trouble seeing the blackboard.*  
Sevim'in gözlüğe sahip olma olasılığı nedir?  
*What is the probability of Sevim owning glasses?*

10. Berrak: Gaye makasını bilediyse, kuru gülleri budayacaktır.  
*Berrak: If Gaye has sharpened her scissors, she will prune the roses.*  
Tuğba: Gaye kuru gülleri budayacak.  
*Tuğba: Gaye will prune the roses.*  
Gaye'nin makasa sahip olma olasılığı nedir?  
*What is the probability of Gaye owning scissors?*

### B.1.8 Control Items - List 2

1. Berrak: Ayşe kedisini veterinerine götürdüyse, işten izin almıştır.  
*Berrak: If Ayşe took her cat to the vet, she must have taken a day off from work.*  
Tuğba: Ayşe işten izin aldı.  
*Tuğba: Ayşe took a day off from work.*  
Ayşe'nin kedi sahibi olma olasılığı nedir?  
*What is the probability of Ayşe being a cat owner?*
2. Berrak: Nehir arabasını temizlediyse, tatile çıkmaya hazırdır.  
*Berrak: If Nehir cleaned her car, she is ready to take a vacation.*  
Tuğba: Nehir arabasını temizledi.  
*Tuğba: Nehir cleaned her car.*  
Nehir'in arabaya sahip olma olasılığı nedir?  
*What is the probability of Nehir owning a car?*
3. Berrak: Cemal şemsiyesini aldıysa, yağmurdan korunuyordur.  
*Berrak: If Cemal took his umbrella with him, he is protected from the rain.*  
Tuğba: Cemal yağmurdan korunuyor.  
*Tuğba: Cemal is protected from the rain.*  
Cemal'in şemsiyeye sahip olma olasılığı nedir?  
*What is the probability of Cemal owning an umbrella?*
4. Berrak: Ali fenerini yanına aldıysa, gece kampta rahat etmiştir.  
*Berrak: If Ali took his flashlight with him, he must have been comfortable at the campsite at night.*  
Tuğba: Ali gece kampta rahat etmemiş.  
*Tuğba: Ali was not comfortable at the campsite at night.*  
Ali'nin fenere sahip olma olasılığı nedir?  
*What is the probability of Ali owning a flashlight?*
5. Berrak: Leyla köpeğini yürüyüşe çıkardıysa, ofiste çalışıyordu.  
*Berrak: If Leyla took her dog for a walk, she must be working in the office.*  
Tuğba: Leyla ofiste çalışıyor.  
*Tuğba: Leyla is working in the office.*

Leyla'nın köpek sahibi olma olasılığı nedir?  
*What is the probability of Leyla being a dog owner?*

6. Berrak: Enver gitarını yanında getirdiyse, piyanoya eşlik edecektir.  
*Berrak: If Enver took his guitar with him, he will play along with the piano.*  
Tuğba: Enver piyanoya eşlik etmeyecek.  
*Tuğba: Enver will not play along with the piano.*  
Enver'in gitara sahip olma olasılığı nedir?  
*What is the probability of Enver owning a guitar?*
7. Berrak: Doruk koşumunu taktıysa, birazdan kaya tırmanışı yapacaktır.  
*Berrak: If Doruk put on his harness, he will rock climb very soon.*  
Tuğba: Doruk birazdan kaya tırmanışı yapmayacak.  
*Tuğba: Doruk will not rock climb soon.*  
Doruk'un koşuma sahip olma olasılığı nedir?  
*What is th probability of Doruk owning a harness?*
8. Berrak: İlke şnorkelini yenilediyse, su altında birçok detayı fark etmiştir.  
*Berrak: If İlke renewed her snorkel, she must have noticed a lot of details underwater.*  
Tuğba: İlke su altında birçok detayı fark etmemiş.  
*Tuğba: İlke did not notice a lot of details underwater.*  
İlke'nin şnorkele sahip olma olasılığı nedir?  
*What is the probability of İlke owning a snorkel?*
9. Berrak: Sevim gözlüğünü unuttuysa, tahtayı görmekte zorlanıyordur.  
*Berrak: If Sevim forgot his glasses, he must be having trouble seeing the blackboard.*  
Tuğba: Sevim tahtayı görmekte zorlanıyor.  
*Tuğba: Sevim is having trouble seeing the blackboard.*  
Sevim'in gözlüğe sahip olma olasılığı nedir?  
*What is the probability of Sevim owning glasses?*
10. Berrak: Gaye makasını bilediyse, kuru gülleri budayacaktır.  
*Berrak: If Gaye has sharpened her scissors, she will prune the roses.*  
Tuğba: Gaye kuru gülleri budamayacak.  
*Tuğba: Gaye will not prune the roses.*  
Gaye'nin makasa sahip olma olasılığı nedir?  
*What is the probability of Gaye owning scissors?*

### **B.1.9 Filler Items**

1. Berrak: Birgül sabahki dersi kaçırdıysa, gece geç yatmıştır.  
*Berrak: If Birgül missed the morning lecture, she must have gone to bed late at night.*  
Tuğba: Birgül gece geç yatmamış.  
*Tuğba: Birgül did not go to bed late at night.*

- Birgöl'ün sabahki dersi kaçırmış olma olasılığı nedir?  
*What is the probability of Birgöl having missed the morning lecture?*
2. Berrak: Yılmaz doktorsa, kalp masajı yapmayı biliyordur.  
*Berrak: If Yılmaz is a doctor, he knows how to give someone CPR.*  
Tuğba: Yılmaz kalp masajı yapmayı bilmiyor.  
*Tuğba: Yılmaz does not know how to give someone CPR.*  
Yılmaz'ın doktor olma olasılığı nedir?  
*What is the probability of Yılmaz being a doctor?*
3. Berrak: Altan havuzlu bir evde yaşıyorsa, aylık geliri iyidir.  
*Berrak: If Altan is living in a house with a pool, his monthly income must be good.*  
Tuğba: Altan'ın aylık geliri iyi.  
*Tuğba: Altan's monthly income is good.*  
Altan'ın havuzlu bir evde yaşıyor olma olasılığı nedir?  
*What is the probability of Altan living in a house with a pool?*
4. Berrak: Dilan sıcaktan bunaldıysa, soğuk bir limonata içmiştir.  
*Berrak: If Dilan was exhausted from the heat, she must drink a lemonade.*  
Tuğba: Dilan limonata içmedi.  
*Tuğba: Dilan did not drink a lemonade.*  
Dilan'ın sıcaktan bunalmış olma olasılığı nedir?  
*What is the probability of Dilan having been exhausted from the heat?*
5. Berrak: Soner kitap satın almayı seviyorsa, kitaplığı doludur.  
*Berrak: If Soner likes purchasing books, his bookcase must be full.*  
Tuğba: Soner'in kitaplığı dolu.  
*Tuğba: Soner's bookcase is full.*  
Soner'in kitap satın almayı sevme olasılığı nedir?  
*What is the probability of Soner liking purchasing books?*
6. Berrak: Kemal diyabet hastasıysa, tatlandırıcı kullanıyordur.  
*Berrak: If Kemal is diabetic, he uses sweetener.*  
Tuğba: Kemal diyabet hastası.  
*Tuğba: Kemal is diabetic.*  
Kemal'in tatlandırıcı kullanıyor olma olasılığı nedir?  
*What is the probability of Kemal using sweetener?*
7. Berrak: Başak migren ilacını içtiyse, ağrısı hafiflemiştir.  
*If Başak took a migraine medication, her pain must be wearing off.*  
Tuğba: Başak'ın ağrısı hafiflememiş.  
*Tuğba: Başak's pain is not wearing off.*  
Başak'ın migren ilacını içmiş olma olasılığı nedir?  
*What is the probability of Başak having taken a migraine medication?*
8. Berrak: Metin acılı lahmacun yediyse, acılı yemekleri seviyordur.  
*Berrak: If Metin ate spicy lahmacun, he likes spicy food.*  
Tuğba: Metin acılı yemekleri seviyor.  
*Tuğba: Metin likes spicy food.*

Metin'in acılı lahmacun yemiş olma olasılığı nedir?  
*what is the probability of Metin having eaten spicy lahmacun?*

9. Berrak: Halil gazete aldıysa, bulmaca ekindeki bulmacaları çözmüştür.  
*Berrak: If Halil bought a newspaper, he has solved the puzzles in the supplement.*

Tuğba: Halil gazete aldı.

*Tuğba: Halil bought a newspaper.*

Halil'in bulmaca ekindeki bulmacaları çözmüş olma olasılığı nedir?

*What is the probability of Halil having solved the puzzles in the supplements?*

10. Berrak: Azra ödevlerini bitirdiyse, televizyon izliyordur.  
*Berrak: If Azra finished her homework, she must be watching TV.*

Tuğba: Azra ödevlerini bitirdi.

*Tuğba: Azra finish her homework.*

Azra'nın televizyon izliyor olma olasılığı nedir?

*What is the probability of Azra watching TV?*

11. Berrak: Elif Bach dinlediysen, o günkü ruh hali iyidir.  
*Berrak: If Elif has listened to Bach, her mood is good that day.*

Tuğba: Elif bugün Bach dinledi.

*Tuğba: Elif listened to Bach today.*

Elif'in bugünkü ruh halinin iyi olma olasılığı nedir?

*What is the probability of Elif's mood being good today?*

12. Berrak: Egemen balık tutmaya gittiysen, evden erken çıkmıştır.  
*Berrak: If Egemen went fishing, he must left home early.*

Tuğba: Egemen balık tutmaya gitti.

*Tuğba: Egemen went fishing.*

Egemen'in evden erken çıkmış olma olasılığı nedir?

*What is the probability of Egemen having left home early?*

13. Berrak: Aylin yüzmeye gittiysen, o günkü kahvesini şekerli içer.  
*Berrak: If Aylin has gone swimming, she takes her coffee with sugar that day.*

Tuğba: Aylin bugünkü kahvesini şekerli içmedi.

*Tuğba: Aylin did not take her coffee with sugar today.*

Aylin'in bugün yüzmeye gitmiş olma olasılığı nedir?

*What is the probability of Aylin having gone swimming today?*

14. Berrak: Ahmet aşçıysa, yemekleri güzeldir.  
*Berrak: If Ahmet is a cook, his meals are good.*

Tuğba: Ahmet'in yemekleri güzel değil.

*Tuğba: Ahmet's meals are not good.*

Ahmet'in aşçı olma olasılığı nedir?

*What is the probability of Ahmet being a cook?*

15. Berrak: Gülten aşırı neşeliyse, o gün alışveriş yapmıştır.  
*Berrak: If Gülten is overly joyous, she has gone shopping that day.*

Tuğba: Gülten bugün alışveriş yaptı.

*Tuğba: Gülten went shopping today.*

Gülten'in bugün aşırı neşeli olma olasılığı nedir?  
*What is the probability of Gülten being overly joyous today?*

16. Berrak: Uğur çevirmense, en az iki dil biliyordur.  
*Berrak: If Uğur is a translator, he knows at least two languages.*  
Tuğba: Uğur çevirmen.  
*Tuğba: Uğur is a translator.*  
Uğur'un en az iki dil biliyor olma olasılığı nedir?  
*What is the probability of Uğur knowing at least two languages?*
17. Berrak: Funda Agatha Christie hayranıysa, bütün kitaplarını okumuştur.  
*Berrak: If Funda is an Agatha Christie fan, she must have read all of her books.*  
Tuğba: Funda Agatha Christie hayranı.  
*Tuğba: Funda is an Agatha Christie fan.*  
Funda'nın bütün Agatha Christie kitaplarını okumuş olma olasılığı nedir?  
*What is the probability of Funda having read all Agatha Christie books?*
18. Berrak: Kerim Beşiktaş fanatığıysa, final maçını izleyecektir.  
*Berrak: If Kerim is a Beşiktaş fanatic, he will watch the final game.*  
Tuğba: Kerim Beşiktaş fanatığı.  
*Kerim is a Beşiktaş fanatic.*  
Kerim'in final maçını izleyecek olma olasılığı nedir?  
*What is the probability of Kerim watching the final game?*
19. Berrak: Esra avukatsa, duruşmalarda müvekkillerini temsil eder.  
*Berrak: If Esra is an attorney at law, she represents her clients at hearings.*  
Tuğba: Esra avukat.  
*Tuğba: Esra is an attorney at law.*  
Esra'nın duruşmalarda müvekkillerini temsil etme olasılığı nedir?  
*What is the probability of Esra representing her clients at hearings?*
20. Berrak: Yavuz günlük işlerini bitirdiyse, akşam yemeğini kendisi hazırlar.  
*Berrak: If Yavuz has finished his daily work, he prepares his dinner himself.*  
Tuğba: Yavuz günlük işlerini bitirdi.  
*Tuğba: Yavuz has finished his daily work.*  
Yavuz'un akşam yemeğini kendisi hazırlama olasılığı nedir?  
*What is the probability of Yavuz preparing his dinner himself?*

### **B.1.10 Training Items**

The same three dialogues were used in all conditions.

1. Berrak: Ece sakinse, yemeğini yemiştir.  
*Berrak: If Ece is calm, she has eaten.*  
Tuğba: Ece sakin değil.  
*Tuğba: Ece is not calm.*

Ece'nin yemeğini yemiş olma olasılığı nedir?  
*What is the probability of Ece having eaten?*

2. Berrak: Özgür pop müziği seviyorsa, dün akşamki konsere gitmiştir.  
*Berrak: If Özgür likes pop music, he must have gone to the concert last night.*  
Tuğba: Özgür pop müziği seviyor.  
*Tuğba: Özgür likes pop music.*  
Özgür'ün dün akşamki konsere gitmiş olasılığı nedir?  
*What is the probability of Özgür having gone to the concert last night?*
3. Berrak: Sinem kareli pantolon giyiyorsa, moda uymaya çalışıyordur.  
*Berrak: If Sinem is wearing plaid pants, she is trying to follow fashion trends.*  
Tuğba: Sinem moda uymaya çalışıyor.  
*Tuğba: Sinem is trying to follow fashion trends.*  
Sinem'in kareli pantolon giyme olasılığı nedir?  
*What is the probability of Sinem wearing plaid pants?*

These dialogues differed depending on the condition.

1. Group 1:  
Berrak: Alp balıkçıysa, balık oltası kolay kırılmaz.  
*Berrak: If Alp is a fisherman, his fishing rod is not easily breakable.*  
Tuğba: Alp balıkçı değil.  
*Tuğba: Alp is not a fisherman.*  
Alp'in balık oltasına sahip olma olasılığı nedir?  
*What is the probability of Alp owning a fishing rod?*
2. Group 2:  
Berrak: Alp balık tutmada deneyimliyse, balık oltası kolay kırılmaz.  
*Berrak: If Alp is experienced in fishing, his fishing rod is not easily breakable.*  
Tuğba: Alp balık tutmada deneyimli değil.  
*Tuğba: Alp is not experienced in fishing.*  
Alp'in balık oltasına sahip olma olasılığı nedir?  
*What is the probability of Alp owning a fishing rod?*
3. Group 3:  
Berrak: Alp şiir okumayı seviyorsa, balık oltası kolay kırılmaz.  
*Berrak: If Alp likes reading poetry, his fishing rod is not easily breakable.*  
Tuğba: Alp şiir okumayı sevmiyor.  
*Tuğba: Alp does not like reading poetry.*  
Alp'in balık oltasına sahip olma olasılığı nedir?  
*What is the probability of Alp owning a fishing rod?*
4. Group 4:  
Berrak: Alp balıkçıysa, balık oltası kolay kırılmaz.  
*Berrak: If Alp is a fisherman, his fishing rod is not easily breakable.*  
Tuğba: Alp'in balık oltası yok.  
*Tuğba: Alp does not own a fishing rod.*

Alp'in balıkçı olma olasılığı nedir?

*What is the probability of Alp being a fisherman?*

5. Group 5:

Berrak: Alp balık tutmada deneyimliyse, balık oltası kolay kırılmaz.

*Berrak: If Alp is experienced in fishing, his fishing rod is not easily breakable.*

Tuğba: Alp'in balık oltası yok.

*Tuğba: Alp does not own a fishing rod.*

Alp'in balık tutmada deneyimli olma olasılığı nedir?

*What is the probability of Alp being experienced in fishing?*

6. Group 6:

Berrak: Alp şiir okumayı seviyorsa, balık oltası kolay kırılmaz.

*Berrak: If Alp likes reading poetry, his fishing rod is not easily breakable.*

Tuğba: Alp'in balık oltası yok.

*Tuğba: Alp does not own a fishing rod.*

Alp'in şiir okumayı sevme olasılığı nedir?

*What is the probability of Alp liking reading poetry?*



## APPENDIX C

### INSTRUMENTS AND ETHICAL CLEARANCE

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ  
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Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (IAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Dr. Öğretim Üyesi Duygu ÖZGE ve Dr. Öğretim Üyesi Umut ÖZGE

"Türkçe'de koşullu ifadelerin işlenmesi, gelişimi ve anlambilimsel modellenmesi" başlıklı araştırmanız İnsan Araştırmaları Etik Kurulu tarafından uygun görülerek gerekli onay 2018-EGT-102 protokol numarası ile 01.03.2018 - 31.03.2022 tarihleri arasında geçerli olmak üzere verilmiştir.

Bilgilerinize saygılarımla sunarım.

Prof. Dr. Ş. Halil TURAN

Başkan V

Prof. Dr. Ayhan SOL

Üye

Prof. Dr. Ayhan Gürbüz DEMİR

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