STUDENTS PERCEPTIONS' OF THEIR SCIENCE TEACHERS' INTERPERSONAL BEHAVIOUR IN TWO COUNTRIES: TURKEY AND THE NETHERLANDS

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SİBEL TELLİ

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Approval of the Graduate School of Natural and Applied Sciences.

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I certify that this thesis satisfies all the requirements as a thesis for the degree of Doctor of Philosophy.

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This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Doctor of Philosophy.

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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ABSTRACT

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This study was conducted to investigate Turkish secondary school students' perceptions of their science teachers' interpersonal behaviour; teacher profiles and variables affecting Turkish students' perceptions of their teachers' interpersonal behaviour. Also, differences in perceptions between Turkish students and their Dutch counterparts were examined. Finally, students' affective learning outcomes were related to their perceptions of their teachers' interpersonal behaviour.

Data were gathered from 7484 secondary school science students (grades 9-11) in 278 classes from 55 schools in thirteen cities of Turkey and collected with a specifically constructed and adapted Turkish version of QTI and translated version of TOSRA. This data set was compared to Dutch data set that contained 8503 students, located in 27 schools and 301 classes.

Descriptive statistics and multilevel analysis with three levels (student, class and teacher) were conducted. Students' perceptions on the QTI scales were aggregated to the class level and compared to an existing QTI-based typology of teaching styles.

Significant differences were found between countries in terms of students' perceptions of their teachers' interpersonal behaviours as well as different

distribution of teachers' profiles over countries and subject. Turkish teachers' interpersonal profiles only marginally differed from existing profiles. Additionally, several teacher, student and class characteristics showed statistically significant associations with students' perceptions of teacher Influence and Proximity. Finally, students' perceptions of their teachers' interpersonal behaviour were related to their affective learning outcomes, to several student, class, teacher background characteristics and to the subject taught.

Key Words: interpersonal behaviour, science education in secondary schools, student perceptions, multilevel analysis, attitudes

ÖZ

FEN ÖĞRETMENLERİNİN KİŞİLERARASI DAVRANIŞLARININ İKİ ÜLKEDE ÖĞRENCİLER TARAFINDAN ALGILANMASI: TÜRKİYE VE HOLLANDA

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Bu çalışmada dört temel amaç vardır. Birincisi, Türkiye'deki lise öğrencilerinin fen branşı (fizik, kimya ve biyoloji) öğretmenlerinin kişilerarası davranış algılarını tespit etmek ve bu öğrenci algılarına dayanarak öğretmen profillerini belirlemektir. İkinci olarak bu algıları etkileyen öğretmen, öğrenci ve sınıf özelliklerini incelemektir. Üçüncü olarak Türk ve Hollandalı öğrencilerin algıları karşılaştırılmıştır. Son olarak da öğrencilerin duyuşsal kazanımları ile öğrencilerin algıları arasındaki ilişkiye bakmaktır.

Veriler Öğretmen Etkileşim Ölçeğinin Türkçe versiyonu (QTI) ve Fen Algıları Ölçeğinin, TOSRA Türkçe versiyonu kullanılarak toplanmıştır. Çalışmanın örneklemini Türkiye'nin yedi bölgesinden on üç şehirden, 55 lisenin, 278 sınıfında öğrenim görmekte olan toplam 7484 dokuzuncu, onuncu ve on birinci sınıf öğrencisi oluşturmaktadır. Bu örneklem 27 okulda 301 sınıfta fen öğrenim gören 8503 öğrenciden oluşan Hollanda verisiyle ile karşılaştırılmıştır.

Verilerin analizi için betimleyici ve çok katmanlı analiz (multilevel analysis) kullanılmış ve öğrenci, sınıf ve öğretmen olmak üzere üç seviye belirlenmiştir. Öğrenci algıları kişilerarası ilişkiler boyutlarında toplanarak, sınıf düzeyinde her iki örneklemde analiz edilmiş ve mevcut öğretmen profilleri ile karşılaştırılmıştır.

Öğrencilerin öğretmenlerinin kişilerarası davranışlarını algılarında ve öğretmen profillerinin görülme sıklıklarında hem ülkeler ve hem de ders bazında (fizik, kimya ve biyoloji) anlamlı farklılıklar bulunmuştur. Bunların yanı sıra Türkiye'ye özgü bir öğretmen profili belirlenmiştir. Sınıf ve öğretmen özelliliklerine bağlı olarak algılamalarda farklılıklara rastlanmıştır Ayrıca, öğrencilerin öğretmenlerinin kişilerarası davranışlarını algıları ile duyuşsal kazanımları, sınıf, öğretmen, öğrencilerin özellikleri ve ders konusu ile ilişkili olduğu belirlenmiştir.

Anahtar Kelimeler: kişilerarası davranışlar, orta öğrenim fen eğitimi, öğrenci algıları, çok katmanlı analiz, tutum

To my parents,

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

SYMBOLS	
QTI	Questionnaire on Teacher Interaction
DC	Leadership Scale
CD	Helpful/Friendly Scale
CS	Understanding Scale
SC	Student Freedom Scale
SO	Uncertain Scale
OS	Dissatisfied Scale
OD	Admonishing Scale
DO=DD	Strictness Scale
MITB	The Model for Teacher Interpersonal Behaviour
TOSRA	Test of Science Related Attitudes
T-TOSRA	Turkish Adapted Version of the TOSRA
LER	Learning Environments Research
IPP	Interpersonal Perspective
ML	Multilevel Analysis
MBO	Middle management or specialist training certificate
VWO	Pre-university education
HAVO	Senior general secondary education
VMBO	Pre-vocational secondary education
PRO	Practical training
DV	Dependent Variables
IV	Independent Variables
SD	Standard Deviation
N	Sample Size
α	Significance Level
SOP=DPT	The Turkish Republic Prime Ministry State Planning Organization
SES	Socio Economic Status
METU	Middle East Technical University
IVLOS	Inter Faculty Institute for Teacher Education, Educational Development and Study Skills/ Institute of Education
TIMMS	Trends in International Mathematics and Science Study

EURYDICE	Information Network on Education in Europe
PISA	Program for International Student Assessment

CHAPTER I

INTRODUCTION

Without hesitation the school days remain fresh memories throughout our lives. Obviously, for most people, teacher-student interactions played an important role. Interpersonal relationships are conditional to teaching ones subject and it is also the base for many events, whether positive or negative, that were characterised by discipline problems. The teacher-student relationship is an important factor in teaching and it has strong effects on student learning, attitudes towards the subject taught and students' profession preferences later on (e.g. Wubbels, Brekelmans, den Brok, & van Tartwijk, 2006). Moreover, it directly relates to order in the classroom, which is among the most common problem areas in education, both for beginning and experienced teachers (Veenman, 1984). So, one of the key requirements of education is to set up healthy communication within the classroom.

Teaching-learning process is at the base of communication and social activity. Generally, the number of students in the science subjects and professions is considerably high compared to other subjects and professions in Turkey. Students' job preferences as well as the idea that science education is a good pathway for obtaining a good job and position are beneficial for these preferences. That is why students that do not have much science interest might still attend science classes. Besides this, students might have stereotypes towards to subject and can carry these to the course or daily topic. Science teachers notice it takes time to cope with such prejudgements about their subject matter area in order to grasp students' attention and interest. For example, observing embryonic development in a fertilized chicken egg in the biology laboratory can be considered as 'a murder attack' by some students which might lead to extra difficulties with learning the topic. Another example: a student having difficulties with optics can have a totally different idea about creating an artificial rainbow and these beliefs can change the atmosphere within the classroom. So, the importance of healthy teacher-student interpersonal relationships is obvious from the student point of view. That is why science education, apart from special methods of teaching like laboratory

hours and field trips, also requires good communication skills from teachers within the classroom.

The topic of teacher-student interpersonal behaviour has been a popular research topic in most Western countries, but recently, some important classroom environment and teacher-student interpersonal studies have been carried out in non-Western countries (Fraser, 1998a; 2002). However, little research within this domain has been done in Turkey, especially within the context of science (physics, chemistry and biology) education at the secondary school level.

According to the results of the second cycle (2000-2003) of the PISA (Program for International Student Assessment) project, the achievement of *Turkish* students in both science and mathematics is not satisfying. Turkey received a score below the international average in both subjects. From this perspective, there is a clear need for further and deeper insight into the factors that may cause low achievement and to find ways to increase both attitudes towards science and mathematics. In a similar vein, science classroom learning environments in Turkish secondary schools have not been analysed much in terms of students' views or in terms of issues that are not directly related to subject matter. It is hoped that with the contribution of this work, new data from a classroom environment research perspective will be provided in science education.

As for the current study, it was conducted to investigate Turkish secondary school students' perceptions of their science teachers' interpersonal behaviour, teacher profiles resulting from (the measurement of) their interpersonal behaviour patterns and variables affecting differences between Turkish students' perceptions of their science teachers' interpersonal behaviour. Also, differences in perceptions between Turkish students in Turkey and their Dutch counterparts in the Netherlands were examined. Finally, students' affective learning outcomes were related to their perceptions of their teachers' interpersonal behaviour.

Data were gathered from 7484 secondary school science (physics, chemistry and biology) students (grades 9 to 11) in 278 classes, taught by 133 teachers from 55 schools in thirteen cities of Turkey. Data were collected with a specifically constructed and adapted Turkish version of the *Questionnaire on Teacher Interaction* (QTI) (Telli, den Brok, & Cakiroglu, 2005) and a translated version of the Test of Science Related Attitudes (TOSRA) (Telli, Rakici, & Cakiroglu, 2003). Additionally, background questions were asked to both

teachers and students. Data were enriched and validated with interviews conducted with teachers and students through the study. At the end of the study, reports of personal outcomes were given to the teachers. A total number of eight teachers from the teacher group were asked for their reflection on these reports with a structured interview. Nine classes of seven teachers were videotaped and teachers received a copy of their videotaped lesson. This study thus provides a timely and unique combination of qualitative and quantitative information. Qualitative information was obtained not only through interviews with teachers and students on the development process of the new version of the questionnaire, but also through teacher interviews held with a group of teachers after their report was given to them and lessons of these teachers were recorded. These varieties of data were thus used for different purposes. All statistical analyses were carried out on student data (both at the individual and class level), teacher data was only used for feedback and motivation purposes. The student data set was compared to a Dutch data set that contained 8503 (mathematics, physics, chemistry and biology) students (grades 8 to 11), located in 27 schools and 301 classes taught by 162 teachers. Data in both countries were collected in the 2004-2005 academic year.

This first chapter starts off by explaining the purpose and design of the study (1.1) and will be followed by the rationale (1.2) of the study. Main and sub-research questions will be provided in section 1.3. Next, the definition of important terms which need to be clarified will be presented (1.4). The significance of the study (1.5) will be followed by a brief look into the Turkish and the Dutch educational systems with the main focus on secondary education (1.6). This chapter will end with a section summarising the ethical concerns (1.7) of the study, an overview of the dissertation (1.8) and the chapter summary (1.9).

1.1. Purpose and Design of the Study

This study starts from and focuses on the classroom learning environment, in particular the role of teachers in this environment. The classroom learning environments domain originates from two important conceptual and theoretical works, namely Kurt Lewins' "*Socio–Psyhological Climate"* (1936) and Murrays' "*Need and Press Model"* (1938). The meaning of the word "Environment" has been given different definitions, but can be reduced for the purpose of this study with Fraser's definition (1986) as (p.1): "*The shared perceptions of the students and sometimes the teachers in that*

environment." Two main aspects of the classroom learning environment are the *physical* and the *psychological* environment. The former covers the material setting of the classroom (facilities, spaces, lightning, ventilation, desks and chairs) and the latter is about perceptions and feelings about social relationships among students and teachers. Within this classroom learning environment, teachers are regarded as the major contributors and determiners of learning and teacher behaviours are a significantly important factor for student achievement and motivation (e.g. Fraser, 1998b). This dissertation contributes to the Learning Environments Research domain by focusing on the teacher role.

Lowyck (1994) and Fraser (1998c) summarized the central characteristic of classroom environment research as *the use of students' and teachers' perceptions*, usually based on empirical and measurable evidence by means of questionnaires. According to Fraser (1998c), classroom environment research is conducted for the reasons below:

- to establish associations between students outcomes and perceptions of the classroom environment;
- to investigate differences between teacher and students perceptions;
- to investigate if students perform better in their preferred classroom environment than in other environments; and,
- to.study the effects of students characteristics on classroom environments and of classroom environments on curriculum development.

This study contributes to the first, second and fourth reason by (a) investigating associations between students' perceptions of their teachers' interpersonal behaviour and their subject-related attitudes, by (b) investigating differences between student and teacher perceptions within Turkey and between Turkey and the Netherlands, and by (c) investigating associations between student, class and teacher characteristics and perceptions of teacher interpersonal behaviour.

1.2 Rationale

The reasons of conducting this study are briefly outlined in this section. First, in many learning environment studies a strong link between students' outcomes and their perceptions of the learning environment (e.g. den Brok, Brekelmans, & Wubbels, 2004; Moos, 1974; Wubbels, & Brekelmans, 1998) and student outcomes and their perceptions of learning environments have been

found (e.g. Fraser, & Butts, 1982; Fraser, & Fisher, 1982; 1983; Haladyne, Olsen, & Shaughnessy, 1982; Talton, & Simpson, 1987). Such associations have not been established at this point for the Turkish context. It would be interesting to see if and to what degree previously found important factors in other (Western) countries apply to the Turkish context. If this is the case, this may help in explaining some of the disappointing outcomes of the PISA studies and to improve secondary science education in a more general sense.

Secondly, over the last few decades, people from different parts of the world (from diverse cultures) have intensified their contact. For example, countries such as the Netherlands and Germany have many Turkish (immigrant) students in their classrooms and Turkish students travel to countries elsewhere in the world, either for holiday, studies or migration. These intercultural and cross-cultural contacts have also left their impression on education, where teachers find themselves faced with growing cultural diversity in the classroom. From this point of view, research on classroom learning environments should not be limited only to students in Turkey but also to Turkish students' in other education systems. Such a study might provide feedback to teachers, professional development trajectories and teacher education programs in Turkey as well as the countries with Turkish population and provide a base to compare these students' potential to those of the native students.

Thirdly, in their review of research on culture and its effect on students' perceptions of teacher interpersonal behaviour den Brok and Levy (2005a) suggested more research from a wider variety of cultures, since the existing work mainly focuses on typical Western countries such as the Netherlands, the United States or Australia. Turkey is a geographical, natural bridge between east and west and has the footprints of many civilizations, because it is located on the crossing point between two continents. The contribution of a study from Turkey might bring more varied outcomes that would enable researchers and practitioners to understand cultural background characteristics of students.

With these reasons in mind, it was decided to conduct a research that would focus on teacher interpersonal relationships in science classrooms in Turkey and that gathered data would be compared with a Dutch sample.

1.3 Research Questions

The main question covered in this dissertation is: "What *interpersonal behaviour styles are perceived by Turkish secondary science students (and by*

these teachers themselves) and what role do these perceptions play within the learning environment in Turkish and Dutch science classes?"**.**

1.3.1 Specific Research Questions

The research problem can be divided into the following, more specific research questions:

- What are Turkish students' perceptions of their science teachers' interpersonal behaviour?
  - What are teachers' perceptions of their own interpersonal behaviour?
  - What (interpersonal) profiles can be discerned in class perceptions of these Turkish science teachers?
- What are the student, class and teacher variables affecting differences in Turkish students' perceptions of their science teachers' interpersonal behaviour?
- What differences in perceptions of (science) teachers' interpersonal behaviour exist between Turkish students in Turkey and their Dutch counterparts in the Netherlands?
- What associations exist between students' perceptions of their science teachers' interpersonal behaviour and their affective learning outcomes?

1.3.2 Expectations

The Research questions obviously lead to some research hypotheses (or expectations) and their corresponding null hypotheses (suggesting the opposite of the expectations).

Research Hypotheses

- Different profiles of Turkish teachers' interpersonal behaviour will emerge. These profiles will only partially fit into existing profiles that have emerged from previous research (from the Netherlands and U.S.).
- Student (e.g. gender, achievement) and class/teacher (class size, experience, teacher gender, class makeup) variables will affect students' perceptions of their science teachers' interpersonal behaviour.

- There will be differences in perceptions of teacher interpersonal behaviour between Turkish students' in Turkey and Dutch students in the Netherlands.
- There will be an association between students' perceptions of their science teachers' interpersonal behaviour and their affective learning outcomes.

Null Hypotheses

- No different profiles will be found in Turkish students' perceptions of their science teachers' interpersonal behaviour. The profiles found will fit perfectly into the existing interpersonal profiles (as developed in the Netherlands and U.S.).
- Student and class/teacher background variables will not affect students' perceptions of their science teachers' interpersonal behaviour (in Turkey).
- There will be no differences in perception of (science) teacher interpersonal behaviour between Turkish students in Turkey and Dutch students in the Netherlands.
- There will be no association between students' perceptions of their science teachers' interpersonal behaviour and their affective learning outcomes.

1.4 Definitions of Important Terms

In this section a definition is given of some important concepts that are necessary to understand the study more efficiently.

Teacher interpersonal behaviour (Teacher communication style) - Teacher behaviour described and studied in terms of the relationship between a teacher and his/her students.

Students' (or teachers') perceptions - Students' (or teachers') views (e.g. interpretation and judgement) of the interpersonal behaviour displayed by the teacher.

Culture - The term culture is an omnipresent term with many definitions in the social sciences. For the present study it is used in a widely accepted form as 'an aggregate of belief, values, traditions, and shared knowledge by a group of individuals with a common language, history, social class and religion'

(Bennett, 1995; Hecht, Anderson, & Ribeau, 1989; Kachru, 1988; Nobles, 1985; Pinderhughes, 1989; Robinson, 1993).

High contact culture - Hall (1966) defined cultures in which people show considerable interpersonal closeness as 'high contact' or 'highly immediate' cultures. People from these cultures, when interacting verbally are sometimes described as speaking loudly and with high temper, giving quick responses to each other and speaking without specific turns or speaking in a manner that seems unplanned.

Low contact culture - Low contact cultures are in some degrees opposite from high-contact cultures. Interaction in this culture can be described as silent and with calm temper, less volume and usually conversing in a manner that seems more planned.

Communication - Every behaviour that someone displays in the presence of someone else. Behaviour is called communication only if the sender and receiver perceive the same meaning (Wubbels, et al., 2006).

Communicative behaviour - Behaviour to be communicative whenever the sender consciously and purposefully intends to influence someone else (Wubbels, et al., 2006).

1.5 Significance of the Study

Despite the vast and still expanding knowledge base, both in the domains of teacher-student interpersonal behaviour (e.g. Wubbels, & Brekelmans, 1998) as well as in the domain of Learning Environments Research (Fraser, 1994; 1998b; Fraser, & Walberg, 1991; McRobbie, Fisher, & Wong, 1998), there are still many limitations and issues that are open for further research.

According to Fraser (1998b) these issues (or limitations) within the domain of Learning Environments Research are:

- The main focus is on science and mathematics classes (also within the domain of Interpersonal Behaviour).
- There is either a lack of cross-cultural research (e.g. Fraser, 1998a) or the existing cross-cultural research is limited in terms of methodology and design (e.g. den Brok, & Levy, 2005a).
- There is a limited use of advanced statistical techniques, such as multilevel analyses, – which may compensate for some weaknesses in study design – and often a lack of integration of both qualitative and quantitative data.

- Many studies have difficulty to distinguish between individual (or personal) elements of perceptions and class (or group) elements of perceptions. This issue is linked to the previous limitation.
- There is a limited incorporation and implementation of research results into teacher education and (teacher) intervention programmes.

Apart from some of the above mentioned issues, there were several general and more incidental arguments for undertaking a study on teacher-student interpersonal behaviour in the Turkish context. Related with the above reasons, the significance of the study will be outlined under three subtitles: theoretical (1.5.1), practical (1.5.2) and methodological (1.5.3).

1.5.1 Theoretical Significance

A general argument that can be made is that teacher-student interpersonal behaviour is a crucial element in the teaching-learning process (in any country) and teacher-student interpersonal behaviour is a major component of classroom management (e.g. Doyle, 1986). Research has shown that students' perceptions of teacher-student interpersonal behaviour are strongly related to student achievement and motivation in all subject areas (den Brok, et al., 2004; Wubbels, & Brekelmans, 1998; Wubbels, et al., 2006) and that healthy teacher-student interpersonal relationships are a prerequisite for engaging students in learning activities (Brekelmans, Sleegers, & Fraser, 2000; Wubbels, & Levy, 1993a). Moreover, healthy interpersonal relationships between teachers and students are positively related with teachers' satisfaction with their profession and with prevention of burn-out (e.g. Ben-Chaim, & Zoller, 2001; Wubbels, & Levy, 1993a).

There has been done some research in Turkey that shows similar importance of the teacher-student interpersonal relationship for the Turkish context. Taşkafa (1989), for example, interviewed 43 middle school students and asked them to write down teacher's desirable and non desirable characteristics. Giving positive reinforcement, interacting friendly with students, and understanding students' feelings were the most frequently mentioned desirable characteristics. Ekinci (1999) studied the relationship between the academic achievement of students and their perceptions, expectations and expectation-perception differences related to classroom climate in history, literature and math courses in one high school in Kayseri, a province in Central Anatolia. Students located in four first, two second and two third grade classes participated in the study. Taken the course and grade into consideration, a

significant relationship was identified between the students' academic achievement and their perceptions, expectation and perception-expectation difference.

Doyran (2000) investigated the effects of perceived teacher verbal and nonverbal behaviours, learning styles, student gender and department with third grades language teacher education program students. In her study, 27 instructors and their 314 students took part and she found strong support for the importance of a favourable classroom climate on students' achievement and of the importance of teachers' roles and behaviours for this.

Korur (2001) conducted his study in three regions of Turkey and three cities of each region, including 2177 high school students from ninth to eleventh grade in physics and reported that teachers' characteristics perceived by the students had an effect on students' achievement, motivation and attitudes.

In this study, different from previous Turkish work, teacher behaviour perceived by students was mapped with the Questionnaire on Teacher Interaction (QTI), a unique instrument based on the Model for Teacher Interpersonal Behaviour (MITB) that was developed to describe students' perceptions of their teachers' interpersonal behaviour in their classroom. The model is an adaptation from a general model for interpersonal relationships designed by Leary (1957) and has been extensively used in clinical psychology and psychotherapeutic settings (Stract, 1996) and also has been accepted as a rather complete model to describe interpersonal relationships (Foa, 1961; Lonner, 1980).

Second, these previous Turkish studies mainly used teacher and student interviews or (expert) observation as their primary methods of investigation and collected data with relatively small samples. This study investigated students' perceptions of teacher interpersonal behaviour by means of a (widely used) questionnaire and focused uniquely on the teacher-student relationship in the classroom. Lastly, the development of a Turkish typology of science teacher interpersonal behaviour in secondary schools has been attempted before only with small samples or only in some regions (e.g. Telli, et al., 2005; Telli, den Brok, & Cakiroglu, 2006a) or as a comparison between different school types (Telli, Cakiroglu, & den Brok, 2006b).

The present study investigated to what extent earlier found typologies also apply to a sample of Turkish secondary school science teachers in a country wide sample size and will direct attention to science classroom environments in the country.

1.5.2 Practical Significance

When the culture of this geographic area is compared with previous research conducted with the Questionnaire on Teacher Interaction (QTI) (e.g. Brekelmans, den Brok, Wubbels, & van Tartwijk, 2005; Fraser, 2002), a clear difference can be seen. First of all, Turkey can be regarded as a '*high-contact*' or 'high-immediate' culture (Hofstede, 1991). Until now, the QTI has extensively been utilized in Northern Europe, the USA and some Asian countries, which can all be described as low-contact cultures (e.g. Andersen, 1997). All versions of the QTI, the 77-item Dutch version, the 64-item American version and the 48-item Australasian versions were developed for the context of low-contact cultures. Nonverbal behaviour and communication are important for interpersonal relationships in the classroom, and students' perceptions of this relationship may be affected by these cultural differences described.

From a more *practical* viewpoint, educational problems in Turkey are not much different from elsewhere in the world. In Turkey, like in other countries a strong focus exists on measurement and evaluation of cognitive outcomes of students, resulting in less attention to other outcomes of education. The focus of Turkish education is mostly on results of selection and placement exams for university and high school. Moreover, these outcomes are also regarded as important since they are accepted as the indicators of school effectiveness. A major concern of education is to prepare students for these exams, to find out reasons for low grades and to find ways for increasing students' achievement in test exams. However, despite this societal pressure, researchers should not uniquely focus on cognitive outcomes, since education can (and must) affect students also in other areas, many of which also have an indirect effect on cognitive outcomes (such as student attitudes). The importance of the learning environment and its effect on students' outcomes has not been considered much in previous studies in Turkey.

Within education programs, teachers and students are complaining about each other and are claiming their rights in (mutual) conflicts or expecting more thoughtful and respectful behaviour from their educational partners. Interpersonal relationships between a teacher and his/her students are at the heart of the classroom climate and classroom management (Wubbels, & Levy, 1993a). Moreover, positive relationships positively affect student learning, students' attitudes towards subjects and even towards their (profession) preferences at university. It was established in previous research that some

teacher behaviour styles are more favourable for promoting students outcomes than others (e.g. Brekelmans, Wubbels, & den Brok, 2002). There can be a considerable mismatch between a teacher's and his or her students' perceptions of teacher behaviour (e.g. den Brok, Bergen, & Stahl, 2002a; Wubbels, & Levy, 1993a). These differences in perceptions between students and teachers can provide an interesting vantage point for teacher education and professional development (den Brok, Levy, Rodriguez, & Wubbels, 2002c). While the focus of the study is not to take into account these differences, the outcomes can also contribute to establishing a frame for students' perspectives in general and results of this study can form a basis for improving and evaluating teaching strategies in science classrooms. Additionally, by collecting information on teacher and student perceptions of teacher interpersonal behaviour, by relating these perceptions to culture and other background variables, it is hoped that 'building blocks' can be gathered for activities in teacher education programs for teaching in classrooms.

Making a comparison between the Netherlands and Turkey might provide feedback on both the Turkish and Dutch educational systems and has an important practical value, since some of these students/teachers continue their education or their professional lives in the other country.

1.5.3 Methodological Significance

The study also adds to *methodological* issues in Learning Environments Research. Most of the studies creating new language (and cultural) versions of the QTI (or most other learning environments instruments) have started from one (e.g. the American or Australian) version of the QTI and used *translation and back-translation* by experts as their primary activities for instrument construction. The quality of these new versions has usually been checked by using Cronbach's alpha and by establishing the amount of variance at the teacher-class level. Sometimes, inter-scale correlations were described to demonstrate construct validity. Although these studies have brought new versions of the QTI with reliable scales (at the student and class level), usually, little is known about their construct validity and variance analyses indicate that much lower amounts of variance are to be found at the class level (around 10 to 15 percent) than in the American and Dutch versions (25 to 40 percent). It seems fair to assume that the (limited) development process in these countries may have contributed to these limitations and that more elaborate methods

would have helped to demonstrate (more elaborately) the quality of these cultural adaptations.

According to Wubbels (1985a; see also Hui, & Triandis, 1985), in order to optimise cultural translation and allow for comparisons between data from different countries, researchers should take into account some criteria when creating new cultural versions of their instruments. First, they should be worried about *conceptual* or *functional equivalence*, which means that concepts or constructs in their instruments have similar connotations and meanings in different cultures. This can be achieved by undertaking interviews with students, teachers and experts on the concepts of interest. Second, researchers should strive for *equivalence in concept operationalisation*, meaning that the same procedure is used in different countries to proceed from a theoretical notion towards a measurement instrument (in this case the QTI). This not only involves translation and back-translation, but also including similar steps in the creation of items – like interviews and pre-testing of items. Additionally, researchers could distribute two language versions to a similar sample. Third, researchers should check for *item equivalence*, meaning that items have similar meaning and structural relations in different countries. This can be realised by conducting interviews with students, but also by employing factor analysis techniques that test whether a similar structure and factor loadings underlie items and their scales. The present study has employed a more elaborate process of development similar to that of the original Dutch (and American) version, including interviews and several rounds of pre-testing and has used a variety of techniques to establish the quality of the resulting QTI. It will show that such an elaborate process brings more optimized results and warrants cultural comparability.

Apart from the careful consideration for developing and adapting a new instrument, using elaborated statistical methods is also a unique characteristic of this study since most LER studies only use regular methods of analyses. The importance of using *multilevel analysis* can be outlined in this respect as follow. First, it has been shown that non-randomly sampled data sets may lead to *artificially increased* associations (Hox, 1995; Muthen, 1994) and using regular analysis of variance thus leads to an overestimation of possible effects (e.g. Hox, 1995).

1.6. A Brief Look into the Education Systems in two Countries: Turkey and the Netherlands

In this section, a short look from various viewpoints into the education systems in Turkey and in the Netherlands will be given. In particular, focus is directed at both countries' secondary education structure.

According to results of PISA (Program for International Student Assessment) - second cycle (2000-2003) - prepared by the Turkish Ministry of National Education, Turkey has some difficulties with research funding support, the amount of the educational budget left after national debt and the number of students in a class when compared to the other countries which participated in the project. The report added that, although Turkey is having some problems with these points, the country will keep on participating in international projects like TIMSS, PIRLS and PISA in future.

The PISA report also compares Turkey and the Netherlands in terms of the per capita income and the number of students. The total population of Turkey is 70 million, with almost 20 million students and the per capita income is 3000 dollars, while the Dutch population is 16 million, with 3.5 million students and the per capita income is 25.000 dollars. When these numbers are compared to the country population, the student ratio is 28.6 percent in Turkey and 21.9 percent in the Netherlands. When the average yearly educational budget for per students is 390 dollars in Turkey, this amount is on average 4000 dollar in European Union countries. So, in Turkey these or similar conditions promote some kind of difficulties in education and place the educational problems relatively low on the political and financial agenda. Before giving information about the secondary education structure, which is the level at which the study is conducted, in Table 1.1 a general overview of both countries' educational system is given.

Table 1.1

General comparison of the Turkish and Dutch educational systems

(Source: The table based on the description provided by Eurydice, 2006)

	Turkey	the Netherlands
Language of instruction	Turkish	Dutch
Length of school year	180 days between the second week of September and the second week of June	200 days between the last week of August and the last week of June
Primary school education	Compulsory at the age of 6	Compulsory at the age of 5
Pre-primary education	The enrolment rate of children aged between 4 and 5 in pre-primary education was 20 percent.	Almost all 4 year-old (99.3 percent) children attended primary school
Public/private schools	Available at each level	Available at each level
The number of school hours (lessons) per week	Between 33 and 41, depending on the school type and level.	Between 28 and 40, depending on the school type and level.
Compulsory education in state school	Free of charge	Free of charge
Inspectorate	Present	Present
Teacher status	Civil servant or contractual Relatively high societal status	Civil servant or contractual Relatively low societal status

Table 1.1 continued

Teacher education	4 years of education at education faculty at university. 5 year education for some subjects like science, mathematics and social subjects, including one year masters program (without thesis)	For primary education teaching 4 years of education at higher professional education (HBO) institutes. For secondary education teaching 5 years of education at the university, including a 2 years masters program (including thesis)
Teacher in-service training program	Available	Available
Special education for disabled students	Available at the primary and secondary level	Available at the primary and secondary level
Average class size	25-45 students with an average of 30	15-35 students with an average of 24
Administrative control	Firmly centralised under the Ministry of education. The local level schools in 81 provinces are under the direction of the provincial governor.	Ministry of education is responsible for the coordination. Local and regional authorities take the form of statutory supervisory and judicial duties.

When focussing on the secondary education school structure in both countries, there are some particular differences that can easily be noticed. Firstly, in *Turkey*, after graduating 8 years of compulsory education, students receive the *İlköğretim diploması*, the diploma of basic education. Then, students who have completed primary education can enrol in secondary education, provided in general, vocational and technical education institutes offering at least four years of education. General secondary education is provided at general high schools, Anatolian high schools, multi-programme high schools, science high schools, foreign language-based schools, Anatolian teacher high schools, Anatolian fine art high schools, social science high schools and sports high schools. Each school type has some key characteristics. For example, in

Anatolian teacher high schools, students attend additional lessons on teaching and education (e.g. pedagogy, philosophy of education, educational psychology, and educational administration). These extra lessons provide the students with extra background for teacher training programs at the university. Mainly in scarcely populated regions *multi-program high schools* exist that offer both general and vocational technical programmes. *The social science high school* that specializes in higher education in the fields of literature and social sciences is a relatively new high school type in Turkey; the first one was established in 2003. Admission requirements for secondary schools depend on the particular type of school concerned. While no admission criteria apply for General high schools or multi-programme high schools, in the case of Anatolian high schools, Anatolian teacher high schools and Anatolian vocational and technical high schools, students have to pass centrally administrated entrance examinations. In the case of foreign language-based high schools, vocational schools and Anatolian art high schools, the average mark in primary education is used to regulate admission. In the Anatolian art high schools admission beside this an aptitude examination that has to be taken. One of the criteria applicable to science secondary schools is the pre-enrolment system in which an average mark in a particular year or for a particular course is the defining factor.

Curricula are composed of *common courses* that are compulsory for all pupils in secondary education, *field courses* that steer pupils towards a profession or the programme for which they wish to enrol in higher education, *field–based elective courses* offered as a part of work in a particular field chosen by the individual students and *elective courses* that seek to develop the individual skills and abilities of students are developed at national level. The content of the course, the number of lessons allocated to them each week, and the years in which they should be given is determined by the *Talim ve Terbiye Kurulu Başkanlığı* (the Supreme Council of National Education).

The average number of weekly lessons in each grades ranges from a minimum of 33 hours to a maximum of 41. Progression to the next grade is based on students' performances in all courses or the average annual level of attainment. Transfers between schools and programmes that generally occur from schools for vocational to technical secondary education are possible.

Lise diploması (the secondary school diploma) is given to the students after successful completion of their secondary school education, in accordance with regulations relating to the type of secondary education or course that is

determined by the Ministry of National Education. There is no exam in national level to complete the secondary education.

For admission to undergraduate programmes at university, a secondary school diploma and satisfying performance in *Öğrenci Seçme Sınavı* (*ÖSS* or the student selection examination) are required. The central university entrance examination, ÖSS, is administered by *Öğrenci Seçme ve Yerleştirme Merkezi* (*ÖSYM* or the Student Selection and Placement Centre) in connection with the Higher Education Council. The ÖSS is normally held in a single session at the same time throughout Turkey.

Table 1.2
Turkish secondary school education system

Stage	Type of schools	Ages	Examples and types of schools
Secondary	I. General high schools II. Vocational and technical high schools	15 – 17/18 years	I. High School, Anatolian High School, Science High School, Anatolian Fine Arts High School, Multi-curricula High School, Anatolian Teacher Training High School II. Technical Education Schools for Boys, Technical Education Schools for Girls, Commerce and Tourism Education Schools, Religious Education Schools

In the Netherlands, secondary education includes the following school types: Pre-university education (VWO), Senior general secondary education (HAVO), Pre-vocational secondary education (VMBO) and Practical training (PRO). Most schools offer at least one type, but most several of these types at the same time. The students, who are on average at the age 12, are admitted to secondary school after leaving primary school.

The admission criteria to VMBO, HAVO and VWO are made by the component authority (school board), which may appoint an admission board to

take such decisions on behalf. The admissions board, with the head and one or more teachers from the school, may also include heads and teachers from primary schools. The head of the pupil's primary school is asked to draw up a report on students' educational potential and the level of attainment (educational report). The most common way to assess students' suitability for admission to VMBO, HAVO and VWO is to test students in the final year of the primary school, using tests developed centrally to measure their level of knowledge and understanding. However, choice is free in choice to administer these tests. The first three years of secondary education are named as the period of *basic secondary education*; the following years are named as *upper secondary education*. In the first three - the period of basic secondary education- students are taught a compulsory core curriculum of 15 subjects. Additionally, the remaining teaching time which is about of 840 hours (20 percent) may be used by schools for lessons and other educational activities at their own discretion. Students must be taught for at least 1.280 periods of 50 minutes per year in the first three years of secondary school. In the first three years of HAVO and VWO a third modern language is compulsory, while the gymnasium part (VWO) curriculum must also include Latin or Greek. The fourth year is part of lower secondary education in VMBO. The recommended time table covers all four years of the course, the three preceding years of basic secondary education included. The fourth year taught in upper secondary education, including the content of the curriculum is a part of compulsory education in both HAVO and VWO. There are continuous teacher assessments in secondary education. During basic secondary education, pupils may have to repeat a year. Only VMBO falls completely under compulsory education. The VMBO leaving examination is in two parts: a school examination and a national examination. Pupils in the first stage of HAVO and VWO can continue their education in those types of education in upper secondary education.

VMBO pupils who have successfully completed the theoretical programme can transfer to the fourth year of HAVO, provided their examination subjects include mathematics and either French or German (English is a compulsory VMBO subject). Pupils entering the fourth year of HAVO and fifth year of VWO have to choose one of the following subject combinations: culture and society, economics and society, science and health, science and technology. Each group of subjects includes a common component, a specialized component and an optional component.

In general secondary education, the school leaving examination for HAVO and VWO consists of two parts: a national examination held in the final year and a school exam. For some subjects there is only school exam.

Admission criteria for higher education are as following: a senior general secondary education (HAVO) certificate, or a middle–management or specialist training certificate (MBO), or a pre-university education (VWO) certificate. Persons aged 21 or over who do not posses the required qualifications may be admitted after passing a special entrance examination. The age limit can be waived in the case of courses in the fine arts and performing arts.

Table 1.3
Dutch secondary school education system

Stage	Type of schools	Ages	Examples and types of schools
Basic Secondary	I. General high schools	12-15 years	I. Pre- University Education (VWO)
		12-15 years	II. Senior general secondary education (HAVO)
	II. Vocational and technical high schools	12-15 years	I. Vocational secondary education(VMBO) II. Practical Training (PRO)
Upper Secondary	I. General high schools	15-18 years	I. Pre- University Education (VWO) II. Senior general secondary education (HAVO)
	II. Vocational and technical high schools	15-17 years 15/16/17/18/ 19/20 years	I. Vocational secondary education(VMBO) II. Practical Training (PRO)

Since the difference between general and vocational schools fall outside the interest of the present study, vocational education is not being dealt with in this section and they are only mentioned in the tables.

1.7 Ethical Issues

All ethical rules have carefully been considered throughout the study. During the data collection process, teachers and students that did not want to write their names and school names were kept anonymous. As the study was on

teacher behaviours, the purposes and significance of the study were explained to teachers briefly before administration of instruments so as not to hurt teachers' feelings or the contact with their classrooms.

During and after data collection, no one saw the collected data except the researcher and her supervisors and the information about schools, teachers and students was not handed over to third parties. The researcher visited and collected the data personally from all schools, except for those in the Black Sea, Mediterranean and South East and Eastern regions. For the cities in this region, instruments were sent by cargo after confirmation by phone. The instruction guide for both the school management and the person(s) administering the questionnaires were added to the post.

1.8 Overview of the Dissertation

This thesis consists of five chapters and twenty-two appendices. This first chapter (Introduction) has introduced the study and has summarized the purposes for conducting the study and outlined the rationale for this dissertation, together with the objectives and their significance. To provide a more understandable insight into further chapters and into the general frame of the dissertation, definitions of some concepts and brief information on the educational systems of Turkey and the Netherlands have been given.

Chapter 2 (Literature) will be used to review the supporting literature describing learning environments, teacher interpersonal behaviour research, including the historical development of the specific instrument used and its accumulated knowledge after almost 25 years of research. The chapter will end with a discussion of previous research on student attitudes.

Chapter 3 (Method) will describe the methodology used in this study and outlines the development of the Turkish version of the Questionnaire on Teacher Interaction, together with the sample and measures used in the study. This chapter will include the pilot studies conducted, the main study, the background questions asked, statistical analyses, validity and reliability of the instruments, the interviews conducted with teachers and students, the attitude scales, information on (the measurement of) cognitive achievement and background information on students.

Chapter 4 (Results) will report the major findings, with reference to the research questions, each in separate subsections. It will also clarify associations between students' perceptions of the classroom learning environment, their attitudes and achievement and other student outcomes.

Finally, Chapter 5 (Conclusion, Discussion and Implication) will outline the conclusions of the study, together with a discussion of the practical and theoretical implications and recommendations for further research in Turkey and elsewhere.

Each chapter will end with a summary section to provide a quick overview for readers. Following the references, there will be several appendices consisting of technical and statistical notes. These appendices provide the full set of questionnaires as used in this study. Also they include is a copy of the report materials provided to the teachers participating in the study, letters of consent, teacher and student interview forms and the vita of the researcher.

1.9 Chapter Summary

The first chapter provided an introduction of the dissertation and presented an overview of the content of each chapter contained in this dissertation, meanwhile touching and framing the general structure of the dissertation. The section detailed the rationale for this study, along with the objectives, significance and a brief overview of two countries' educational systems and the ethical concerns throughout the study.

CHAPTER II

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1 Introduction

The theoretical and empirical background of the study will be discussed in this chapter. To obtain a comprehensive overview, databases on the internet containing literature, such as the *Social Sciences Citation Index* (SSCI), *Educational Resources Information Centre* (ERIC), *Ebscohost*, *Science Direct* and *Google Scholar,* were consulted. In these searches, the following key words were used: 'Questionnaire on Teacher Interaction', 'Teacher Behaviour', 'Learning Environments Research', 'Interpersonal Behaviour' and 'Teacher-Student Relationship'.

Related articles were obtained from databases of the *Middle East Technical University* (METU) and the *Turkish Academic Network and Information Centre* (ULAKBIM). Also, theses and dissertations from Turkey and abroad – in particular Australia[1], the Netherlands, and the United States - were examined and relevant works were downloaded via the *University of Michigan* (UMI) or the *online dissertation webpages* of universities. Turkish education journals, e.g. *Hacettepe Eğitim Dergisi* (Hacettepe Journal of Education), *Eğitim ve Bilim* (Education and Science), *MEB Dergisi* (Journal of the Ministry of Education) and *Fen Bilimleri Eğitimi Konferans Dergileri* (Science Education Conference Journal) were also scanned using the same keywords.

The objective of this chapter is to provide a conceptual framework for the dissertation by reviewing the literature on which this study and its subcomponents are based. In the light of this objective, the chapter starts off with an introduction (section 2.1) continued by a review of the related research literature, focusing mainly on three topics: Learning Environments Research (section 2.2), Teacher Interpersonal Behaviour (section 2.3) and Student Attitudes (section 2.4). It will be shown that, although the domains mentioned are very interrelated and emerged at the same time (and partially grew from similar seminal works), they also developed in their own right and that sometimes similar assumptions and elements included in the present study were

[1] In particular dissertations from Curtin University were studied at http://adt.curtin.edu.au/theses/browse/by_author/all.html (Retrieved, December 2004-February 2005)

drawn from different theoretical sources and domains at the same time. An example of this is the use of (student) perception data, which can be justified both from an actor-observer (or environment 'press') viewpoint, but also from a systems approach viewpoint (pragmatic effects of communication).

The next section (2.2) contains the first part of the literature and will be limited to the Learning Environments Research (LER) Domain.

2.2 Learning Environments Research (LER)

This section will deal with the field of *Learning Environments Research* (LER). First, its theoretical and historical background will be discussed (section 2.2.1). This will be followed by the part in which using student and teacher perceptions will be discussed as measures or indicators for Learning Environments (section 2.2.2). Then, some examples of Learning Environment instruments (section 2.2.3) will be provided. Next, a general look at the different areas of past research in Learning Environment Research and the contribution of this study to the field will be explained (section 2.2.4). Finally, the first part of the literature on Learning Environments will be summarized (section 2.2.5).

2.2.1 Theoretical and Historical Background of Learning Environment Research

With Fraser (1998a) Learning Environment Research is described as research on the

> *"Social, psychological and pedagogical context in which learning occurs and which affects students' achievement and attitudes" (p.3).*

Formal and informal learning situations are included in this wide scope of the definition. There are two levels of (formal) Learning Environment studies: the *school* and the *classroom.* In spite of a remarkable separation between research on the school and the classroom environment, these are two interrelated educational research areas that not only developed simultaneously but also have other logical linkages, such as relationships between teachers and the school management (some of the discipline problems in the classroom may transfer to the school principal) or a hive of activity in social facilities that might affect the classroom atmosphere directly and might cause off-task behaviour in students or loss of concentration for the daily topic.

Learning Environments Research has become one of the most rapidly developing educational research domains and various instruments for educators and curriculum developers have been created to investigate the nature of the

psychosocial environment in classroom settings from students' and teachers' perspectives.

The first steps in the domain of research on Learning Environments were taken almost a century ago by the pioneers Hartshorne and May (1928) who associated personality traits with students' tendencies to participate in deceitful behaviour, like cheating in exams. Newcomb (1929) compared students' talkativeness during lunch periods, a highly stable trait, to other situations and concluded that the same trait did not transfer to other situations. So, with their very first studies, these researchers directed attention to the environment and showed that the environment could affect and alter students' behaviour.

A few years later, Lewin (1936) revised the environment and its dynamic interaction with personality traits of the individual. He put forward a theoretical foundation for learning environment research by describing the relationship between environment and person with the equation *B* =f *(P, E),* which postulates that behaviour (*B)* is a function of person (*P)* and his/her environment *(E).* Murray (1938) explained Lewin's interaction between a person's needs and the external environment by proposing a *Need and Press Model.* According to this model, *personal needs* are motivated by personality characteristics which represent an individual tendency to move in the direction of certain goals, while *environment press* is a situation external to the person, which either supports or frustrates the expression of internalized personal needs. Murray defined the term *alpha press* as an environment as perceived by an external observer and *beta press* as an environment perceived by milieu inhabitants. A further distinction for Murray's definition of beta press was made by Stern, Stein and Bloom (1956) who distinguished between *private beta press* (each persons unique view of environment*)* and *consensual beta press* (the collective opinion of the environment held by all the members in the environment concerned).

Getzels and Thelen (1960) proposed that group behaviour can be predicted from personality needs, role expectations and the classroom environment, so their idea brings a framework to analyze classroom groups as *a unique social system*. How a combination of personal needs and environmental press might enhance *students' outcomes* was described by Stern (1970) in his theory of *person-environment congruence.* For example, a student's willigness to be popular among classmates could motivate him/her to concentrate more on one of the subjects failed by many students and lead to higher grades on the exam(s).

The work of Lewin and the other mentioned works provided a new perspective to the home, work and school setting in educational research by directing attention to the person, to personal needs and to the interaction of these needs with the psychosocial environment. In the late 1960s and early 1970s, Herbert Walberg and Rudolf Moos departed from these works, independent from each other, focused on the psychosocial environment and its influences on students' outcomes. Their work can be accepted as the real "starting points for contemporary Learning Environment Research" (Fraser, 1990, p. 201) that "took off in the 1970s" (Tobin, 2000: p223). According to Moos (1976), not only the (physical) environment but the ways in which people have been socialized and adapt their environments are important. He motivated the idea that humans form environments that provide a maximization of human functioning and competence.

From this perspective, Moos (1974) identified three dimensions for classifying human social environments and these dimensions were later used to classify individual scales of learning environment instruments (see Table 2.1).

Table 2.1

Human social environments classified by Rudolph Moos

Dimension	Definition	Related Terms
Relationship	The nature and intensity of personal relationship within the environment and the extent to which people are involved in the environment and support one another.	cohesiveness, expressiveness, support, involvement, affiliation and involvement.
Personal development	The basic directions along which personal growth and self-enhancement tend to occur.	independence, achievement, task orientation, self-discovery, anger, aggression, competition, autonomy and personal status.
System maintenance and system change	The extent to which the environment is orderly, clear in expectations, maintains control and is responsive to change.	organization, control, order, clarity, innovation, physical comfort and influence

Over several decades, the quality of these dimensions – relationships, personal development and system maintenance/change - has been verified in studies on family, work, school, health, military, prison and social community environments (Moos, 1976; 1979; 2002). One additional achievement of Rudolph Moos is the pioneering instrument in the field of Learning Environments Research, *the Classroom Environment Scale (CES)* (e.g. Moos, & Trickett, 1974; Trickett & Moos, 1973).

The observation of Moos (1979) that the communication between a teacher and his/her students is one important aspect of the classroom learning environment was also confirmed by succeeding works. These works (e.g. Doyle 1979a; 1986) also directed attention to psychosocial characteristics of the classroom, including interrelations and communications among its members. With Berliner (1986) the classroom was described as a workplace and a teacher as an executive who manages.

In the 1980s, nine factors that contribute to variance in students' cognitive and affective outcomes were summed up by Walberg (1981; 1984) in his *Multifunctional Psychological Model of Educational Productivity.* These factors

are student ability, age and motivation, the quality and quantity of instruction, the psychosocial climate of the home environment, the classroom social group, peer groups outside the classroom and mass media (especially television). The model proposed that learning is a function of all these nine factors and that in principle any factor at zero results in zero learning. Additionally, Walberg explained the dynamic structure of the model elements by claiming that improving one factor that limits learning is better than raising a factor that is already high and that students' achievement and attitudes are affected by all nine factors rather than by only a dominant one. The model was tested with empirical probes that confirmed validity of the model as well as its dynamic structure (Walberg, 1986; Walberg, Fraser, & Welch, 1986; Fraser, Walberg, Welch, & Hattie, 1987). In sum, while controlling for other factors, classroom and school environments were determined as particularly important factors for improving student cognitive and affective outcomes.

Curriculum innovation projects, like the *Harvard Physics Project* (Anderson, & Walberg, 1968; Walberg, 1969; Fraser, Anderson, & Walberg, 1982) and the *Australian Science Education Project* (ASEP) (Fraser, 1979), led to the development of a prelimary version of *the Learning Environment Inventory (LEI)* and brought the first prelimary versions of *instruments* for research in the Learning Environments domain.

At the same time, the foundation of *the Learning Environments Special Interest Group (SIG)* within the *American Educational Research Association* in 1984 (e.g. Fraser, 1986; 1988; Waxman, & Ellet, 1990) highlighted the fast growing knowledge base in the domain and the popularity of the field. This growing popularity was also reflected in appearing reviews of the field (e.g. Fraser, 1989; 1994; 1998b; Fraser, & Wubbels, 1995) and in 1998 a new journal was initiated by Kluwer Academic Publishers called *"Learning Environment Research: an International Journal"* (Fraser, 1998a).

Since then, many articles and reviews have appeared and even some book series were launched containing learning environment studies from all over the world, such as a book series from World Scientific Publishers (Singapore) with volumes appearing in 2002, 2003 and 2006[2].

[2] 2002-"*Studies in educational learning environments: an international perspective",* edited by S. C. Goh and M. S. Khine.
2003–"*Technology-rich learning environments: a future perspective*", edited by M. S. Khine and D. L. Fisher.
2006 - *"Contemporary approaches to research on learning environments: world views"*, edited by D. L. Fisher and M. S. Khine.

In the next section, students' and teachers' perception as measurement units will be discussed.

2.2.2 Using Student and Teacher Perceptions to Measure Learning Environments

As mentioned in the previous section, the fields of school and classroom learning environment are two remarkably different parts of the Learning Environments Research domain and it is useful to distinguish the psychosocial aspects of the whole school and classroom (Anderson, 1982; Fraser, & Rentoul, 1982; Genn, 1984). The study of this dissertation investigated psychosocial aspects of the Learning Environment at the *classroom level*.

This first part of this section briefly discusses research methods in Learning Environments Research and the reasons for using perceptions. Systematic direct *observations* by external observers, assessing student and teacher *perceptions* and *case studies* are the common methods in Learning Environment Research. For studying Learning Environments, the use of the first two - observations and perceptions - was contrasted by Fraser (1994). Direct observation depends on the external observer coding classroom communication (*alpha press)* and perceptions depend on views or answers of participants from within the classroom (*beta press).* Rosenshein (1970) referred to perceptions as "*high inference"* and direct observation as "*low inference"* measures. Since the psychosocial aspect of the classrooms is the main concern of classroom learning environment research, not surprisingly the main approach is using perceptions of participants who observe this aspect in the classroom.

A combination of qualitative perceptual measures with quantitative observation and interviews, however, is advised for capturing a more meaningful and complete understanding of the teaching-learning process in the classroom (e.g. Fraser, & Tobin 1991; Tobin, & Fraser, 1998). Since students' perceptions have found to be highly connected with students' outcomes, they are the most commonly used data source in the domain, while teacher perceptions have not been widely studied yet.

In this study, the psychosocial context of the classroom environment was investigated from the perspective of the *interpersonal relationship* between students and their teacher. Data was collected on students' perceptions as well as teachers' perceptions. However, teacher data were mainly used for feedback purposes (to teachers themselves), whereas most (statistical) analyses in this dissertation were conducted primarily on student perception data.

In the upcoming second half of this section, reasons for choosing students' perceptions are debated. Students' perceptions have been accepted as important variables, not only since they are directly related with students' cognitive and affective outcomes, but also because they are major determiners of the psychosocial environment of the classroom. By large, students respond to their teachers as they perceive them (e.g. Doyle, 1979b; Shulman, 1986; Shuell, 1996). The methodological advantages of using students' perceptions over teacher perceptions and observations to measure classroom environments have been enumerated by Fraser and Walberg (1981):

1. Paper and pencil perceptual measures are more economical than classroom observational techniques that involved the expense of trained outside observers.
2. Perceptual measures are based on students' experiences over many lessons whereas observational data are usually restricted to a certain time.
3. Perceptual measures involve the pooled judgements of all students in a class, whereas observational techniques typically involve only a single observer.
4. Students' perceptions can be considered more important than observed behaviours, because they are the determinants of student behaviour, more than the actual situation.
5. Perceptual measures of classroom environments typically have been found to account for considerably more variance in student learning outcomes than directly observed variables.

In sum, since students gather experience around many different learning environments and have enough time in class to form a precise impression, they are a good vantage point to make decisions about classrooms.

Fraser (1998b) has also described different forms of student perceptions. The first distinction is between *actual* (the experienced teaching) and *preferred* (ideal teaching that is based on how students would like to be taught) perceptions of students. While being similar in item wording, instructions for answering are different in actual and preferred forms of instruments. For example, an item asking for an actual perception could be 'There is a clear set of rules for students to follow'; while this would be changed for the preferred perception into 'There would be a clear set of rules for students to follow'. The second distinction is between perceptions of the *whole class* versus *personal* perceptions (students' individual perceptions or perceptions with respect to the

role of groups/subgroups in class). In the present study, all respondents completed whole class forms of questionnaires; students were asked to answer to an actual form, whereas teachers were asked to answer both an actual and a preferred form.

The validity and reliability of students' perceptions have been demonstrated in research (e.g. d' Apollonia, & Abrami, 1996) and are pointed to as useful variables to measure the classroom context (Doyle, 1986; Shuell, 1996). Not surprisingly, students' perceptions of classroom environment form the basis of many widely-applicable questionnaires that have been developed and used for assessing Learning Environments (Fraser, 1998c). Moreover, Fisher and Fraser (1983) also reported differences between students' and teachers' perceptions of the same learning environment (as measured with the Classroom Environment Scale) and their perceptions of actual and preferred environments. They found that in general, a more positive learning environment is perceived by teachers than is by their students in the same classroom. From the students' point of view, a more positive learning environment than was actually present is preferred by students. These findings have been replicated for other instruments and learning environment elements as well (e.g. Wubbels, & Brekelmans, 1998; den Brok, Bergen, & Brekelmans, 2006a; Rickards, & Fisher, 1998).

The use of students' (and teachers') perceptions is a complex matter. This complexity is related to the *multilevel* nature of the classroom environment and the *sampling* procedures used in most environment research (den Brok, Brekelmans, & Wubbels, in press). Den Brok et al. (in press) provide some decissions that Learning Environments researchers should take in order to deal with this multilevel nature. The first choice regards the target of students' (or teachers') perceptions. Depending on the research question, students' perception can directed at *physical objects* in the learning environment (for example the learning material), *students' own thoughts and behaviour* (for example task performance) or to *other persons* (the teacher, fellow classmates, etc.). If the choice regards perceptions of other persons, such as in this dissertation (where students perceive their teachers), further choices are needed. A teacher can communicate with both individual students as well as with students as a group. Instruments that are being used to map student perceptions can be directed at either of these two types of behaviour (or at both). Den Brok and his collegues (in press) showed possible choices in item formulation of instruments with the following example on teacher friendliness and emphasized the importance of different item wording to gather data with respect to different levels of the

environment. For example,an item to measure teacher friendliness could be formulated in one of the following ways:

A. This teacher is friendly to *the class*.
B. This teacher is friendly to some *students* in our class.
C. *I* find this teacher friendly.
D. *I* find this teacher friendly to *me*.

These four item wordings differ with respect to (a) the *level* teacher behaviour is *directed at* (a class or an individual student) and (b) the *level of perception* (class, personal). In Table 2.2 these four types are categorized.

Table 2.2
Four types of items to investigate students' perceptions of teacher behaviour

	Class perception	Personalized perception
Teacher behaviour towards class as a whole	A	C
Teacher behaviour towards individual students	B	D

As can be seen in the example, apart from the topic of perception (behaviour towards individuals or whole classes), the second choice is between the conceptualisation of perceptions as individual occasions (personalised perceptions) or as group observations (class perception). Apart from these conceptual issues, a third decission involves methodological issues. In many learning environment studies, multistage sampling (first selecting schools, next teachers, then classes, last students) is most convenient to collect data on students' perceptions of their learning environment (den Brok, et al., in press). Because respondents in similar classes or with similar teachers share experiences and history, multistage sampled data usually contains more *shared* elements by nature than randomly sampled data. To deal with this issue, researchers can decide to use *multilevel analysis* (instead of regular single level analysis). Within such analyses, a choice has to be made for different levels (e.g. the student, class or teacher level) and validity can be determined at any of these levels. Various authors have shown that different models may apply to different levels of the data and that different validity issues may be at stake at different levels (e.g. Ericsson, & Simon, 1993; den Brok, et al., in press). Den

Brok and his colleagues (in press) implemented the personalised version and class version of the Questionaire on Teacher Interaction (QTI). Statistical analyses (for validity of the instrument) were conducted both with multilevel and single-level analyses and within multilevel analyses at different levels for both versions. The results of these analyses showed that multilevel analyses excelled over single-level analyses in all cases and that such analyses could provide more accurate feedback with respect to the validity of instruments used. Also, their results showed that scales and models may apply well to one level (in their case the class level) but not to other levels (in their case the student level).

In the present study, these kinds of level decisions have been taken by focussing at students' perceptions of the teacher-student relationship, by studying these perceptions with the class version of the Questionnaire on Teacher Interaction (QTI) and by using multilevel analyses, assuming that theory and models apply primarily to the class level and as such are described and interpreted at this level (see also section 3.3.1.2).

A brief overview over some commonly used instruments in the Learning Environment domain (for classroom context) will be provided in the next section.

2.2.3 Some Examples of Learning Environments Instruments

Moos's (1976) work has affected the development and use of instruments that appraise qualities of the classroom learning environment from the perspective of the student during the past four decades (Fraser, 1986; 1994; Fraser, & Walberg, 1991) and researchers studying classroom environments have been developing various approaches for collecting data over these years. A "prolific development of questionnaires" (Tobin, 2000: p223) in the domain has provided researchers with an opportunity to select conspicuous scales and the items within those scales while conducting their studies.

Early instruments used in the educational Learning Environment domain were *the Learning Environment Inventory (LEI)* and *the My Class Inventory (MCI)*; these have been mentioned in the previous section.

The LEI was composed of 15 scales and 105 statements and was administered to students as well as teachers (Anderson, & Walberg, 1974). The MCI is mainly an adapted and simplified version of the LEI for use among children at the elementary level. The final form of this questionnaire contained 38 items that fitted well to the reading level of 8–12 year old students (Fisher, & Fraser, 1981).

The *Individualised Classroom Environment Questionnaire (ICEQ)* is different from other instruments in the domain, since it assesses Moos's dimensions rather than specific elements. It is a 50-item questionnaire with 5 scales and distinguishes individualised classrooms from traditional ones (Rentoul, & Fraser, 1979). Although the vast majority of the studies and instruments has focused at the elementary and secondary school level, higher education classrooms also start to be investigated, initiating the development of the instruments for this education level, such as *the College and University Classroom Environment Inventory (CUCEI)* (Fraser, Treagust, & Dennis, 1986) and *the Science Laboratory Environment Inventory (SLEI)* (Fraser, Giddings, & McRobbie, 1992).

Other instruments developed are *the Constructivist Learning Environment Survey (CLES)* (Taylor, Fraser, & Fisher, 1997) and *the Classroom Environment Scale (CES)* evaluating teacher-student interaction, teacher behaviour and student-student interaction (Moos, 1979). *The Computer-Facilitated Learning (CFL) Environments Instrument* was developed to study technology-rich university courses (Bain, McNaught, Mills, & Luedkenhausen, 1998).

In addition to these current (and other contemporary) instruments, Fraser, Fisher, and McRobbie (1996) developed a learning environment instrument based on scales from previous studies, called the *What Is Happening In This Class? (WIHIC)* questionnaire, which incorporated the scales most closely linked to student outcomes from previous research. The WIHIC has been used by many researchers from different countries to collect data about the classroom environment. It has been validated in Australia and Taiwan (Aldridge, Fraser, & Huang, 1999), Singapore (Fraser, & Chionh, 2000), Korea (Kim, Fisher, & Fraser, 2000), Indonesia (Margianti, Fraser, & Aldridge, 2002) and cross-nationally (Dorman, 2003).

The final instrument discussed in this overview is *the Questionnaire on Teacher Interaction (QTI)* (Wubbels, Créton, & Hooymayers, 1985; 1987a), an instrument that focuses on the interpersonal relationships between students and their teacher (Wubbels, 1993b). It is one of the key instruments in the domain as well as the major instrument used in the present study.

The variety of measuring alternatives in the domain make it a vivid field and carry it over to other domains and different types of classroom environments; examples are studies on science laboratory classroom environments (McRobbie, & Fraser, 1993), computer-assisted instruction classrooms (Teh, & Fraser, 1994), constructivist classroom environments

(Taylor, et. al., 1997), cross-national studies of science classroom environments (Aldridge, et al., 1999), computer laboratory classroom environment (Newby, & Fisher, 2000; Zandvliet & Straker, 2001), and special education classrooms (Adam, 2000).

With the dimensions of Moos, the scales of all of these instruments can be referred to with some conceptual consistency. In Table 2.3, information is provided on nine major instruments namely: LEI, ICEQ, CES, CUCEI, MCI, SLEI, QTI, CLES and WIHIC.

Table 2.3

Overview of scales contained in nine learning environment instruments (adapted from Fraser, 1998c)

Instrument	Year & Authors	Scales classified according to dimensions of Moos		
		Relationship dimensions	Personal development dimensions	System maintenance and change dimensions
Learning Environment Inventory (LEI)	1968 Walberg & Anderson	Cohesiveness Friction Favoritism Cliqueness Satisfaction Apathy	Speed Difficulty Competitiveness	Diversity Formality Material Environment Goal Direction Disorganization Democracy
Classroom Environment Scale (CES)	1974 Moos	Involvement Affiliation Teacher Support	Task Orientation Competition	Order and Organization Rule Clarity Teacher Control Innovation
Individualized Classroom Environment Questionnaire (ICEQ)	1979 Rentoul & Fraser	Personalization Participation	Independence Investigation	Differentiation
My Class Inventory (MCI)	1981 Fisher Fraser	Cohesiveness Friction Satisfaction	Difficulty Competitiveness	
College and University Classroom Environment Inventory (CUCEI)	1986 Fraser & Treagust	Personalization Involvement Student Cohesiveness Satisfaction	Task Orientation	Innovation Individualization
Questionnaire on Teacher Interaction (QTI)	1985 Wubbels, Créton & Hooymayers	Helpful/Friendly Understanding Dissatisfied Admonishing Leadership Student Responsibility Uncertain Strict		

Table 2.3 Continued

Science Laboratory Environment Inventory (SLEI)	1995 Fraser, Giddings & McRobbie	Student Cohesiveness	Open-Endedness Integration	Rule Clarity Material Environment
Constructivist Learning Environment Survey (CLES)	1995 Taylor, Dawson & Fraser	Personal Relevance Uncertainty	Critical Voice Shared Control	Student Negotiation
What Is Happening In This Classroom (WIHIC)	1996 Fraser, McRobbie & Fisher	Student Cohesiveness Teacher Support Involvement	Investigation Task Orientation Cooperation	Equity

2.2.4 Areas of Past Research in Learning Environment Domain and Contribution of this Study

In his review of the Learning Environments Research literature, Fraser (1994) proposed several (new) lines of research, which are presented in Table 2.4. The present study explicitly connects to some of these lines, since its analyses and data collection are directly aimed at providing knowledge on the issue. These include *associations between students' outcomes and the environment* and *cross–national studies* (see Table 2.4). The *combination of qualitative and quantitative data* has been a focal point in the adaptation process of the new version of the questionnaire and will be discussed in detail in the Chapter 3, Method, (see section 3.3.1. p. 90). Results of the study may provide general insight into the behaviour of teachers and may therefore indirectly contribute to the topic of teacher improvement and teacher education; however, these topics are (not explicitly) investigated in this dissertation. In addition to these topics, the study investigated factors that affected students' perceptions of their teachers' interpersonal behaviour. This topic is not mentioned in any proposed line of research, but partially touches topics like *school psychology* and *student-teacher differences*.

Table 2. 4

Areas of research in the field of Learning Environment and their emphases

Research Area	Main Emphasis of Research	Focus in this study
Associations between Students Outcomes and Environment	Investigation of associations between perceptions of psychosocial characteristics of a classroom and students' cognitive and affective learning outcomes.	Studied
Evaluation of Educational Innovations	Use of process criteria in the evaluation of education obtained via classroom learning environment instruments.	Not studied
Student – Teacher Differences	Investigation of perceived differences between the students and teacher in a classroom situation. Differences could be between actual or preferred environments.	Not studied
Person – Environment Fit	Research into whether students' outcomes depend on the similarity between preferred and actual classroom environment.	Not studied
Teacher Improvement	Providing feedback information through instruments for reflection upon, discussion of and attempts to improve the classroom environment.	Not studied, indirect contribution possible
Combining Research Method	Research involving the use of both qualitative and quantitative methods in the same study in order to identify salient features of the environment studied.	Partially studied
School Psychology	Use of research instruments to identify areas of classroom life and differences that impact the mental and emotional welfare of students.	Not studied

Table 2. 4 Continued

Links between Environments	Identification of connections and influences of multiple environments involved in the educational process, both in and out ot the formal school.	Not studied
Cross – National Studies	Investigation of the similarities and differences between educational environments in various countries; questionning the practices and beliefs of a given country.	Studied
Transition between Grade Levels	Research on the effect of students moving from one level of education to another, such as from primary to junior high school.	Not studied
Teacher Education	Using theory and instruments on learning environments in the construction and evaluation of programs for the preparation and training of future educators.	Not studied, indirect contribution possible
Teacher Assessment	Using dimensions of learning environments to yield insight into present teaching methods and focus, as well as the possible effectiveness of teaching from the student perspective.	Not studied, indirect contribution possible

2.2.5 Summary of Research on Learning Environments

The first part of the literature review mainly tried to cover one important starting point of this study, the Learning Environment Research domain. Firstly, an overview of the field's foundations with its conceptual milestones - Murray (1938), Lewin (1936), Getzels and Thelen (1960), Stern (1970), Walberg (1969) and Moos (1979) - was provided. Then, the use of students' and teachers' perceptions was discussed, including some issues involved. This part was followed by information on exemplary instruments used in the domain. Also,

current research topics in the area of Learning Environments Research (LER) were discussed.

In this study, the psychosocial context of the classroom environment will be investigated from the perspective of the *interpersonal relationship* between students and their teachers. Data was collected on students' as well as teachers' perceptions. All respondents completed class forms of questionnaires; students were asked to answer actual forms, whereas teachers were asked to answer both actual and preferred forms.

As remarked by the author and her colleagues previously (Telli & Cakiroglu, 2002; Cakiroglu, Telli, & Cakiroglu, 2003; Telli, et al., 2006a) and can be concluded from this short review section, the LER domain is still a young and to be developed field in Turkey. The Turkish context has only scarcely been studied with LER instruments and many of the empirical claims made for other countries have not been tested here. The present study might attract more attention to the domain in Turkey.

2.3 Research on Teacher Interpersonal Behaviour

In this section of the dissertation, research on the *teacher-student interpersonal relationship* (section 2.3) will be presented. First, the section will touch the idea of multiple perspectives on teaching (section 2.3.1) and the systems approach of communication (section 2.3.2). Then, Timothy Leary's interpersonal theory of personality (section 2.3.3), that culminated in the publication of Leary's 1957 monograph, *Interpersonal Diagnosis of Personality,* will be dicussed. The rest and large part of the section will focus on the interpersonal perspective on teaching and its diagnostic instrument, the Questionnaire on Teacher Interaction (QTI). The Model for Interpersonal Teacher Behaviour (MITB) that lies behind the instrument and that is an adaptation of Leary's theory will be dicussed (section 2.3.4). The model will be reviewed in relation to the family of models it belongs to, namely circumplex models (section 2.3.3). That part will be followed by a discussion of the historical development of the instrument, its applications and an overview of research with the QTI from all over the world (sections 2.3.5 and 2.3.6). This third part of the literature will focus on research on *students' attitudes* (section 2.4), and the chapter will end with the general summary of the whole chapter (section 2.5).

2.3.1 Multiple Perspectives on Teaching

This second part of the literature covers research on the teacher-student interpersonal relationship, the main topic of this dissertation. The subsection will start with an analysis of the teaching process in the classroom and the relationship between teaching and learning.

Teaching is an interrelated and interactive process affected by and being the cause of many other factors within the classroom. Den Brok (2001) defined *teaching* as "all actions of teachers, mental or over in the classroom in the presence of students" (p13). The classroom, with its multifaceted and vivid structure is located within a considerably small room and contains a relatively crowded population and is usually open to the infleunce of many other things, like emotional, cultural, interpersonal and environmental factors (Shuell, 1996; Brekelmans, et al., 2000). Teachers generally have to perform a variety of functions to reach their objectives in this environment, which include motivating, instructing, instructional effectiveness and organizing (Doyle, 1986).

The relationship between teaching and *learning outcomes* is given in Figure 2.1. Teaching is here seen as a combination of (covert) cognition and (overt) behaviour.

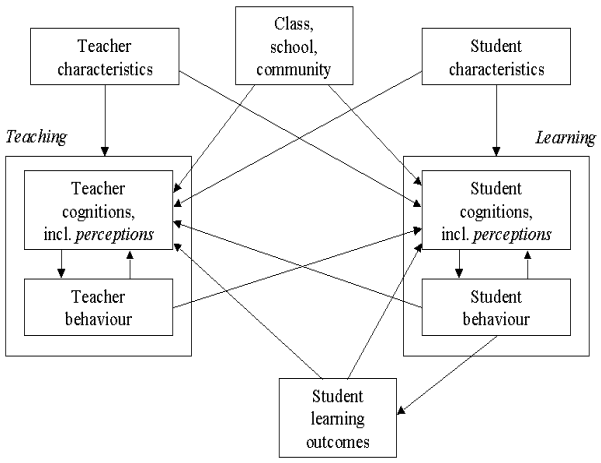

Figure 2.1
A model for the relationship between teaching and learning outcomes
(Source: den Brok, 2001)

To explain the multifaceted structure of teaching, different *types* of teaching acts have been differentiated by some researchers (e.g. Brophy, & Good, 1986; Creemers, 1994; Lee, 1995), like classroom management or instructional behaviours, while others (Wubbels, et al., 2006; Wubbels, & Levy, 1993a; Créton, & Wubbels, 1984) have conceptualised teaching in terms of *perspectives*. The perspective concept was operationalized by den Brok (2001) as "a set of assumptions, a sort of theory that is used to describe behaviour of persons in a certain context with a certain goal in mind" (p.18). With this in mind, teaching can be examined from various perspectives, such as interpersonal, learning activities, a moral, an organisational or a subject-content perspective (Table 2. 5).

Table 2.5

Analysis of a classroom situation where a teacher is lecturing studied from different possible perspectives (Source: Wubbels, et al., 2006)

Perspective	Focus	Examples of relevant (research) questions
The subject-content perspective	To analyze subject content	Is the content the teacher has presented correct? What content has been selected by the teacher? What concepts are being used by the teacher?
The interpersonal perspective	To analyze teaching in terms of the relationship between a teacher and his/her students	Does this teacher impress students? Do students see the teacher as someone who really understands their problems and needs?
The learning activities perspective	To examine the type of learning activities the teacher is eliciting	Do students have to rehearse information? Do students have to organize characteristics or objects?
The moral perspective	To consider the values that are communicated by the teacher	Does the teacher show respect for differing opinions?
The organizational perspective	To analyze the contribution to and fit of teaching to school policy and regulations	Does this teacher behave in line with school policy or department agreements?

Perspectives can be used *simultaneously* to study a particular teaching act and although being separate, multiple partially overlapping perspectives may be needed to explain a phenomenon (den Brok, 2001, Wubbels et al., 2006; Brekelmans, et al., 2000). Den Brok (2001) argued that it is not useful to discuss which perspective is most useful (following Shuell, 1996). However, the stronger the strength of any given perspective in explaining a phenomenon, the fewer are needed. The number of perspectives is related with the situation or problem concerned in research (den Brok, 2001). So, different perpectives are theoretical sources for the study of teaching that originate from different research domains. The *Interpersonal Perspective* (IPP) domain differs somewhat from the Learning Environments Research domain. The latter has mostly built on Walberg's and Moos's dimensions of learning environments, whereas the perspectives on teaching are based on effectiveness research, the systems approach of communication (see 2.3.2) and research on competencies in education (e.g. Shulman, 1986; Doyle, 1986). This also explains the somewhat unique development of the *Questionnaire on Teacher Interaction* (QTI) and its resulting research, which only later were integrated into the Learning Environment Research (LER) domain.

Studies investigating teaching from multiple different perspectives at the same time are scarce. Explicit associations between teaching in terms of an interpersonal, an instructional perspective and in terms of a learning activities perspective have been reported in some preliminary studies (e.g. Brekelmans, et al., 2000; den Brok, 2001; Fisher, Waldrip, & den Brok, 2005; Fraser, 2002; Levy, Rodriguez, & Wubbels, 1992b).

In the next section, a brief overview will be given over the conceptual framework of the *Interpersonal Perspective (IPP)* that is the main topic in this dissertation.

2.3.2 The Systems Approach of Communication

Two important starting points for the Interpersonal Perspective (IPP) on teaching are *the Systems Approach of Communication* (Watzlawick, Beavin, & Jackson, 1967) and the *Model for Interpersonal Teacher Behaviour (MITB)* (Wubbels, et al., 2006). Den Brok (2001) distinguished these two elements on the concept of time to evaluate the teacher-student relationship. The MITB is suitable to study the teacher-student relationship *at* a certain point of time, while the Systems Approach is useful to study the relationship *over* a certain time span.

In this subsection, *the* S*ystems Approach of Communication* - proposed in the book "*Pragmatics of Human Communucation*" (Watzlawick, et al., 1967) - will be examined, together with its application to student-teacher communication in the classroom context. According to Watzlawick and his colleagues (1967), the behaviour of the participants involved in communication can be studied at three levels (see Table 2.6).

Table 2.6
Three levels of communication (based on Watzlawick, et al., 1967)

	Level	Definition
1st	Molecular (The syntax)	One single code or physical process (e.g a handshake, a greeting, etc.)
2 nd	Interaction (The semantix)	A series of exchanged meanings of words and sentences (e.g. a question and an answer, etc.)
3 rd	Pattern (The pragmatics)	The most extended level of communication, exchange of messages (e.g. a lecturing teacher, etc.)

The Questionnaire on Teacher Interaction (QTI), the major instrument of this study, is a diagnostic instrument directed at the pattern level communication in the classroom context (Wubbels, et al., 2006).

Watzlawick and his colleagues (1967) regarded communication as an interactive process. As a starting point to *"The* S*ystems Approach of Communication"* they formulated *axioms*. These are:

- One cannot not communicate (*First Axiom)*
- Human beings communicate both digitally and analogically (*Second Axiom*)
- Communication=content + relationship (*Third Axiom*)
- Punctuation of the communication sequence (*Fourth Axiom*)
- All communication may be either complementary or symmetrical (*Fifth Axiom*)

One cannot not communicate - Communication is only possible in the presence of the other (see teaching definition in section 2.3.1). For example "being late to the first lesson" is totally meaningless when there is no one.

Human beings communicate both digitally and analogically - Digital communication (verbal cues) refers to communicating things by name while analogical communication (nonverbal communication) refers to communicating things by likeness. For example, when the teacher warns the student(s) being late to the first lesson with a smiling face, student(s) might infer that the teacher is flexible or not much serious about the warning. This could be the message for the whole class as well as the late student(s). So, communication is the combination of these two in the end.

Every message contains content and a relationship - Every form of communication has *content* and a *relation* aspect. La France and Mayo (1978) called them the report and the command aspects of behaviour. The content conveys information or description; the relational element carries instructions on how to interpret the content. Teacher and students relate in many ways in a lesson that are outside the subject matter (content). For the given example, being late to the first lesson is out of the subject matter but might carry intimation for students' behaviour in the learning process. The student(s) could develop a positive or negative attitude towards the subject matter depending on his/her interpretation of the relationship. The present study focuses mainly at the relationship aspect.

Punctuation of the communication sequence - The nature of a relationship depends on how both parties punctuate a communication sequence. The punctuation occurs generally in the presence of our disapproval or our perception of a situation as "bad" and creates defensiveness. For example, asking the cause of "being late to the first lesson" might be interpreted by students as being accepted as "late" and might evoke anger with "on time" students. In this example student(s) might focus on what was punctuated although the teacher only asked for the cause. Punctuation is a major factor in classroom communication. At the pattern level of continually exchanged messages, this perpetual sequence of interchanges makes it impossible to distinguish cause and effect (Watzlawick, et al., 1967). Parties see behaviours of each other as the cause of and the justification for their own behaviour. At this point, one message is considered to be the cause of the other. Disagreement can not be solved by expecting to find the one who started or the one who is right. To break subversive spirals, someone should change his/her behaviour and only in that way can the behaviour of the other person change.

All communication may be either complementary or symmetrical - Complementarity means that interactants display opposite behaviours (teacher

talks, students listen), while symmetry expresses the same kind of behaviour by both parties in the communication (teacher smiles and students smile). Symmetrical or complementary messages are based on equality or difference. There is no equal power in the classroom. In terms of power, the teacher-student relationship is thus a structural complementary relationship.

The main focus of the systems approach to communication is the *pragmatic* aspect, e.g. the effects of someone's actions on the other. This effect is most visible in the *perception*[3] of the person involved. Another important element is the notion of *circularity,* meaning that someone's behaviour influences the behaviour of someone else which in turn influences the behaviour of the first person and so on. This interelated and interactive spiral in communication mainly depends on the perceptions of the parties involved (Wubbels, et al., 2006).

Research on teacher interpersonal behaviour has reported on how teacher-student communication patterns in the classroom develop (e.g. Wubbels et al., 2006). Perceptions of the relationship are formed during the first few weeks of the school year and after this period remains relatively stable (Wubbels, & Levy, 1993a; Wubbels, et al., 1985; 1987a). In other words, both students and teachers resist against changes (e.g. Doyle, 1986). Additionally, research has pointed out very recognisable, typical, and different forms of patterns (e.g. Wubbels, Brekelmans, & Hermans, 1987b; Wubbels & Levy, 1991).

At the beginning of this section two important elements of the interpersonal perspective were mentioned: *the Systems Approach of Communication* and *the Model for Interpersonal Teacher Behaviour (MITB*). In this section, general knowledge on the first element and its application to the teacher-student relationship was provided.

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[3] The perception idea here is different from the 'press' idea in Learning Environment Research. In the systems approach, perception means the interpretation of someones behaviour in terms of its effects. With 'press' the distinction between actor and observer is more important.

2.3.3 Leary's Circumplex Model for Interpersonal Behaviour

In this section, Leary's Model for Interpersonal Behaviour, the base for the Model for Interpersonal Teacher Behaviour (MITB), the second element of the interpersonal perspective, will be introduced.

Timothy Leary was director of psychology research in the Kaiser Foundation Hospital in Oakland, California. Over the course of his research more than 5,000 cases (psychiatric, medical and normal controls) were examined and the results of these studies were compiled into Leary's magisterial (1957) book "*Interpersonal Diagnosis of Personality*". Interpersonal personality variables were put in a circle model that later came to be known as the "*Interpersonal Circumplex*". The Leary model has proven to be a rather complete model to picture interpersonal relationships (e.g. Foa, 1961; Lonner, 1980; Wubbels, & Levy 1991; Strack, 1996; Triandis, 1994).

Leary (1957) accepted that individuals strive to diminish anxiety and preserve self–esteem and that this motivates interpersonal behaviour. So, a pattern of communication is formed only when a person keeps behaviour that minimizes anxiety and that maximizes self-esteem. This idea connected his theory with the systems approach, as did his idea of circular communication processes (e.g. Créton, Wubbels, & Hooymayers, 1993).

Behaviours constructed by Leary and his colleagues are plotted on a two dimensional coordinate system (see Figure 2.2). Leary originally defined the horizontal axis as the degree of cooperation between individuals, the *Affection-Hostility axis* and the vertical axis as the degree of control or influence over the communication process, the *Dominance-Submission axis* - (Wubbels, Créton, Levy, & Hooymayers, 1993c). Other interpersonal models proposing titles for types of human interactions named the axes differently, such as 'Status' and 'Solidarity' (Brown, 1965), 'Warmth' and 'Directivity' (Dunkin, & Biddle, 1974), and 'Authority' and 'Affiliation' (Slater, 1962). Leary (and others after him) used the two dimensions to distinguish between sixteen or eight sectors of interpersonal personality behaviours that combined different amounts of Cooperation-Opposition and Hostility-Affection.

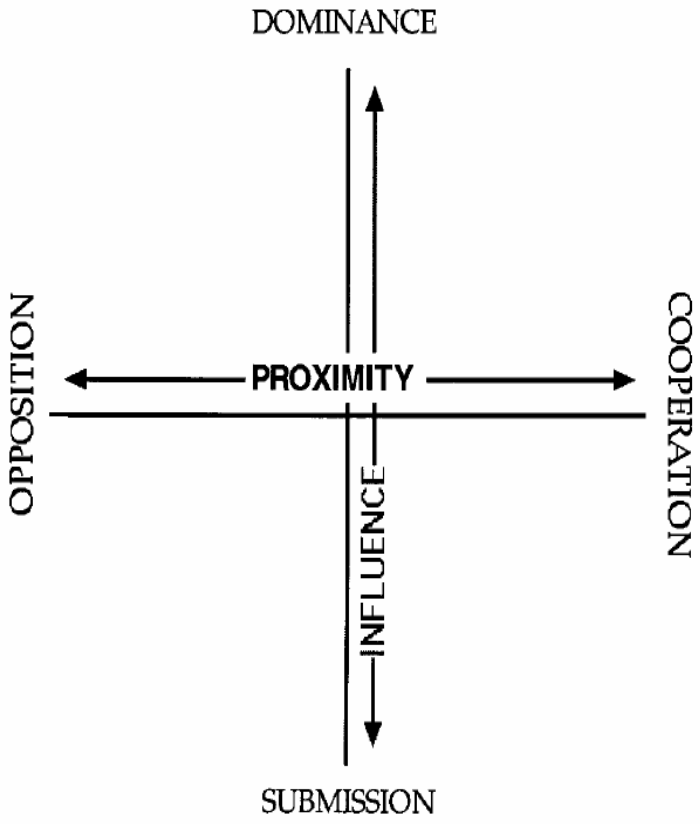


Figure 2.2
The Leary Model for interpersonal communication in a two-dimensional plane (Source: Wubbels, et al., 1985b, p.15)

Interpersonal relationships are in their nature the joint activity of two (or more) underlying factors and a circumplex structure expresses this charcteristic in a model form (Wiggins, Philips, & Trapnell, 1989). The Leary model as well as the *Model for Interpersonal Teacher Behaviour (MTIB)* are special models that are theoretically linked to a particular branch of models named C*ircumplex Models.* These models are based on a specific set of assumptions (Blackburn, & Renwick, 1996; Fabrigar, Visser, & Browne, 1997; Gaines, Panter, Lyde, Steers, Rusbult, Cox, & Wexler, 1997; Gurtman, & Pincus, 2000) that can be outlined as follows:

- The eight behavioural sectors (or scales) of the model are represented by two dimensions (or factors).(*Assumption 1*)

- The two interpersonal dimensions that lay behind the sectors are independent[4]. (*Assumption 2*)
- With the two interpersonal dimensions, the sectors (or scales) of the model can be ordered in a circular structure. (*Assumption 3*)
- The sectors (or scales) of the model are equally distributed over the circular structure. (*Assumption 4*)
- The sectors (or scales) occupy specific positions on the circle (as given in Figure 2.4), which can be determined with a goniometric circle function. (*Assumption 5*)

To test these assumptions - each is a precondition of the next one - behind the circumplex, psychologists have developed a number of statistical tests and procedures. These methods are briefly tabulated in Table 2.7.

Additionally, a number of statistical techniques were developed by scientists to find out the degree to which their empirical models deviate from the perfect circumplex (as given in Figure 2.4). These additional methods (den Brok, Fisher, Brekelmans, Rickards, Wubbels, Levy, & Waldrip, 2003a) concern three issues. First, empirical angular location of a sector can be determined with the help of factor loadings that come out from (confirmatory or exploratory) factor analyses. These results are then compared to the theoretical or perfect location factor loadings, resulting in *angular dislocations*[5] (Pincus, Gurtman, & Ruiz, 1998; Wagner, Kiesler & Schmidt, 1995). Second, variation in *vector length* can be analyzed. In a perfect circumplex, variation in vector length should be minimal. Vector length is the distance of a sector to the circle centre[6] (Blackburn, & Renwick, 1996; Pincus, & Gurtman, 1995) and designates the 'intensity' of a given behaviour. Third, empirical and perfect (theoretical) influence and proximity scores for each respondent can be computed and the correlation between both sets can be established (Blackburn, & Renwick, 1996;

[4] This second assumption does not necessarily apply to all variants of the circumplex (Fabrigar, et al., 1997).

[5] Angle A of a sector is the angle from a scale to the starting point of the cooperation pole of the proximity dimension. It can be computed by the following formula: A=arctan(DS/CO), where DS and CO are factor loadings for the influence and proximity dimension (see Fig 2.4), one can compute ideal/theoretical angular locations A(i) in a similar manner. Angular dislocation can be computed with the formula: A'=1-dev/180, where dev=A-A (i).

[6] Vector length=$\sqrt{}$(influence^2/proximity^2),where influence=factor loading of a sector on the influence dimension, proximity= factor loading of a sector on the proximity dimension.

Wiggins, et al., 1989). Perfect or theoretical dimension scores are computed as follows:

Influence = (.92*DC) + (.38*CD) - (.38*CS) - (.92*SC) - (.92*SO) - (.38*OS) +(.38*OD) + (.92*DO);

Proximity = (.38*DC) + (.92*CD) + (.92*CS) + (.38*SC) – (.38*SO) – (.92*OS) –(.92*OD) – (.38*DO).

In the empirical situation, .92 and. 38 are replaced by values that result from factor analyses. In a perfect circumplex, correlations between the theoretical and empirical dimension scores should be very high (close to 1), while correlations between both dimensions should be non-significant or low (close to 0). High correlations indicate good replication of dimension scores by empirical data.

Table 2.7

Statistical analyses and conditions to test circumplex structure assumptions (based on den Brok, 2001 and den Brok, et al., 2003a)

As.	Analyses	Software	Aim	Criteria	Model Name
1	Exploratory factor analyses Multidimen-sional scaling	SPSS	Checking the existence of 2 factors	The amount of variance explained and/or Eigenvalues of the factors extracted[7]	Spatial representati-on model (Gurtman and Pincus, 2000)
2	Exploratory and confirmatory factor analyses	SPSS LISREL AMOS EQS Mplus etc.	Testing if the two factors are indepen-dent	Correlation between the two factors should be (set to) zero.	Irregular circumplex or Non-circumplex model (Gaines, et al., 1997)

[7]When factors explain less than 10 percent of 'additional' variance, when eigenvalues are below one, or when Eigenvalues hardly drop between factors (this can be seen by looking at the scree-plot), the number of factors is optimal. The best solution provides two factors and the overall amount of variance explained by the factors should be high (e.g. above 70 percent).

Table 2.7 Continued

3	Correlation between subscales	RANDALL (Tracey, 1994) CIRCUM	Checking if scales have a circular ordering[8]	Correspon-dence index (with p-value)[9]	Circular order model (Gurtman, & Pincus, 2000)
4	Confirmatory factor analyses	CIRCUM (Browne, 1992) Mplus LISREL etc.	Checking if scales are equally distributed over the circle	Model to data fit indices should be sufficient (e.g. χ^2 non-significant, TLI, GFI and CLI above .95, RMSEA and SRMR below .05)	Equally-spaced circumplex (Gurtman, & Pincus, 2000)
5	Confirmatory factor analyses	LISREL Mplus etc.	Checking if scales form perfect circumplex	Model-data fit indices should be sufficient	Perfect circumplex (Gaines, et al., 1997)

Note: As.= Assumption

Den Brok (2001) reviewed work on (the validity of) circumplex models outside the domain of education - psychology, sociology, antroplogy, pedagogy, communication and discovered that not always two interpersonal dimensions are found, while the need for a third (or sometimes fourth) dimension has been argued. He summarized the arguments for the emergence of additional factors by researchers as follows. The first interperatation in the literature is that the interpersonal model in its present form is incomplete, and an additional third dimension is needed (e.g. Mehrabian, 1981; Lonner, 1980; Truckenmiller, & Warner Schaie, 1979). Next, a group of researchers claim that the interpersonal model is not specific enough and that the third dimension should be considered

[8]Correlations between pairs of scales or sectors are greater for sectors closer on the (interpersonal) circle, and smaller if they are more distant. Thus, correlations between opposing scales are smallest (most negative), while correlations between adjacent scales are highest (positive) and correlations decrease in (equal) steps if one moves from adjacent scales towards opposing scales (Gurtman & Pincus, 2000; Tracey, 1994; Tracey & Schneider, 1995). The *Correspondence Index (or CI)* basically represents the proportion of correlations that is in accordance with the expected circular ordering.

[9] The *p-value* computed for CI indicates the probability that the expected ordering is similar to a circular ordering. The p-value should be significant.

as a subdimension of one of the two orginal dimensions of the interpersonal model (e.g. Burgoon, & Hale, 1987). Then, the interpretation of the third dimension explanation is searched in other factors that unintentionally have been taken along in the operationalisation of the model (Lonner, 1980; Foa, 1961; Carter, 1954; Briar, & Bieri, 1963; Osgood, 1971; Wagner,et al., 1995). Besides these three explanations, some authors have concluded that the emergence of the third dimension is related to methodological problems in the design of studies and consists of mainly measurement error (Leary, 1957; Pincus, et al., 1998; Benjamin, 1974).

In the next section the second element of the Interpersonal Perspective (IPP), the *Model for Interpersonal Teacher Behaviour (*MITB) will be presented.

2.3.4 The Model for Interpersonal Teacher Behaviour (MITB)

The Systems Approach of Communication and the *Model for Interpersonal Teacher Behaviour (MITB)* have been stated as two important elements of the Interpersonal Perspective (IPP) in teaching (see section 2.3.2). The latter, the Model for Interpersonal Teacher Behaviour (MITB), will be introduced in this section.

The rationale for choosing for the Systems Approach of Communication to analyse teacher-student relationships has been stated as "teaching also being a form of communication" (Wubbels, et al., 1985b). Teachers normally develop various ways to communicate with their students in the classroom, from businesslike to lenient or from distant to friendly. These characteristics should be well defined and carefully examined for a healthly communication between students and teacher. So, drawing on the two dimensions - Proximity (Cooperation-Opposition, CO) and Influence (Dominance-Submission, DS) - the MITB transferred the ideas of Leary to education and the classroom context (Figure 2.3).

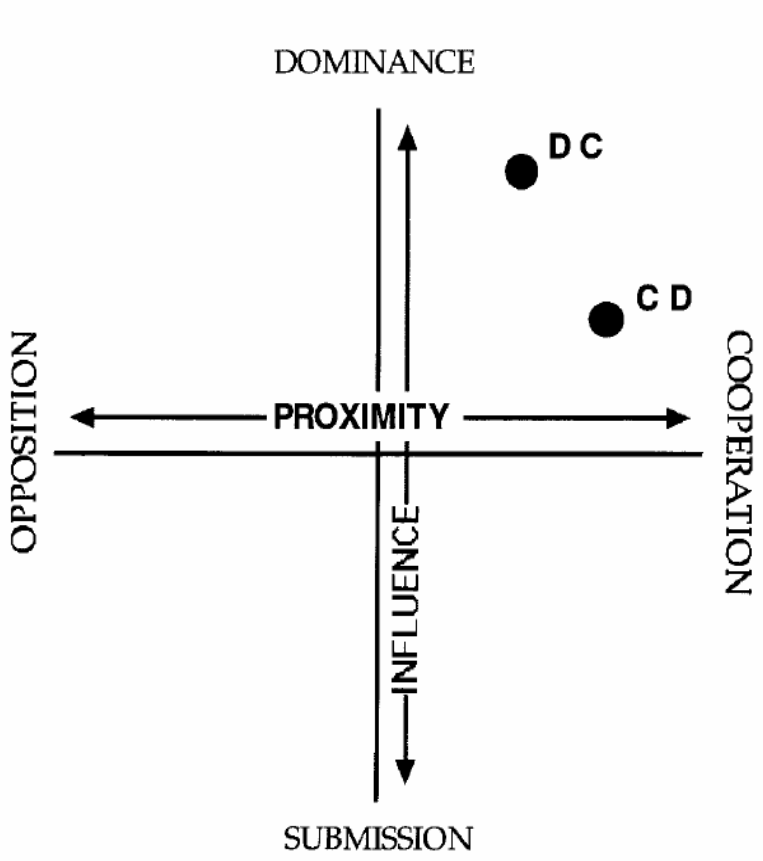


Figure 2.3
Adaptation work of two dimensional coordinate system of the Leary Model
(Source: Wubbels, et al., 1993c: p15)

Each quadrant of the coordinate system encapsulates two sectors of behaviour. The definition of these two sectors of behaviour varies depending on the amount of dominant and cooperative behaviour. To illustrate this principle, the points DC and CD in Figure 2.3 are examined. The two sectors in the first quadrant of the model are Leadership (DC) and Helpful/Friendly (CD) and the points represent these two. DC is a point referring to behaviour with high dominance and some cooperativeness; the point CD represents behaviour that is highly cooperative and somewhat dominant. So, each quarter of the model is composed of two sectors of behaviour, their definitions depend on the most prevalent dimension, but also include the other dimension.

To map teacher-student interpersonal behaviour in this two-dimensional coordinate system, Wubbels and colleagues reduced the sixteen sectors of Leary's original model to eight scales (or sectors) of interpersonal behaviour.

These sectors are labelled as Leadership (DC), Helpful/Friendly (CD), Understanding (CS), Student Freedom (SC), Uncertain (SO), Dissatisfied (OS), Admonishing (OD) and Strict (DO). Each sector is presented graphically in Figure 2.4 and some characteristics are given in Table 2.8.

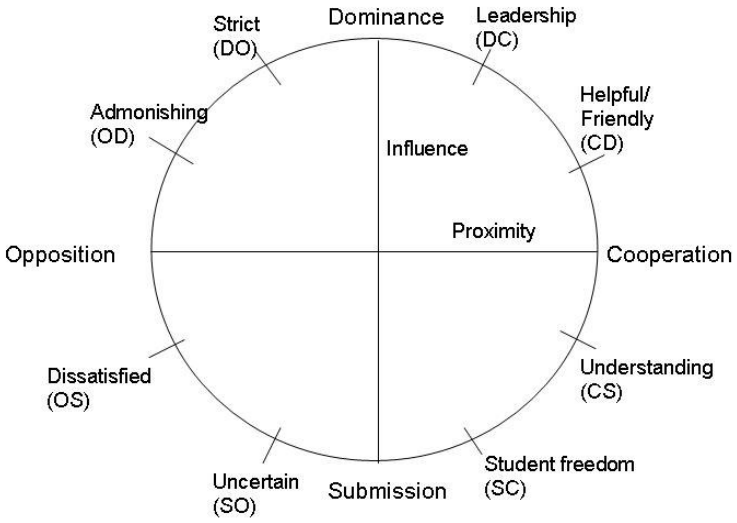


Figure 2.4
The Model for Interpersonal Teacher Behaviour (MITB) (Source: Wubbels, & Levy, 1993a)

Table 2.8

Typical behaviours for the sectors of the MITB

(based on descpritions provided by Wubbels, et al., 1985b)

Label	Sector (scale)	Sample Behaviours
DC	Leadership	Organizes, gives directions, sets tasks, determines procedures, is aware of what's happening, structures classroom situation, explains, makes intentions clear, holds class attention.
CD	Helpful/Friendly	Assits, shows interest, shows concern, is able to take a joke, inspires confidence and trust.
CS	Understanding	Listens with interest, emphatizes, shows trust, is accepting, looks for ways to settle differences, is patient, is open.
SC	Student Freedom	Gives opportunity for independent work, is lenient, allows students to go at their own pace, waits for the class to settle down, aproves of student activity.
SO	Uncertain	Acts hesitant, apologizes, has 'wait and see' attitude and is timid.
OS	Dissatisfied	Is disapproving, questions seriously, looks unhappy or glum and criticizes.
OD	Admonishing	Gets angry, be sarcastic, expresses irritation, forbids, admonishes, punishes.
DO	Strict	Keeps a tight rein, checks, judges, demands silence, sets rules, gives hard tests.

The Questionnaire on Teacher Intercation (QTI), the diagnostic instrument behind the model, was developed for mapping teacher-student interpersonal relationships. Detailed information about this instrument and its development (e.g. the first Dutch version) will be given in section 2.3.5 and 2.3.5.1.

2.3.5 The Questionnaire on Teacher Interaction (QTI)

The Questionnaire on Teacher Interaction (QTI) is a unique instrument that can be used to determine both students' and teachers' perceptions of interpersonal teacher behaviour and it provide different perspectives to researchers. The report given to teachers (based on their personal outcomes) is a useful feedback tool for self-evaluation and for giving clues to teachers on the direction of their professional development. Due to its mentioned advantages, the Questionnaire on Teacher Interaction (QTI) was chosen as the central instrument in this study (see section 3.3.1). In the upcoming section, the development process of this eligible instrument will be explained.

2.3.5.1 Development of the Dutch QTI

At Utrecht University in the Netherlands, the long-term research programme called "Education for Teachers" was started in the 1970s (e.g. Wubbels, et al., 1987a) to study teacher-student interpersonal behaviour in secondary education (Wubbels, & Levy, 1993a). The aim of the programme was to carry over major research findings to a school induction programme by means of observations, analyses of interviews, conferences and other research activities (Wubbels, Créton, & Hooymayers, 1992). With this aim, the intention was to help beginning teachers with discipline problems in their classes.

Over the course of time of the research programme a specific focus was developed for studying the interpersonal behaviour of teachers. Inspiration was found in the Systems Approach to Communication and the Leary Model, which was adapted to form a convenient model to describe the interaction in the classroom context (Wubbels, et al., 1993c)[10]. The Model for Teacher Interpersonal Behaviour (MITB) formed the theoretical starting point of the Questionnaire on Teacher Interaction (QTI). Its practical starting point was the 128 items *Interpersonal Adjective Checklist* (ICL) that Leary used to collect his data and that was piloted in education by Wubbels and his colleagues. (1985). They concluded that it was awkward to use this checklist in an educational context, since many of the items were irrelevant to teachers and the education

[10] First references in the research programme date back to 1972 and first discussions of the model and its usefulness to education have been described in (unpublished) University reports in the mid-70s (Wubbels, personal communication). This places research with the QTI and the interpersonal perspective right at the beginning of emerging Learning Environments research.

field. This, in turn, led to the development of *the Questionnaire on Teacher Behaviour* (Wubbels, et al., 1985b) and subsequently to *the Questionnaire on Teacher Interaction* (QTI) in 1982 (Wubbels, et al., 1985b; 1987a). The Questionnaire on Teacher Interaction (QTI) was designed according to the two-dimensional Model for Interpersonal Behaviour (see Figure 2.3) and its eight sectors (see Figure 2.4). The original 77 items Dutch form of the questionnaire was formed out of a pool of over 200 items for secondary school students and emerged after four trial runs that included statistical analyses, group-interviews, think-aloud responses by students and teachers, as well as on researchers judging the face validity of items (for examples of items see Table 2.9). The instrument contains eight scales with the same names as the sectors of the model and items within the scales are answered on a 5-point Likert-type scale, ranging from "Never/Not at all" to "Always/Very" (den Brok, 2001; den Brok, et al., 2003a; Wubbels, et al., 1993c).

Table 2.9
Typical items of the QTI for each of the eight sectors of the interpersonal behaviour model

Label	Sector (scale)	Typical Item
DC	Leadership	S/he is a good leader.
CD	Helpful/Friendly	S/he is someone we can depend on.
CS	Understanding	If we have something to say s/he will listen.
SC	Student Freedom	S/he gives us a lot of free time in class.
SO	Uncertain	S/he seems uncertain.
OS	Dissatisfied	S/he is suspicious.
OD	Admonishing	S/he gets angry.
DO	Strict	S/he is strict.

After its development, the Questionnaire on Teacher Interaction (QTI) was embraced by researchers in a short period of time and the instrument spread over many parts of the world and was translated into many languages. The upcoming section briefly reviews these developments.

2.3.5.2 Validity and Reliability of the Questionnaire on Teacher Interaction (QTI) across the World

In this section, studies from across the world that have used the Questionnaire on Teacher Interaction and that tested its reliability and in particular its validity (in terms of the circumplex assumptions described in a previous section) will be discussed.

After having been constructed in the Netherlands, the first version of the QTI was followed by a number of different versions for primary education, higher education, principals, supervisors and parents (den Brok, 2001; den Brok, Wubbels, van Tartwijk, Veldman, & Dekovic, 2006d). Over a very short period of time, international interest in the Questionnaire on Teacher Interaction (QTI) developed and soon it was translated into more than 15 languages (e.g. English, German, Hebrew, Russian, Finnish) (Wubbels, Brekelmans, van Tartwijk, & Admiraal, 1997).

First, the 64 items American version was constructed by translating the set of 77 items from the Dutch version and testing it in three rounds with teachers and students. This process was needed because some items required adjustment and additional items were needed due to translation and language disparities (e.g. Wubbels, & Levy, 1991). The next version was the 48 items Australian version, developed mainly as a shorter and more economical version of the 64 items American version and was initially used in Australia (Wubbels, & Levy, 1993a; Fisher, Henderson, & Fraser, 1995; Fisher, Fraser, & Wubbels, 1993; Henderson, Fisher, & Fraser, 2000). The Australian version has been used in Singapore and Hong Kong without translation or adaptation (e.g. den Brok, Fisher, Brekelmans, Wubbels, & Rickards, 2006b; Fisher, Goh, Wong, & Rickards, 1996; Fisher, Rickards, Goh, & Wong, 1997; Goh, & Fraser, 1996). From this point onwards, some QTI versions from across the world followed the American (64 items) version, whereas others followed the Australian (48 items) version. One of the versions that followed the Australian version was the Brunei version, in which the 48 items version had been translated into Malay (Scott, & Fisher, 2000). Other versions based on the Australian version were those in Canada (Lapointe, Pilote, & Legault, 1999), Hong Kong (Yuen, 1999), Korea (Kim, Fisher, & Fraser, 2000), Fiji (Coll, Taylor, Fisher, & Ali, 2000) and Indonesia (Soerjaningsih, Fraser, & Alldridge, 2002). Studies based on the American version were conducted by researchers from the United Kingdom (Harkin, Davis, & Turner, 1999), Slovakia (Gavora, Marek, & den Brok, 2005), Israel (Kremer-

Hayon & Wubbels, 1992), the Philippines (Oberholster, 2001) and Greece (Kyriakides, 2005).

Researchers have also reported on the intercultural (e.g. den Brok, Levy, Wubbels, & Rodriguez, 2003b) and cross-cultural validity of the questionnaire (e.g. den Brok, et al, 2003b; den Brok, et al., 2006b; Fisher, & Rickards, 2000; Wubbels, & Levy, 1991). Reviews with respect to the setup and analyses used for establishing the validity and reliability of these QTI versions (using student perception data in secondary education) across the world (e.g. den Brok, 2001; den Brok, Brekelmans, & Wubbels, 2005b) show that researchers should be careful in choosing their methods to adapt the instrument and analysing the resulting data. *First,* in analyses on the validity (and reliability) of the instrument the level of analysis is crucial. The circumplex model is only assumed to underly the class (aggregated) level of student perception data, but not the individual (deviation of a) student level of the data. As such, it is not surprising that more dimensions have been found in analyses on individual data (e.g. see van Tartwijk, Brekelmans, Wubbels, Fisher, & Fraser, 1998). The multilevel nature of data and variables should be taken into account when testing the circumplex structure of the model (den Brok, et al., 2005b). *Second*, limited statistical approaches have been used in most studies to validate the model. For example, studies used *exploratory* factor analyses to test the structure of their data, if they even tested such structure (which was not the case in most Questionnaire on Teacher Interaction studies – mostly only presenting scale correlation matrices). Confirmatory factor analysis should be used and can test more assumptions behind the data. In studies that did employ exploratory factor analyses, researchers often used the *Principal Component Method* with *Varimax* rotation while a *Maximum Likelihood* method (with orthogonal factors) and *rotation by hand* are advised (e.g. Wubbels, et al., 1997). *Third,* if studies tried to take into account the multilevel nature of their data they used aggregation (or disaggregation), which has several disadvantages (Hox, 1995). Researchers are advised to combine exploratory and confirmatory factor analyses and conduct multilevel analyses whenever possible. *Fourth,* very few studies established reliability (Cronbach's alpha) of the eight scales at the class level as well as the amount of variance in scales at the class level (most focused at the student level). *Fifth* and perhaps most importantly, most versions were created by conducting a translation and back translation process, only very few studies included several rounds of testing and observations in the classroom (and in some cases interviews with teachers and students) (e.g. Fraser, 2002). Wubbels

(1985, following Hui, & Triandis, 1985) argued that only translating (and back-translating) may lead to qualitatively weaker and incomparable versions compared to the original instrument, since researchers have not taken into account differences in meaning, concept structure, answering intensity between country versions. These arguments have been verified by cross-cultural comparisons on the QTI (e.g. den Brok, et al., 2006b), showing that empirical scale positions sometimes differ from their theoretical positions as hypothesized by the circumplex model and that these scales occupy different distances to the circle centre and sometimes shift (even in order) in (counter) clockwise direction within and between countries. Scale positions differ between countries, however, two independent dimensions are found in all countries, as well as a circular order in scale positions. As a consequence, QTI results cannot be compared between countries at the scale level, but they can be compared at the dimension level. Even more, differences between countries have been found with respect to the amount of perceived teacher influence and proximity (den Brok, et al., 2003a; den Brok, et al., 2006b).

The research line starting from the Netherlands in secondary classrooms (involving mainstream students) spread over many countries and grade levels all over the world in a relatively short time period because interpersonal behaviour is an important element of the classroom environment –Interpersonal behaviour is regarded important also in Turkey –and several studies have been conducted in Turkey (with a variety of instruments) to map teachers' behaviours in the classroom context. Some of these studies and their instruments focus on a variety of teacher behaviours and interpersonal behaviour is only part of these (e.g. Açıkgöz, 1990; Korur, 2001), while some other studies specifically focused on teacher–student interaction (e.g. Eyibakışlı, 1991; Çakar, 1994; Doyran 2000).

The present study has been conducted with 62 items Turkish version of the Questionnaire on Teacher Interaction, based on the American 64 items version and its reliability and validity have been tested according to proposed research methods (e.g. den Brok, 2001; den Brok, et al., 2006b).

In section 2.3.6 a brief overview will be given of research outcomes with the QTI from studies in the Netherlands and from studies across the world.

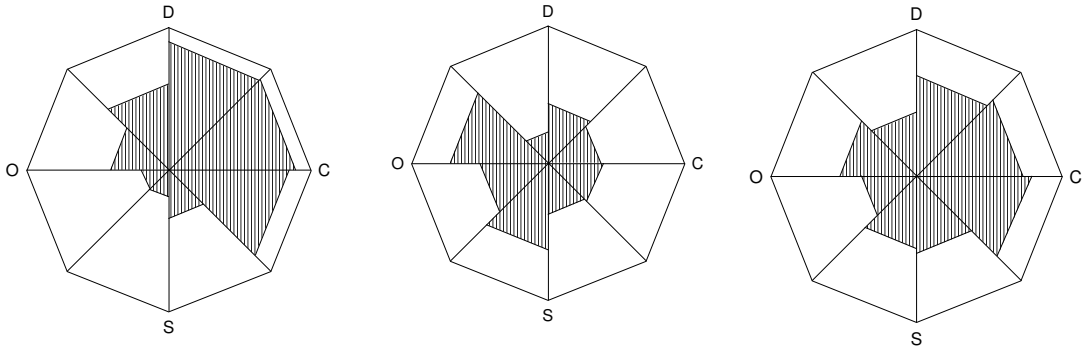
2.3.5.3 Questionnaire and Reports for Teachers on their Personal Results

The Questionnaire on Teacher Interaction (QTI), the diagnostic instrument using the MITB (see section 2.3.4), is familiarized in this section briefly with its student form, teacher form (actual and preffered) and the report given to teachers for feedback purposes.

The Questionnaire on Teacher Interaction (QTI) is completed in various forms to help investigating and improving teacher behaviour, such as a *student form* (Appendix A), a *teacher form* and an *ideal teacher form* (Appendix B). These different forms help researchers (as well as teachers themselves) to look at teacher–student interpersonal behaviour from different angles. These forms are similar in wording, only the instructions given are different among the versions. This can be followed with the following example:

- This teacher talks enthusiastically about her/his subject (student form).
- I talk enthusiastically about my subject (teacher actual form).
- I would talk enthusiastically about my subject (teacher preferred form).

A *teacher report* is given after collection and analysis of the data to every participating teacher for each of their classes (see Appendix C). The scores in this report range from 0 to 4, corresponding to the answer categories 'Never – Always' or 'Not at all – Very'. The higher the score, the more the behaviour is perceived, either by the teacher or the students. In the report attention is also attracted to discrepancy between teacher and student scores. These are insignificant in some casses, such as 2.4 versus. 2.2, when the discrepancy is small. If the discrepancy is more remarkable, such as 2.8 vs. 3.5 or 4.0, a careful analysis or reflection as to why such differences occurred may be helpful (of course, this is not a matter of being right or wrong but trying to explain where focus between participants may differ). Scores are also presented in terms of charts or profiles to provide an easier to interpret overview to the teacher. To arrive at a sector profiles like those in Figure 2.5, scale scores of students are combined to a class mean. An average sector score can be easily calculated by adding the scores of all the items in a sector and dividing them into the number of items that belongs to this sector for each class. These sector scores can be plotted on a graph to represent a teacher profile. Within each profile, the sector scores are represented by shaded figures. The three profiles, the *Ideal*, the *Teacher him/herself* and the *Students* appear for each class in the report given to the teacher (Figure 2.5 is an example for one teacher).



Teacher ideal | Teacher self perception | Students' perception

Figure 2.5
Examples of sector profiles of a teacher (Source: Wubbels et al., 2006)

2.3.6 Research on Teacher Interpersonal Behaviour with the Questionnaire on Teacher Interaction (QTI)

In this section of the dissertation, an overview of some major findings from research with the QTI will be summarized. First, the development of an eightfold typology of teaching styles (section 2.3.6.1) will be presented and connections between teacher interpersonal behaviour and cognitive and affective outcomes of the students will be discussed (section 2.3.6.2). Then, variables affecting students' perceptions of their teacher's communication style (section 2.3.6.3) will be reviewed and will be followed by cultural differences in interpersonal behaviour (section 2.3.6.4). These sections correspond to the research questions as presented in the Introduction section (see page 6) and their corresponding results in the upcoming chapters.

2.3.6.1 A Typology of Teacher Interpersonal Behaviour Styles and Nonverbal Behaviour in the Classroom

Within the domain of research on teaching, different typologies of teaching have been constructed by reserachers (e.g. Bennett, 1976; Brophy & Good, 1986; Ramsaym & Ransley, 1986). A typology of teacher interpersonal behaviour styles has been developed by using data gathered with the Questionnaire on Teacher Interaction (QTI). To create such a typology, researchers conducted cluster analyses (e.g. Everitt, 1980) and found a typology with eight styles or types, which were named *Directive, Authoritative, Tolerant/Authoritative, Tolerant, Uncertain/Tolerant, Uncertain/Aggressive, Repressive* and *Drudging,* (e.g. Brekelmans, Levy & Rodriguez, 1993; Wubbels,

Créton, Brekelmans, & Hooymayers, 1987c; Brekelmans, 1989). These eight types (in terms of a profile) and their corresponding visible behaviour in the classroom (based on observation studies) are provided in Table 2. 10.

Table 2.10
Description and profiles for the eight interpersonal types
(Source: Brekelmans, et al., 1993)

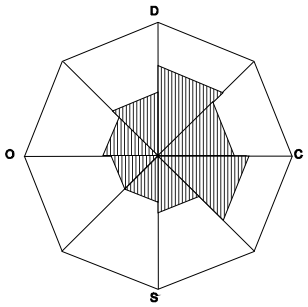
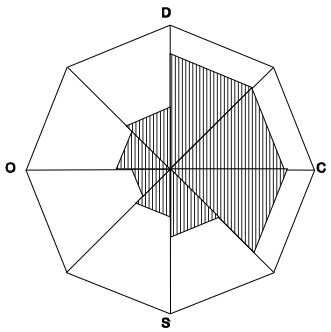
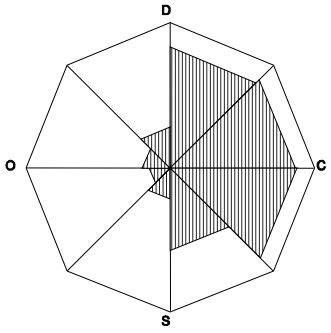
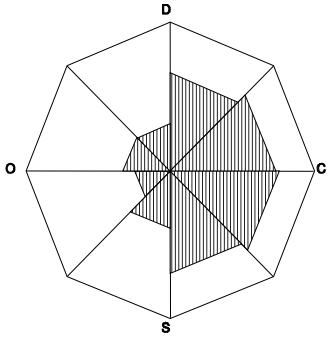
Type interpersonal profile	**Description of classroom environment**
 **1. Directive**	The learning environment in a class with a teacher with a Directive profile is well-structured and task-oriented. The Directive teacher is organized efficiently and normally completes all lessons on time. S/he dominates class discussion, but generally holds students' interest. The teacher usually is not really close to the students, though s/he is occasionally friendly and understanding. S/he has high standards and is seen as demanding. While things seem businesslike, the teacher continually has to work at it. S/he gets angry at times and has to remind the class that they are there to work. S/he likes to call on students who misbehave and are inattentive. This normally straightens them up quickly.
 **2. Authorative**	The Authoritative teacher's class atmosphere is well-structured, pleasant and task-oriented. Rules and procedures are clear and students do not need to be reminded. They are attentive and generally produce better work than their peers in the Directive teacher's classes. The Authoritative teacher is enthusiastic and open to students' needs. S/he takes a personal interest in them and this comes through in the lessons. While his/her favorite method is the lecture, the Authoritative teacher frequently uses other techniques. The lessons are well planned and logically structured.

Table 2.10 continued



3. Tolerant/ Authoritative

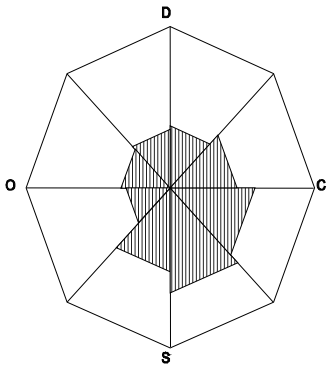
Tolerant /Authoritative teachers maintain a structure which supports student responsibility and freedom. They use a variety of methods, to which students respond well. They frequently organise their lessons around small group work. While the class environment resembles Authoritative (Profile 2), the Tolerant/Authoritative teacher develops closer relationships with students. They enjoy the class and are highly involved in most lessons. Both students and teacher can occasionally be seen laughing and there is very little need to enforce the rules. The teacher ignores minor disruptions, choosing instead to concentrate on the lesson. Students work to reach their own and the teacher's instructional goals with little or no complaints.



4. Tolerant

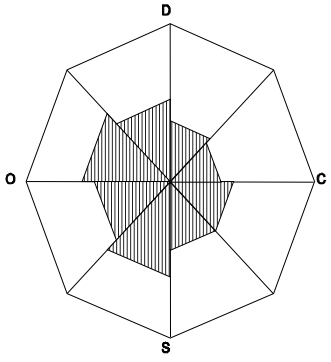
There seem to be separate Dutch and American views of the Tolerant teacher. *To the Dutch*, the atmosphere is pleasant and supportive and students enjoy attending class. They have more freedom in Tolerant teacher's (Profile 4) classes than in those above and have some real power to influence curriculum and instruction. Students appreciate the teacher's personal involvement and his/her ability to match the subject matter with their learning styles. They often work at their own pace and the class atmosphere sometimes may be a little confused as a result.
In the U.S., however, the Tolerant teacher is seen to be disorganised. His/her lessons are not prepared well and they do not challenge students. The teacher often begins the lesson with an explanation and then sends the students off to individually complete an assignment. While the teacher is interested in students' personal lives, his/her academic expectations for them are not evident.

Table 2.10 continued



5. Uncertain/ Tolerant

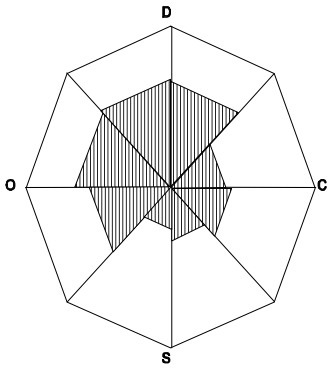
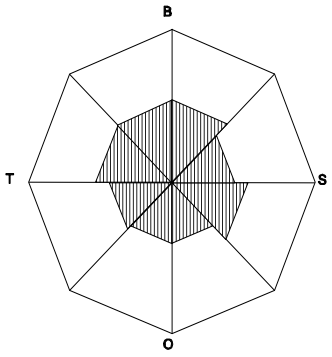
Uncertain/Tolerant teachers are highly cooperative but do not show much leadership in class. Their lessons are poorly structured, are not introduced completely and do not have much follow-through. They generally tolerate disorder and students are not task-oriented. The Uncertain/Tolerant teacher is quite concerned about the class and is willing to explain things repeatedly to students who have not been listening. The atmosphere is so unstructured, however, that only the students in front are attentive while the others play games, do homework and the like. They are not provocative, however, and the teacher manages to ignore them while loudly and quickly covering the subject. The Uncertain/Tolerant teacher's rules of behaviour are arbitrary and students do not know what to expect when infractions occur. The teacher's few efforts to stop the misbehaviour are delivered without emphasis and have little effect on the class. Sometimes the teacher reacts quickly and at other times completely ignores inattentiveness. Class performance expectations are minimal and mostly immediate rather than long-range. The overall effect is of an unproductive equilibrium in which teacher and students seem to go their own way.



6. Uncertain/ Aggressive

These classes are characterised by an aggressive kind of disorder. Teacher and students regard each other as opponents and spend almost all their time in symmetrically escalating conflicts. Students seize nearly every opportunity to be disruptive and continually provoke the teacher by jumping up, laughing and shouting out. This generally brings a panicked over-reaction from the teacher which is met by even greater student misbehaviour. An observer in this class might see the teacher and student fighting over a book which the student has been reading. The teacher grabs the book in an effort to force the student to pay attention. The student resists because s/he thinks the teacher has no right to his/her property. Since neither one backs down, the situation often escalates out of control. In the middle of the confusion the Uncertain/Aggressive teacher may suddenly try to discipline a few students, but often manages to miss the real culprits. Because of the teacher's unpredictable and unbalanced behaviour, the students feel that s/he is to blame. Rules of behaviour are not communicated or explained properly. The teacher spends most of his/her time trying to manage the class, yet seems unwilling to experiment with different instructional techniques. S/he prefers to think `first, they'll have to behave'. Learning is the least important aspect of the class, unfortunately.

Table 2.10 continued

 **7. Repressive**	Students in the Repressive teacher's class are uninvolved and extremely docile. They follow the rules and are afraid of the teacher's angry outbursts. S/he seems to overreact to small transgressions, frequently making sarcastic remarks or giving failing grades. The Repressive teacher is the epitome of complementary rigidity. The Repressive teacher's lessons are structured but not well-organised. While directions and background information are provided, few questions are allowed or encouraged. Occasionally, students will work on individual assignments, for which they receive precious little help from the teacher. The atmosphere is guarded and unpleasant and the students are apprehensive and fearful. Since the Repressive teacher's expectations are competition-oriented and inflated, students worries allot about their exams. The teacher seems to repress student initiative, preferring to lecture while the students sit still. They perceive the teacher as unhappy, impatient and their silence seems like the calm before the storm.
 **8. Drudging**	The atmosphere in a Drudging teacher's class varies between Uncertain/Tolerant (Type 5) and Uncertain/Aggressive (Type 6) disorders. One thing is constant, however: the teacher continually struggles to manage the class. S/he usually succeeds (unlike Types 5 and 6), but not before expending a great deal of energy. Students pay attention as long as the teacher actively tries to motivate them. When they do get involved, the atmosphere is oriented toward the subject matter and the teacher does not generate much warmth. S/he generally follows a routine in which s/he does most of the talking and avoids experimenting with new methods. The Drudging teacher always seems to be going downhill and the class is neither enthusiastic nor supportive nor competitive. Unfortunately, because of the continual concern with class management the teacher sometimes looks as though s/he is on the verge of burnout.

These eight types given in Table 2.10 can also be depicted on the two dimensions of the Model for Interpersonal Teacher Behaviour (MITB) (see Figure 2.6).

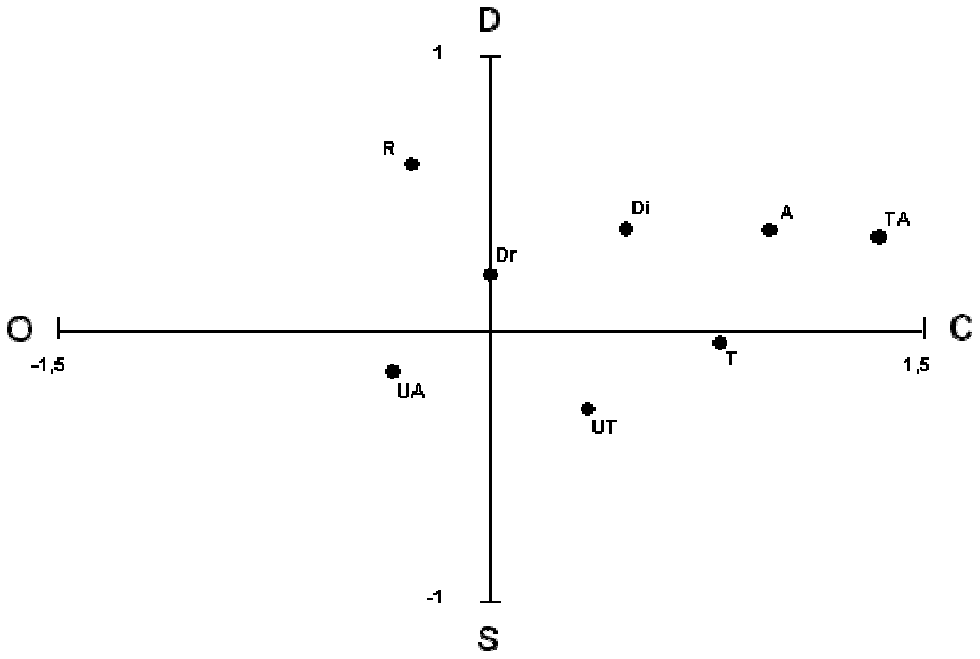


Figure 2.6

The eight interpersonal types in the MITB (Source: Brekelmans, et al., 1993)
Di:Directive, A:Authorative, TA:Tolerant /Authorative, T:Tolerant,
UT:Uncertain / Tolerant, UA: Uncertain / Aggressive,R: Repressive, D:Drudging,

Figure 2.6 can be summarized as follows (considering the place of each type on the dimensions). The most cooperative perceived teachers are the *Tolerant/Authoritative, the Authoritative and the Tolerant* teachers, who have the highest scores on the Proximity dimension (CO). Within this highly cooperative trio, the Tolerant type is the least dominant. As it can be easily noticed from the co-ordinate system, the *Directive*, the *Uncertain/Tolerant and* the *Drudging* types are placed right after these first three and normally they are perceived less cooperative than the first mentioned trio. The *Uncertain/Tolerant* type is least dominant; the *Repressive* is the most dominant of all eight types, followed by *the Uncertain/Aggressive*.

Research results have shown that Directive, Authoritative, Tolerant and Tolerant/Authoritative teachers establish a more reality and activity-based learning atmosphere and succeed best in motivating their students for learning and participation in their classrooms (e.g. Brekelmans, et al., 1993; Brekelmans, et al., 2000). Studies also investigated the connection between what teachers would like to and what students' view in the classroom. For example, although being most dominant right after the Repressive teachers, Drudging teachers would like to be the least dominant and highly cooperative. Directive and

Repressive teachers would like to be average in terms of cooperation, but at the same time they would like to be perceived as dominant. It has also been found that Repressive teachers are stationary towards innovation, while Drudging teachers are more ambitious and flexible. Repressive teachers often have a tense atmosphere in their classrooms, because they tend to resort to agrressive behaviours (Brekelmans, et al., 1993).

The typology was also found to be a factor in the supervision of student teachers. A study conducted by Kremer–Hayon and Wubbels (1992) concluded that student teachers were highly satisfied if they had been supervised by Tolerant/Authoritative or Authoritative teachers, while they were very unsatisfied if they had been supervised by Drudging teachers. Student teachers were perceived most positively if their supervising teachers were Tolerant/Authoritative, Uncertain/Tolerant or Drudging.

Results of QTI studies have indicated that the typology presented (in Table 2.10) is relatively stable and transfers to other countries, although some types do not occur as frequently in one country as compared to another. For example, while eight types have been detected with a similar distribution (of occurrence) both in the Netherlands and the USA, in Singapore, Brunei and Australia mainly Authoritative, Tolerant/Authoritative and Directive teachers could be found (den Brok, et. al., 2003a; Wubbels, et al., 1993c, see also section 4.4.1).

Different profiles can be found in different classes of the same teachers (e.g. Brekelmans, van den Eeden, Terwel, & Wubbels, 1997; Wubbels, & Levy 1993a), and teachers seem to keep changing from type to type over their teaching career (e.g. Brekelmans, et al., 2002). As such, researchers have also found connections between teacher communication types and teacher experience and age (Brekelmans, et al., 1993; Wubbels, Créton, Brekelmans, & Hooymayers, 1987c) (see section 2.3.6.3). Additionally, research has shown that similar profiles can be assigned to male and female teachers and those teachers from different cultural origins also are distributed in a similar pattern over the various types (den Brok, et al. 2006b; 2006d).

As described in section 2.3.2, human beings communicate both digitally (verbal cues) and analogically (nonverbal communication). Research has emphasized the importance of nonverbal behaviours for effective communication and students' perceptions in the classroom (Doyran, 2000; Green, 1982; Woolfolk, & Brooks, 1985; Felder, & Brent, 2000; Köknel, 1994; Moore, 1989; Neill, & Caswell, 1993; Pektaş, 1988; Wootton, 1992; van Tartwijk, et al., 1998).

Not surprisingly, it is crucial to study (and identify) nonverbal teacher behaviour to be able to understand how teachers' interpersonal profiles come across (van Tartwijk, et al., 1998).

Van Tartwijk (1993) connected students' perceptions of teacher interpersonal behaviour to teacher nonverbal behaviour. He classified nonverbal behaviour (at message level) into five channels: Space, Body, Face, Visual Behaviour and Voice. Then, the significance of each of these channels for perceptions on the dimensions of the Model for Interpersonal Teacher Behaviour (MITB) were investigated (for an overview, see Appendix D). For his study thousand 8-second video fragments were analyzed, taken from the videotaped lessons of 53 teachers and scored in terms of nonverbal behaviour and the two interpersonal dimensions. The results of his study pointed out the importance of Face and Voice channels that mainly explained variance in Proximity (CO) ratings. Of these two, facial expression was found as most important. Voice was found to be second most important and includes elements such as tone, potency and length of speech period in the classroom.

The dynamic relation among these five channels can be described as follows. As long as the teacher maintains visual contact with the class, his/her behaviours were perceived as more dominant. The co-presence and combination of visual contact with emphatic verbal presence promoted most dominant behaviour (van Tartwijk, et al., 1998). Van Tartwijk and his colleagues (1998) also found that central teaching moments (e.g. moments with whole-class teaching) are more important for students' perceptions than non-central moments and that central moments determine how students will perceive teachers during non-central moments (e.g. Wubbels, et al., 2006).

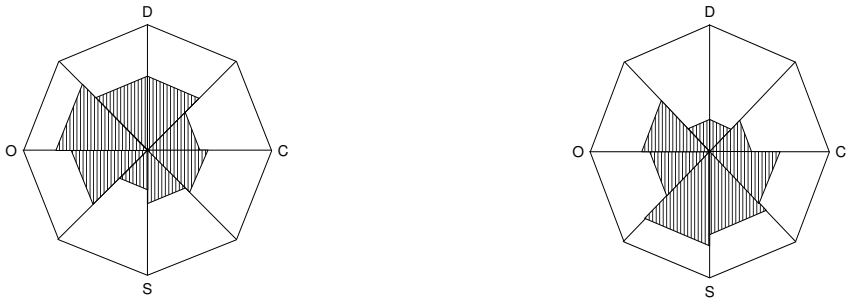
The forthcoming section will touch the association between teacher interpersonal behaviour and cognitive and affective outcomes of students.

2.3.6.2 Teacher Interpersonal Behaviour and Cognitive and Affective Outcomes of Students

In addition to typologies, QTI research has devoted much attention to the association between perceptions of Influence (DS) and Proximity (CO) and cognitive and affective student outcomes. Strong and positive correlations between perceptions of Influence (DS) and Proximity (CO) dimensions and cognitive and affective student outcomes have been found by researchers in many studies in different countries, for example in the Netherlands (e.g. den Brok, 2001; Wubbels, & Brekelmans, 1998), in the United States (Wubbels, &

Levy, 1993a) Australia (Evans, 1998; Goh, 1994; Henderson, 1995; Rawnsley, 1997), India (den Brok, Fisher, & Koul, 2005c), Brunei (den Brok, Fisher, & Scott, 2005d) and in various South-East Asian countries (e.g. Fraser, 2002).

Starting with *cognitive outcomes* in relation to influence dimension, Brekelmans ,Wubbels (1991; see also, den Brok, et al., 2004) reported that students' perceptions of teacher Influence were positive in relation to outcomes of students on a physics test (see Figure 2.7 with some examples). Similarly, a positive correlation between the Leadership scale and cognitive outcomes was found in other studies (e.g. Goh, 1994; Henderson, 1995).



High student achievement Low student achievement

Figure 2.7
Interpersonal profiles of teachers with relatively high and low cognitive outcomes (Source: Brekelmans, 1989)

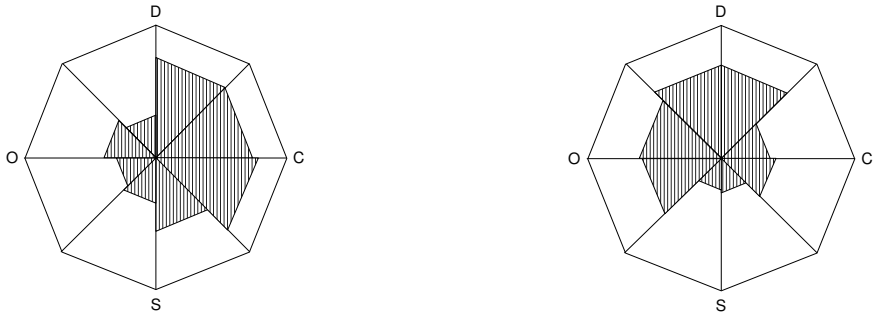
Parallel with findings for Influence and cognitive outcomes, the Proximity dimension and proximity related scales like Helpful/Friendly and Understanding were positively related with students' cognitive outcomes and a positive connection was found even with Student Freedom, though less strong (Goh, 1994; Henderson, 1995; Evans, 1998). Relationships between interpersonal behaviour and cognitive outcomes may not be linear, as higher amounts of leadership, friendliness and understanding behaviour have shown to lead to higher performance but higher amounts of Uncertainty, Dissatisfaction and Admonishing behaviour have not necessarily led to lower performance (Rawnsley, 1997).

Researchers have found inconsistent results when they used report card grades as outcomes measures and in most studies no relationship was found between student perceptions of teacher Proximity (CO) or Influence (DS) and

report card grades (Levy, Wubbels, & Brekelmans, 1992a; Wubbels, et al., 2006).

In sum, it can be concluded that as long as the students perceived their teachers as more cooperative and dominant they received higher scores on cognitive tests.

Second, associations between students' *affective outcomes* with teacher interpersonal behaviour are dicussed in this section. With respect to associations between teacher interpersonal behaviour and affective outcomes, researchers found much more consistent patterns than for cognitive outcomes. Similar to outcomes for cognitive measures, a positive effect of both dimensions was found with affective outcomes, with stronger effects for Proximity (CO) than for Influence (DS). Brekelmans and Wubbels (1991) found a clear relationship between Proximity (CO) and student motivation in her study conducted with physics students and their teachers (for examples of teachers with high and low affective outcomes in her study, see Figure 2.8).



High student attitudes Low student attitudes

Figure 2.8
Interpersonal profiles of teachers with relatively high and low student attitudes (Source: Brekelmans, & Wubbels, 1991)

Den Brok (2001) also found a strong connection between affective student outcomes and interpersonal behaviour, while other elements of teacher behaviour (e.g. teaching from a learning activities perspective) in his study were more relevant to cognitive outcomes. A positive and strong effect was found between teacher Proximity (CO) and affective student outcome variables – pleasure, relevance, confidence and effort - in his study with English Foreign Language (EFL) teachers.

This strong, direct and positive relationship between affective student outcomes and perceptions of Proximity (CO) corresponds to studies investigating teacher *immediacy*, a proximity-related concept (Gorham, & Zakahi, 1990; Sanders, & Wiseman, 1990; Powell, & Harville, 1990; Comstock, Rowell, & Bowers, 1995; Neuliep, 1995; McCroskey, Richmond, Sallinen, Fayer, & Barraclough, 1995).

In terms of scales, positive relationships were found for Helpful/Friendly and Understanding behaviour with pleasure, confidence, effort and relevance of students (e.g. van Amelsvoort, 1999).

Another method used by researchers to investigate associations between students' cognitive and affective outcomes and interpersonal behaviour is by using the aforementioned teacher typology (see Table 2.11, taken from Brekelmans, 1989).

Table 2.11
Effects on Achievement and Attitudes of Students' Perceptions of the Interpersonal Profile of their Physics Teachers (Source: Brekelmans, 1989)

Interpersonal profile type	Effect on achievement	Effect on attitude
1 Directive	0.17	0.62
2 Authoritative	0.07	0.79
3 Authoritative / Tolerant	Missing [a)]	Missing [a)]
4 Tolerant	0.23	0.53
5 Uncertain / Tolerant	-0.17	0.51
6 Uncertain / Aggressive	-0.15	0.20
7 Repressive	0.40	0.38
8 Drudging [b)]	0	0

[a)] Too few cases to include in the analyses; [b)] reference group

As can be seen in Table 2.11, highest achievement scores were realized in Repressive teacher's classes followed by Tolerant and Directive teachers, while the lowest achievement was found in Uncertain/Tolerant and Uncertain/Aggressive teachers' classes. Regarding students' attitudes, highest scores were detected in Authoritative and Directive teachers' classes. Tolerant and Uncertain/Tolerant teachers were on average, while lowest scores were reported for Drudging, Uncertain/Aggressive and Repressive teachers (Brekelmans, 1989).

In general, higher degrees of teacher Influence (DS) and Proximity (CO) relate to higher student outcomes. Second, certain teacher profiles may be more

effective in the classroom than others. The Tolerant/Authoritative teacher profile approximates the image of the 'best' or 'ideal' teacher in this respect best.

In line with these previous studies, associations between students' perceptions of their teachers' interpersonal behaviour and their attitudes toward their science class are investigated in this study. Students' attitudes to science subjects (physics, chemistry and biology) are assessed with a translated version of the *Test of Science Related Attitudes* (TOSRA) (Telli, et al., 2003) (see section 2. 4 and section 3.3.2).

In the upcoming section variables affecting students' perceptions of their teachers' interpersonal behaviour will be discussed.

2.3.6.3 Variables Affecting Students' Perceptions of their Teacher's Communication Style

The importance of appropriate teacher-student relationships for students' cognitive and affective outcomes has been fairly demonstrated in the previous section. Which factors, however, contribute to differences in students' perceptions will be discussed in the present section.

In recent studies researchers have found that most of the differences in students' perceptions (roughly 50 to 80 percent) are determined by factors connected with individual students (within a class), while the remainder (10 to 30 percent of the variance) is connected to class, teacher and school factors, of which teacher-related factors are most considerable (den Brok, Brekelmans, Levy, & Wubbels., 2002b; Levy, den Brok, Wubbels, & Brekelmans, 2003). Recent work has also emphasized the importance of a number of variables that may affect differences in student ratings of teacher communication style, such as student and teacher gender, gender makeup of the class, student and teacher ethnic background, grade level, teacher experience, subject taught, report card grade and class size (Wubbels, et al., 2006). In this section, some of these variables (that are also part of the present study) will be discussed with their related literature.

S*tudent gender* appears to be one of the most commonly used variables as a determinant of perceptions of the learning environment. The QTI related studies reported that female students (both at the primary and secondary levels) perceived their teachers more dominant and more cooperative than did males (e.g., Goh, & Fraser, 1995; Rickards, & Fisher, 1997; Levy, et al., 1992a; 2003; Rickards, 1998; Wubbels & Levy, 1993a). Similar results have been reported for other elements of classroom learning environments (e.g., Dart, Boulton-Lewis,

Campbell, Smith, & McCrindle 1999; Ferguson, & Fraser, 1998; Pianta, & Nimetz, 1993; Waxman, & Huang, 1998). Gender-related differences have also been found in studies on students' preferred (ideal) perceptions, which reported females preferring less competition than males (e.g., Fraser, 1994; Levy, Créton, & Wubbels, 1993; Byrne, Hattie, & Fraser, 1986). QTI research has also indicated interaction effects of gender with other variables (such as ethnicity) on perception scores (e.g. Levy, et al., 2003).

Another variable found to be significantly related with students' perceptions of teachers is *students' age*. Levy and his colleagues (Levy, Wubbels, Brekelmans, & Morgenfield, 1997; Levy, et al., 2003) noted that teachers were perceived more dominantly by older students, while no difference was found with respect to proximity. However, in another study student age was found to be unrelated to both dimensions (Levy, et al., 1992b). Thus, findings with respect to student age remain inconclusive.

Studies have indicated *grade level* as a potentially important variable affecting students' perceptions. Researchers have concluded that students in higher grade levels perceive more influence and proximity than their younger peers (Ferguson, & Fraser, 1998; Levy, et al., 1992a).

Class size has found to be negatively associated with students' perceptions of teacher proximity, while no effect has been found with teacher influence (Levy, et al., 2003). This seems a logical finding, as teachers have less time to have contact with (individual) students in larger classes.

As for *subject taught,* in some studies physics, science and mathematics teachers have been perceived as less understanding and displaying less leadership than teachers from other subjects (Levy, et al., 2003); however, in other research they have been found to be more cooperative and dominant (den Brok, et al., 2004; Wubbels, & Levy, 1993a). So, the result for this variable is also rather inconclusive.

Studies with the Questionnaire on Teacher Interaction (QTI) also addressed changes in teacher behaviour over the professional career (see Table 2.12). T*eacher professional experience* is one of the factors that affect the way in which students' perceive interpersonal behaviour in the classroom.

Table 2.12

Percentages of interpersonal profiles for six groups of teachers with different experience levels (based on students' perceptions)

(Source: Brekelmans, et al., 2002)

Type	Experience (years)					
	0*	1–5	6–10	11–15	16–20	>20
Directive	6	12	30	37	29	28
Authoritative	7	19	21	19	16	17
Tolerant/Authoritative	11	8	6	4	11	6
Tolerant	42	19	21	11	13	6
Uncertain/Tolerant	27	20	6	4	3	11
Uncertain/Aggressive	4	8	2	6	8	11
Repressive	0	1	4	8	11	17
Drudging	3	13	9	11	11	6
Total	100	100	99	100	102	102

Note: *=*S*tudent teachers

The general picture that emerges from Table 2.11 is that the Tolerant and Tolerant/Uncertain profiles are the major types during the student teaching period. Within the first two years of experience in teaching, Authorative and Tolerant/Authoritative profiles can be found more often. Generally, towards the end of the teaching career an increase in the number of Repressive teachers is noticeable while this profile is totally absent at the beginning and going upward over the course of professional career time (Brekelmans, Wubbels, & van Tartwijk, 2006). In sum, the more experience a teacher has, the higher the perception of Dominance, Leadership and Strictness (Levy, et al., 1992b), while for Proximity – including Helpful/Friendly or Understanding behaviours – no experience effects have been found. In other words, there is no parallel development between the cooperative behaviour of teachers and the years of experience (Brekelmans, Holvast, & van Tartwijk, 1992; Brekelmans, et al., 2002; Somers, Brekelmans, & Wubbels, 1997; Wubbels, & Brekelmans, 1998; Wubbels, & Levy, 1993a).

2.3.6.4 Cultural Differences in Teacher Interpersonal Behaviour

Recent studies have also investigated the effect of ethnical variables on students' perceptions of their teachers' interpersonal behaviour (for a review,

see den Brok & Levy, 2005a). Researchers have reported a fair connection between *student ethnicity* and their perceptions of teacher communication patterns when *self-designated ethnic group membership* was used as an explanatory variable. In American samples, African-American, Hispanic-American or Caucasian students perceived their teachers as more dominant and cooperative than students with Asian-American backgrounds (Brok, et al.2002b; 2003b; Levy, et al., 2003; Levy, Wubbels, & Brekelmans, 1996). Similarly, Hispanic-American students rated their teachers as more dominant and cooperative than other ethnic groups did (den Brok, et al., 2002a; 2003b; Levy, et al., 1996). Studies in Australia replicated these findings, reporting Asian students perceiving more influence and proximity and describing their classes more positively than students originating from other cultural groups (Evans, & Fisher, 2000; Rickards, 1998; Rickards, & Fisher, 1997). Obviously, these (contrasting) findings can be ascribed to differences in methodology (the Australian studies used regular analyses of variance, the American studies used multilevel analysis), sample distribution and the country of interest (U.S. vs. Australia) (e.g. Fisher, den Brok, & Rickards, 2006).

Researchers established connections between *teacher ethnic background* and students' views of teacher interpersonal behaviour. It has been reported that Hispanic teachers were rated as more dominant and cooperative (den Brok, et al., 2002b; Levy, et al., 1996), while Asian and Asian-American teachers were perceived as less dominant and cooperative than teachers from other ethnic groups (den Brok, et al., 2002b; 2003b; Levy, et al., 1996). Findings with respect to teacher and student ethnic backgrounds were replicated with *researcher-ascribed categories* (as compared to self-assigned categories) (den Brok, & Levy, 2005a). Also, findings translated to class-makeup as well, e.g. higher numbers of African-American and Hispanic-American students resulted in higher amounts of Influence and Proximity perceived (e.g. den Brok, & Levy, 2005a).

One more ethnicity-related variable found to be significant in explaining the range of students' views was *primary home language*. In studies in the USA, students speaking English at home were found to rate their teacher lower in terms of dominance when compared to students speaking other languages (Levy, et al., 1997), while those speaking Spanish perceived most cooperation (den Brok, et al., 2003a). In Australian studies, it has been found that students speaking an Asian language at home perceived their teachers higher in terms of Influence (DS) and Proximity (CO) (Rickards, & Fisher, 1997; Rickards, 1998).

A last ethnicity-related variable found to be important was *acculturation.* Researchers reported that the longer the students had lived in the country of interest, the less dominance they perceived in comparison to those who had just arrived (Evans, & Fisher, 2000, for Australia; den Brok, et al., 2003a, for the USA).

Additionally, researchers investigated differences in the effect of perceptions of interpersonal teacher behaviour between ethnic groups in Dutch multicultural classes and reported a stronger connection between both dimensions – Influence, Proximity- and students' subject-related attitudes for Turkish and Moroccan students than for Dutch students. Based on these outcomes, it was concluded that teacher interpersonal behaviour may have been more relevant to students' subject-related attitudes for non-Western students than for Western students (den Brok, & Levy, 2005a).

Parallel with increasing contact between cultures and their people over last few decades, intercultural and cross-cultural contacts have left their impression on education as well, where teachers find themselves faced with a growing amount of cultural diversity in the classroom. An upward interest in cultural issues within science education is noticable (Hui, & Villareal, 1989; Jegede, & Okebukola, 1988; Lonner, 1980; Riah, Fraser, & Rickards, 1997; Rickards, 1998). According to Ting-Toomey (1999) due to multicultural diversity in the classroom, teachers' communication styles are being challenged. Whilst there is a clear need for changing teacher education programs in order to support teachers while confronting and intercepting these challenges, Banks (1995) reported that little has changed over the last two decades. The need for changing programs and supporting teachers by collecting information on teachers' and students' perceptions of interpersonal behaviour has been emphasized by researchers (e.g. Au, & Kawakami 1994; Grossman, 1995; Nieto, 1996; Matsuda, 1989; Nguyen, 1986; Samovar, & Porter, 1995; Stefani, 1997) and studies have been conducted to investigate these effects of the cultural factors on students' perceptions of their teachers' interpersonal behaviour (see first part of this section).

Communication and perceptions obviously are under the influence of participants' cultural backgrounds (Giles, & Franklyn–Stokes, 1989; Segall, Dasen, Berry, & Poortinga, 1990; Gay, 2002; Jacobs, 2003; Jegede, & Okebukola, 1991; Le Roux, 2002; Squire, MaKinster, Barnett, Luehmann, & Barab, 2003). The interconnected and interactive relationship atmosphere of the classroom, verbal and nonverbal behaviours are under the clear influence of

cultural factors (e.g. Gumperz, 1982; Ogbu, 1992). Ethnicity related variables have confirmed these assertions in QTI related studies by explaining variance in students' perceptions. However, how to explain these cultural differences is another issue.

Researchers have mostly based their interpretations on Hofstede's (1984) cultural dimensions, which also have been translated to educational settings and are based on data collected with thousands of individuals working in multi-national corporations in 40 countries. Hofstede (1984) identified four dimensions that differentiate cultures namely, *Power Distance, Uncertainty Avoidance, Individualism-Collectivism, and Masculinity-Femininity* (see Table 2.13).

Table 2.13
Cultural dimension of Hofstede

Dimension	Definition	Example for effects of the dimension on interpersonal behaviour (perceptions) in the classroom
Power Distance (PD)	Unequal distribution of power and wealth in a culture.	Student perception of strong teacher authority in the classroom might decrease student participation in classroom activities or can lead to lower perception values on the proximity dimension
Uncertainty Avoidance	The amount of uncertainty that people can tolerate in a situation.	Teachers from strong uncertainty avoidance countries could use a strict timetable or clear cut precise objectives in the classroom, while students from weak uncertainty avoidance cultures might function better in setting with less defined parameters. Higher uncertainty avoidance can cause higher perceptions of students on the Influence dimension or lower perceptions of Friendly/Helpful behaviour.
Individualism /Collectivism	Individualism is the inclination for a culture to place individual rights and needs over group's aspects. Collectivism implies the tendency of a culture to emphasize the importance of 'we' over 'I'	The atmosphere in the classroom can affect cultural values. Students with more individualistic values could have difficulties with or may not fully perceive collectivist behaviours, which may lead to lower perceptions of teacher cooperation.

Table 2.13 Continued

Masculinity-Femininity	The acceptance of traditional roles defined by gender. The acceptance of differences between genders.	Boys may assume that a female teacher can not well manage the classroom or that she can not explain phycis as well as a male teacher. In cultures with higher gender differences, teachers could be perceived as more dominant and less cooperative.

Part of the differences in perceptions may be connected to differential treatment by the teacher, as well as the cultural and individual norms and values related to learning and teaching (den Brok, & Levy, 2005a; den Brok, et al., 2003a). Studies investigating cultural background differences generally concluded that teachers should be aware of these contrasting characteristics in their classrooms and develop mutual understanding (e.g. Rodriguez, 1999; den Brok, et al., 2003b).

As was touched in the very first lines of this section, teaching and learning require perception and communication, both of which are culturally affected and it is important to support teachers with data collected from different cultures and countries. Still, most of the QTI research has involved students in Western countries, which can all be described as *low contact* cultures (e.g. Andersen, 1997; Sussman, & Rosenfeld, 1982). Turkey can be regarded as a '*high-contact*' or '*high-immediate*' culture (Hofstede, 1991). The results of the present study will add new building blocks to the cultural investigation of the interpersonal perspective as well as to the domain of learning environments research by providing data from a new geography and culture for the ongoing research line in the domain.

Research on teacher interpersonal behaviour in Turkey has not grown parallel with the worldwide attention to this topic. Only a few studies have been conducted with the QTI in science (Rakici, 2004) and mathematics (Şimşeker, 2005).

Rakici' s (2004) work was the first study conducted with QTI in Turkey. A total of number of 722 eighth grade science students in 24 classes of 5 schools participated in her study and also answered the *What is Happening in this Class* (WIHIC) questionnaire, plus a science attitude scale. She concluded that the students generally perceived their science classroom learning environment positively and that they perceived their teachers with more cooperative behaviours (than opposition behaviours), while indicating the relationship

between students' perceptions of classroom environment and students' cognitive and affective outcomes. Şimşeker's (2005) study was the second one with the QTI in Turkey and additionaly one mathematics attitude scale was used. A total number of 1317 eight grade mathematics students in 37 classes from 17 schools and 22 teachers participated in her study. Results showed that students perceived their mathematics teachers more cooperative and strict. Also, she reported that male teachers were perceived with higher Influence scores than female teachers. Moroever, she concluded that students with higher socio economic background and girls generally perceived their teachers more favourably and more cooperative.

Data obtained in both these studies were analyzed by using analysis of variance (ANOVA), multivariate analysis of variance (MANOVA), multiple regression analysis, bivariate correlations and multiple regression. In both studies, the QTI was only translated and backtranslated from the 64 items American version.

Other studies in Turkey have focused on classroom interaction and the classroom atmosphere, but these studies used different frameworks and instruments to study teachers' interactional behaviours. Okçabol and Gök (2003) conducted a survey study with teachers entitled 'the teacher profile in Turkey' and concluded that 55 percent of the teachers shared the idea that they had control and dominance over their clases.

One study conducted with 846 students from three different universities pointed out the importance of positive classroom atmosphere on students' cognitive outcomes, motivation and attitudes towards the subject (Kısakurek, 1985).

Although the importance of classroom communication, verbal and nonverbal behaviours have been underlined by researchers in Turkey (e.g. Çetinkanat, 1998; Doyran, 2000; Memişoglu, 2004; Pektaş, 1989; Yılmaz 2001), there is still a strong need for more research and for a special focus on science classes in secondary schools.

As mentioned, this chapter will review literature for three topics. The first two - Learning Environments Research and Research on Teacher-Student Interpersonal Behaviour – have been discussed up to this point. The upcoming section is the last part of the literature and will focus on Student Attitudes. After this, a summary will be provided over the whole literature review chapter and its major findings.

2.4 Student Attitudes

In the present study, the researcher investigated whether associations exist between the two interpersonal dimensions - Influence and Proximity- of the QTI and student attitudes (see section 4.4.4). That is why this section briefly will discuss literature related to students' attitudes. First, a definition of attitudes will be given, and then the measurement of attitudes will be discussed.

In the past, defining students' attitudes was a difficult task for researchers and caused unsettled definitions. Klopfer (1976) developed a structural framework for the affective domain that was specifically associated with science education in mind. His taxonomy consisted of four categories that are as given in Table 2.14.

Table 2.14
Klopfer's attitude taxonomy

Dimenson	Definition
Events in the natural world	Awareness and an emotional response to experience.
Activities	Students' participation in activities related to science, both formal and informal.
Science	The nature of science as a means of knowing about the world.
Inquiry	Scientific inquiry processes.

The second category, relating to students' attitudes towards their science activities in Klopfer's (1976) frame, is the focus in this study.

Another point that needs to be clarified is the measurement of attitudes. A variety of techniques, including interviews, open-ended questions, projective techniques, closed item questionnaries and preference rankings have been used to evaluate students' attitudes towards a subject (Laforgia, 1988). Researchers have also developed instruments to map attitudes of students towards science (Fisher, 1973; Fraser, 1978; 1981; Mackay, 1971; Wubbels, et al., 1985b). One of the most widely used contemporary instruments to measure students science related attitudes is the TOSRA (Fraser, 1981), which is also being used in the

present study. *The Test of Science Related Attitudes* (TOSRA) was developed by Fraser (1978; 1981) to measure students' attitudes towards their science classes following Klopfer's frame (1976) for the affective domain in science education. The seven original scales were: social implications of science, normality of scientists, attitude to scientific inquiry, adaptation of scientific attitudes, enjoyment of science lessons, leisure interest in science, and career interest in science. Each of the seven scales included 10 items. The TOSRA items are scored on a 5-point Likert scale, ranging from strongly agree (5) to strongly disagree (1). The translated versions of this questionnaire have been used in previous studies in non-Western countries with a high degree of reliability (Goh, 1994; Goh, & Fraser, 1995; Wong, & Fraser, 1996).

Since main interest of the study was on the effect of interpersonal behaviours on subject-related attitudes, four scales from the original form of the TOSRA were selected: *attitude to scientific inquiry*, *enjoyment of science lessons*, *leisure interest in science*, and *career interest in science.* The TOSRA will be discussed further in method chapter (see section 3.3.2).

2.5 Chapter Summary

The studies in the reviewed literature can be collected under main three topics, namely Learning Environments Research (LER), Research on Teacher Interpersonal Behaviour and Research on Student Attitudes. These three interconnected and related fields of educational research, nevertheless originating from different domains, were discussed in depth and at length.

The main focus of the review was on Teacher Interpersonal Behaviour and the QTI, the major topic of this dissertation. Based on the reviewed literature and similar to LER studies, it was concluded that research on teacher interpersonal behaviour is a newly developing research domain and should be more focused on by researchers in Turkey.

The review of the literature also indicated that there is a need to develop a reliable and valid form of the QTI for high-contact cultures and that Turkey could serve this purpose well. It was also shown those students' perceptions of teacher interpersonal behaviour can be organised in terms of profiles, that these perceptions are strongly connected to student outcomes and that they are affected by a variety of variables, not surpringly being cultural or ethnic background being one of these variables.

The current study will investigate students' perceptions of their teachers' interpersonal behaviours from a science teaching perspective. Science lessons

are usually considered as difficult subjects and many students have stereotypes towards the subject. With respect to this issue teacher-student interpersonal relationships might be important to overcome these stereotypes and to concentrate students on science and to develop positive science attitudes. It is hoped the outcomes of this study will help science teachers to reflect on and build more positive relationships with their students.

CHAPTER III

METHODOLOGY

3.1 Introduction

In the first chapter, the research problems, hypotheses and significance of the study were discussed and a general overview of two countries' educational systems was provided. After this, a general introduction and reasons for undertaking the study were provided; in the second chapter the related literature was reviewed and focused on three domains, namely *Learning Environments Research*, *Research on Teacher Interpersonal Behaviour* and *Student Attitudes*.

This chapter aims to describe the way in which the study was conducted. With this in mind, the chapter will be composed of four parts, starting with the procedure (3.2) in which the general process of data collection and setup of the study will be mentioned. Next, details on the instruments (and their development) of the study will be given in the instrumentation section (3.3); this will be followed by the section that describes the population and sample (3.4). Finally, the procedure to analyze the data will be outlined in the section named data analysis (3.5). Lastly, a synopsis of the chapter will be given in the chapter summary (3.6). The methodology outlined in this chapter involves both quantitative and in minor way qualitative methods, the latter especially carried out to develop a 62- item Turkish version of the QTI [11] The following section is the first part of the method and will describe the procedure of the study.

3.2 Procedure

3.2.1 Approval Process

After decisions on key terms had been taken, a detailed literature search was undertaken (and has been described in Chapter 2). Information sources were followed continuously (also via searches on the internet and libraries). Some of the documents related to the QTI - like book chapters and conference

[11] In particular dissertations from Curtin University were studied at http://adt.curtin.edu.au/theses/browse/by_author/all.html (Retrieved, December 2004-February 2005)

papers - were provided electronically or personally by Dr. den Brok and his colleagues from the IVLOS Institute of Education (Utrecht University).

Financial support for the study was obtained from METU via *METU-Scientific Research Project (BAP-2005-05-06-01)*, entitled "*Secondary School Students' Perceptions of Science Teachers' Interpersonal Behaviours*" with a budget of 3000 YTL. Stationary items were covered by this grant. All other costs were covered by the researcher herself.

To start the data collection process for the study within schools, official permission of the Ministry of National Education was asked. For this purpose, the *Secondary School Science and Mathematics* (SSME) *Department* within the Educational Faculty at the Middle East Technical University (METU) was contacted and a letter asking for approval was written to the department secretary. Next, after completing the approval process within the university, a letter was sent to the *Department of Research Planning and Coordination of the Ministry of National Education* via the presidency of METU to receive official permission to conduct the study with secondary schools countrywide (see Appendix E). With this permission letter local educational directories permission was asked since this is a necessity to visit schools and start the administration process. The researcher contacted local educational directories of each province in the regions[12] personally or by phone and faxed the permission letter. After school visits and administration of the instruments had been approved by the local authorities, the researcher contacted school managements and teachers of the selected schools.

3.2.2 Sampling Process

Since the opinions of a large group of people about a particular topic are studied here and the aim is to describe characteristics of a population, *survey research* was used in the pilot studies and main study. However, data were enriched with interviews - both with teachers and students - during the pilot studies in developing the 62-item Turkish version of the QTI. Actually, the development process consisted of rounds of pilot studies and interviews that

[12] The seven *geographical regions* of Turkey are the principal unit of information and administration in publications of governmental organizations such as the *Türkiye Cumhuriyeti Devlet Planlama Teşkilati* (the Turkish Republic Prime Ministry State Planning Organization) or the *Ministry of National Education*. In this study, data were collected on the basis of the geographical regions. Educational regions (1899 exist in Turkey), the smallest unit distinguished by

followed each other. All these pilot studies were carried out mainly in two different high schools in Bursa. The schools participated in the study together (or separately) within the realms of their possibilities. Sampling throughout the development process was thus *convenient* in nature (see section 3.4.1.1). Data was collected at just one point in time, both during the pilot studies as well as in the main study, although the time needed to collect all data took anywhere from a day to a few weeks or more. Data collection concentrated within the academic term 2004-2005. The data collection process started in November 2004, almost two months after the start of the academic term. The administration did not start with the academic term to allow for settlement of communication. According to Brekelmans and her colleagues (2002) it takes about two months for interpersonal behaviour styles and perceptions to become fully stable. The data collection process did not start simultaneously in every province; in some places the process began one or more months later. All data was collected by the end of April 2005, one month before original planning. Although the surveyed participants were selected randomly as best as possible, the researcher also wanted to provide some freedom to participants to chose suitable moments for administration and make sure that they could provide the desired information at that time and that they would be willing to answer the questions (Fraenkel, & Wallen, 1996) (see section 3.5). All instruments used were administered to the ninth, tenth and eleventh grade science (physic, chemistry and biology) students in public, coeducational, daily general schools (Anatolian and General High Schools[13]) in the rural, suburban and urban regions of provinces.

The researcher visited the schools in the *Marmara, Aegean and Central Anatolia* regions personally and carried out and organized the administration process with the help of teachers and school managements within these regions. In the other four regions, cities were selected *randomly*.

Regarding the selection of *schools*, the upcoming described procedure was followed for all schools that participated in the study. *First,* for each province the public general high schools were numbered with the University Entrance Examination catalogue published by Öğrenci Seçme ve Yerleştirme Merkezi (ÖSYM, or the Student Selection and Placement Centre). *Second*, in order to construct a representative sample for each city, all of the general public schools

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the government was not used as starting point since this unit is not a unit for programming or administration (Bozan, 2004).

[13] These school types have the same science curriculum.

in these two types were counted and at least 10 percent of the schools were selected for the study. *Third,* random numbers were drawn manually and the schools labelled with these numbers were selected. Some selected schools could not participate in the study since their current conditions were not convenient for reasons such as change in managerial position(s), extra workload due to the coordination of student teachers, allocation of new science teachers, or in-service training programs followed by teachers (as lecturer or as participant).

The study attempted to sample at least *three teachers* from science subjects within each school - preferably from different subjects - with at least *two* of their *classes* consisting of at least *10 students*. Results of prior studies with the QTI indicated that the questionnaire should be administered to at least 10 students in a class for the data to be reliable and that there is no need to administer it more than once per year, since interpersonal style remains relatively unchanged and stable. A minimum of 2 classes should complete the questionnaire for one teacher to achieve a reliable evaluation of overall style (see Wubbels, Brekelmans, & Hooymayers, 1991). Obviously, some changes occurred in practice, such as some schools attending with less than three teachers, with one or two teachers or with more than two classes of the same teacher. Due to the limited number of science classes, especially in the rural parts of the province, some classes completed the questionnaire for two different teachers and lessons separately; this happened for two classes in two different schools and provinces.

3.2.3 Procedure for Participating Schools and Teachers

Questionnaires were sent in the form of cargo packages to every school in the East Anatolia, South East Anatolia, Black Sea and Mediterranean Sea regions. Each cargo package contained the following documents: one permission letter from the Ministry of Education with its seal of approval by local authorities (see Appendix E), one instructional guide for the school management (see Appendix F), three teacher sets including questionnaires for students (see Appendix A) in two classes (a maximum of 60 students), teacher (actual and ideal) form of the QTI (see Appendix B) and one teacher instructional guide (see Appendix G). In addition to these items, one extra teacher set was added (for emergency use). The researcher distributed these items personally for the schools in the Marmara, Aegean and Central Anatolia regions. Continuous contact with schools has been held throughout the study, but six schools were contacted extra as they did not send the data after their deadline. One selected

city could not complete the work and send the data. All data were returned to the researcher via cargo.

School visits were conducted mainly on Mondays since the researcher had no teaching load during that day. She visited schools twice or more. During her school visits, school management approval was sought and after this she had contact with teachers. The *first meeting* with teachers usually started by explaining the study (in oral and written form) and instrument(s) and reasons were asked from the teacher to participate in the study. Some teachers did not want to participate because of time restrictions. When teachers accepted to participate, an appointment was arranged with the teacher for visiting hours, days and administration of the questionnaires. *A second visit* was scheduled during the first visit, preferably within two weeks. Questionnaires were distributed and completed during the second visit. During that visit, the researcher tried to cover all data collection within the same day for one school. Sometimes, teachers did not want to complete the instruments in all of their classes at once because of curriculum constraints. If that happened, a different class hour or class was chosen and administration was completed any other weekday within the realms of possibility for teacher and class. Because of the limited time and the impossibility of being present in each class, the researcher occasionally asked teachers for support. So, administration of the instruments was carried out both by the researcher and different implementers. Teachers' and students' participation in the study was voluntary and teachers decided by themselves which classes to include.

Teachers were asked whether the researcher needed to administer instruments to one classroom as a demo or not. If the response was positive, the questionnaire was distributed and administered by the researcher in at least one class of the teacher. During administration, directions were given clearly and necessary explanations were provided by the researcher or person distributing the questionnaire. Students were also assured by the researcher that any data collected from them would be held in confidence. Students were asked to complete all instruments without leaving any items empty as well. Questionnaire administration time did not exceed one class hour (45 minutes) and no instrument was administered or started within break time. If administration had been covered during the second visit, there was no need for a third visit. But if not, a suitable date was arranged to finish administration within that school. Data collection was realized by teachers and school managements themselves in other regions than the Marmara, the Aegean and Central Anatolia. After the data

had been returned, it was noticed that five teachers had not completed the teacher version (actual-ideal) while their classes had completed the student version. Contact was sought and to three teachers a form was faxed (and returned to the researcher via facsimile). Four classes had to be eliminated on the account of missing data. From all the remaining data, forty-six students were eliminated since there were lots of empty or erroneously completed items.

No specific problems were experienced during administration of the instruments nor were any problems reported by schools or teachers.

The responses given by each student in the sample were coded into standardized categories for purposes of analysis, and these standardized records were then analysed to provide descriptions of the students in the sample. Each student was allocated a unique code. Demographic data, such as gender, age, family background and subject grades were also obtained and entered into the data file. In addition, demographic data of the teachers were entered, such as teacher gender, age, professional experience and class size. To create a student data file in SPSS, questionnaires were checked and numbered manually when the researcher received them. Data were entered manually and to check data entering, a small number of student forms were entered a second time and compared to the first entry. No optic answer forms could be used during any step of the study.

3.2.4 Sending Reports to Teachers

The Questionnaire on Teacher Interaction (QTI) can be used to map both students' and teachers' perceptions of interpersonal teacher behaviour according to the Model for Teacher Interpersonal Behaviour (MITB) (see section 2.3.5). The teacher form of the QTI is used to describe teachers' perceptions of their own interpersonal behaviour and their ideal. Whereas student perceptions are of major interest for the actual research questions and all analyses have been carried out on student data, teacher perceptions were mainly gathered for feedback and motivation purposes.

Teacher reports were sent to participating teachers at the end of the study personally, via regular post or e-mail. Since Bursa was a more convenient and accessible part of the population for the researcher, she distributed reports to teachers in Bursa personally and monitored their reflection on these reports. Through this process she inspired further development. A total number of seventeen teachers from Bursa attended the study. A structured interview was conducted with these teachers while they were given their reports and they were

asked to be audio taped. In total ten teachers responded positively to this request. The average interview time with teachers was half an hour. *Firstly*, brief information was given on the model, instrument and study. *Then*, questions about the self-evaluation from their reports were asked (see Appendix L). *Lastly,* teachers were asked to be video-recorded while lecturing and seven teachers accepted this request. Some teachers noted that it was their first recording and wanted to pilot it first. After teachers had seen their first recordings, general evaluation for the study and their reports, they were asked to record a lesson one more time. Teachers in general responded positively to all feedback and evaluated it as a chance to see themselves from the listener's point of view. They emphasized the importance of watching themselves while lecturing and had a clear answer for the questions on why their students perceived them as they did. Two teachers asked to be re-recorded in the other class after watching the first one to see if they could change something. So, a total of nine class hours (three physics, one chemistry and five biology) were recorded. These recordings were given to the teachers on compact disk personally (as well as their reports). None of the teacher data were shared with someone else, not even school management.

The researcher made notes during each visit in a diary. She wrote her observations and impressions after each visit by giving day, hour, school and personal characteristics in detailed descriptions. There were also short notes about interviews held with the teachers, school managements and students. Since the complete study was implemented by different persons, the described notes were not available for every school. The researcher also kept an address and phone list for the participating schools and teachers.

Student data, the main interest of the study, were also compared to a Dutch sample. This Dutch data set was selected from a large data set that had been gathered with the QTI over many years. The large data set included data from research projects, but also from consultancy and development projects with schools or self-administration by schools as part of their quality assurance and management policy. Selection criteria were science classes, student perception data and secondary education. This data set was organized and provided by IVLOS (also see section 3.4 page 121). The students answered the questionnaire in the official language of the country, Turkish in Turkey and Dutch in the Netherlands.

In the next section, the instruments of the study will be introduced.

3.3 Instrumentation

All students responded to two questionnaires: in section 3.3.1 the development process of the *Questionnaire on Teacher Interaction* (QTI) will be explained and in section 3.3.2 the adapted version of *the Test of Science Related Attitudes* (TOSRA) will be described.

3.3.1 The Turkish Version of the QTI

In the course of her teaching career the researcher has examined and noticed the importance of positive interaction with students in the classroom, for example by observing students' willingness to attend one teacher's lesson and their enjoyment with this teacher and their 'lack of willingness' for other classes and teachers. This observation, which seems to be unrelated to the subject matter area, evoked both an interest and a question in her mind as a school teacher. The *Questionnaire on Teacher Interaction (QTI)* had attracted her attention during the second half of the 2002 Academic Year while she was looking for an answer. This instrument seemed a systematic solution to her observations and to other questions she had, like "How can a profile of a teacher in the classroom be determined from the students' point of view?" and "How is it possible that teachers are perceived differently by students in two different classes?" By that time, pilot studies had started at METU with the QTI, but these usually faced problems with the analyses of the data. These preliminary experiences were shared in contacts with researchers from Utrecht University.

These contacts – starting with a focus on student attitudes and teaching - ended with the initiation of a study to investigate the effects of cultural differences on student perceptions of teacher behaviour. The three most widely used versions of the QTI had been developed for low-contact cultures (see section 2.3.5.2), while Turkey was a high-contact culture. Clearly, there are differences between cultures and this triggered the need to create a new, adapted version of the QTI for the Turkish context. One of these cultural differences is the amount of uncertainty people can tolerate (e.g. uncertainty avoidance, see Hofstede, 1991; 1984). Andersen stated this issue as "People with intolerance of ambiguity or high levels of uncertainty avoidance want clear, black and white answers. People with tolerance of ambiguity and low levels of uncertainty avoidance are more tolerant, accept ambiguous answers, and see many shapes of grey" (1997: p252). In Turkey, students (and teachers) can probably deal with less uncertainty than students in the USA or the Netherlands, which makes some items of the Leadership and Uncertain scales of the QTI

virtually non-existent in the Turkish context. That is a reason why items like "This teacher acts as if s/he does not know what to do." and "S/he is hesitant" are not very meaningful to Turkish students. Also, in Turkey, students (and teachers) are used to more power distance between teachers and students (Hofstede, 1991; Hofstede, & Hofstede, 2004) than students in the US or the Netherlands and teachers usually have high control and are considered natural leaders of the classroom. Students are expected to be attentive and silent.

Most of the studies creating new language (and cultural) versions of the QTI have started from one (e.g. the American or Australian) version of the QTI and used *translation* and *back-translation* by experts as their primary activities for instrument construction. Although these studies have brought new versions of the QTI with reliable scales, usually little is known about their validity and variance analyses indicate much lower amounts of variance present for scales at the class level (around 10 to 15 percent) than in the American and Dutch versions (25 to 40 percent). It seems fair to assume that the (limited) development process for these versions may have contributed to these findings, and that more elaborate methods should have been used to demonstrate the quality of these cultural adaptations. There have been other studies that also reported difficulties in applying survey instruments validated in a Western context to another, different cultural environment. For example, the Test of Science Related Attitudes (TOSRA) and Science Laboratory Learning Environment Inventory (SLEI) were unreliable in South Africa (Mahapa, 2001). Also, data collected by the College and University Classroom Environment Inventory (CUCEI) in a regional university in Pacific Islands showed low reliabilities (Coll, et al., 2002) ascribed to English language difficulties and differences in meanings of items mainly caused by the cultural differences of the participants. In another study, problems with answering items and distorted results of factor analyses were related to variation in English competency of respondents, differences in meaning of concepts and traditional beliefs of respondents (Taylor, & Macpherson, 1992a; 1992b). Also, Gür (2001) reported lower internal consistencies compared to the original scale of the Classroom Environment Scale (CES) in his study with 1761 students of 9 and 10 grade students attending six schools in İzmir, a province in Aegean region of Turkey. He also reported the need for new instruments that have been specifically developed for Turkish context to evaluate classroom environment.

According to Wubbels (1985a; see also Hui, & Triandis, 1985), in order to optimise cultural translation and allow for comparisons between data from

different countries, researchers should take into account some criteria when creating new cultural versions of their instruments (see section 1.5.3)

In the light of these cautionary statements for the cultural sensitivity of instruments, a number of steps to develop and warrant the quality of the new version of the QTI were undertaken. Steps to develop a 62- item Turkish version of the QTI were carried out during the Academic Year 2003-2004. This process will be described step by step in the next section.

3.3.1.1 Development of the Turkish Version of the QTI

The development process of the 62 items Turkish version of the QTI consisted of five steps, which will be described subsequently.

Step 1

First, a pilot study with the 64 items American version (see Appendix H) was carried out after having translated and back translated the questionnaire directly. This translation and back translation process was carried out by the researcher, a Foreign Language (EFL) teacher educator, two EFL university experts, one English teacher and one Turkish teacher. This first round of piloting was conducted to determine how the items in the 'original' QTI version reflected Turkish society and to what extent the questionnaire needed to be modified. This first pilot study was conducted during the first term of the 2003 Academic Year and a total of 21 teachers from different subjects and 246 students in 8 classes of one high school in Bursa answered the questionnaire and their responses were evaluated. Remarks by the experts and statistical results of the piloting round showed the need to construct a new version of the QTI. Although the general outcomes seemed favourable - Cronbach's alpha of the scales was between 0.69 and 0.94, scales were ordered in a circular structure and two uncorrelated dimensions could be found behind the scales – many problems were found with respect to separate items in the questionnaire.

Some items were deleted because they contained a missing answer in more than three percent of the cases. Other items were deleted because they could not discriminate between teachers or classes (in an analysis of variance eta-squared or the percentage of variance at the teacher-class level was determined and its limit was set to 0.10 or 10 percent). A third group of items was deleted because they contributed negatively to scale consistency (item-rest correlation was below 0.60). From the items of this third group a total of six were reformulated or moved to another scale (Table 3.1, see Appendix H).

Finally, it was determined if items correlated highest with 'their own' scale and correlated highest negatively with their hypothesized opposite scale (e.g. see Appendix N) and some items showed problems in this respect.

Table 3.1

Number of items with unsatisfying quality, remaining number of items of the original QTI and (newly created) sample items for the Turkish version of the QTI

Scale	Number of items with Missing data	Low eta^2	Low alpha/ validity	Remaining items
DC – Leadership	1	3	1	2
CD – Helpful/Friendly	2	1	2	4
CS – Understanding	-	-	2	6
SC – Student Freedom	2	4	4	3
SO – Uncertain	2	1	1	4
OS – Dissatisfied	-	1	3	6
OD – Admonishing	-	-	1	7
DO – Strict	1	6	3	3

The first round of piloting also involved teachers and students answering to some open-ended questions (21 teachers and 246 students) in order to create possible alternative items, obtain relevant interpersonal concepts and clues regarding the interpretation of these concepts. The question "What should be/should not be the characteristics of an ideal teacher?" was asked to students and teachers as an open-ended question. Generally, the ideal teacher was described as a person who guides students, motivates and encourages them, gives confidence, has a tendency to build more positive relationship and has earned respect from students. On the other hand, the "opposite of an ideal teacher" can be summarized as a person who is disorganized, has lack of attention to students, gives lots of critic and is suspicious about students' work and behaves inconsistently.

Some of the answers from students and teachers to the open-ended question are given next to illustrate these conclusions (see Appendix S for original form).

Student A:

1-) First of all, a good teacher should do his/her best to prevent being monotonous. S/he should help us with points we do not understand. Besides this, if teachers display friendly behaviour, this will motivate students to study harder.

2-) S/he should not discriminate between students and treat everyone equally."

Student B:

1-) S/he should be active; in other words s/he should not be talking monotonously when s/he is lecturing. In a 45 minute class, s/he should not spend the whole time lecturing since after certain time concentration for topics break unwillingly. S/he should certainly be smart. While taking to his/her class, I [as student] should not have stress even if I do not like the subject. Certainly, s/he should not be arrogant, that is to say s/he should not make me feel bad and unmotivated. S/he should not be too sensitive and s/he should not say, "If you have an inconvenience, share with me". It seems, then, as if s/he is pretending care. S/he should be a source of inspiration for me.

2-) S/he should certainly not have a sulky face, high voice, piercing eyes*, sloth, criticism, self–exaggeration, arrogance."*

Student C:

"Good teacher: Should communicate easily with people .S/he should have good knowledge of the subject matter. Should speak fluently (at least should be clear about what s/he says). Should be able to direct students' attention to the lesson. Should be careful since s/he is an example for the students. Should be lenient and patient.

Bad teacher: Boring. Behave towards students as if they were second class people'. S/he is not aware of the convincing methods of the teachers who adopt at maintaining discipline without shouting. S/he can not take control over the class. S/he does not have any idea about class topics, not even the last ones."

Student D:

1-) Firstly, S/he should be energetic. Because a teacher's energy reflects students' energy as far as I have observed. S/he should not reflect on his/her problems with the students, as much as possible, his/her psychology should be in balance. Students do not like unbalanced teachers. After this, patience comes to my mind. In my opinion if someone is patient, s/he should be a teacher. To explain at the same place, the same things over and over again, handle with problematic students; a teacher should be really good at being patient. S/he should be affectionate. The student should be elevated when the teacher smiles at him/her. A teacher should also be a friend of student up to a point.

2-) Worst diction, inconsistency, absence of mind, lethargy, ' know-it-all mood'."

Student E:

"A good teacher should pay attention to his/her communication with students. In the end, teachers should give a response to students' respect towards him/her. S/he could put him/herself into the student's position and this makes him/her more thoughtful. A good teacher should not talk continuously. When a student likes a teacher, his/her success increases. A disliked teacher's class is not liked much."

Teacher A:

"Ideal teacher: makes no comparisons (between students); consistent; scrupulous; masterful in subject matter area; should share personal and individual points with his/her students not only unhappiness but also happiness. The teacher should be a good model as much as possible as for diction, dressing, and manner.

Opposite of ideal: treats everybody unequally (not much concentrated on individual differences); inconsistent; feeling no need to develop him/herself in the subject matter area; unfamiliar to adolescent period; tough, rude and inattentive."

Teacher B:

"Ideal teacher: Should prepared lesson topic; should be able to treat all the students with respect and love. S/he should renew him/herself. S/he should pay attention to student's problems, should motivate students; should choose examples for the topic considering grade level.

Opposite of ideal: Should not discriminate between students. S/he should not poke fun at the students' questions or belittle them in any way. S/he should be honest towards students. S/he should not show factitious behaviour."

As can be concluded from the given examples, the vast majority of the statements reflected teacher-student interaction, showing the importance of this element, although other characteristics (such as subject-matter knowledge) were mentioned as well.

Step 2

After this first round, interviews were conducted to get a clearer picture for the items needed and to search for ideas for usable items. To this end, semi-structured interviews were conducted by the researcher. A total of 17 students and 5 teachers were randomly selected from the group that answered the open-ended questionnaire in the first step and were interviewed to obtain additional suggestions for rewriting some of the items and to validate outcomes of the previous study. As for teachers, the researcher interviewed them individually with 30 to 40 minutes duration (see Appendix K).

As for students, they were interviewed in small groups of about two or three students to make them feel less nervous and to allow them to react to each other, which helped the researcher to obtain a wider variety of ideas for items. Interviews with the students were started with general questions, next they were asked what behaviour their teachers displayed in the classroom, or how teachers behaved to them personally. Things they liked and things they disliked were asked, as well as reasons for these judgements. The researcher made sure that she had some alternatives/synonyms when asking questions to the students in order to be able to use other words to make the question clear for them (for example, if she asked them about strict and they misunderstood, some alternative words for 'strict' like 'demanding' or 'pressing' were asked to explain what the researcher meant). Because many students answered in rather

general terms and had difficulties in providing concrete examples of behaviours, they were also asked about their best teacher they had met so far and why he or she was the best and in a similar way they were asked about their worst. Then, to compare some of the teachers they had been taught by, students were asked about teachers they had heard interesting stories about (see Appendix M). All teachers' names were kept anonymous. By using this information, much could be learned about teacher-student interpersonal behaviour.

Some statements by students from the interview were:

Student F:

"A teacher should not build up a gap among his/her students and should not look down. S/he should give energy to the class to learn the topic. When the teacher strives for teaching, this gives us self-confidence and motivates us."

Student G:

"There should be a consistency between what a teacher said and what a teacher did. Moreover, teachers should have hobbies besides his/her subject matter and should make us noticing alternatives or different things in life. For example, one of my teachers is playing chess and is club leader. With him I had interest in chess and I am still playing chess. He gave me a new view of life plus math knowledge."

Student H:

"The manner in which the teacher expresses his/her idea is really important. Teachers should not disappoint us and harm our feelings when correcting or warning."

Student I:

"A teacher should clearly indicate the important points of a topic and these should be ordered. One of my teachers was talking so much but in the end no one could understand where we were going to. Then the teacher shouted to the class: 'all untalented students are choosing art class in this school, I can not stop this'."

The outcomes of the interviews – apart from providing a host of new possible items – showed two interesting patterns. First, both teachers and students had difficulties with respect to generating examples for Uncertainty. They needed more alternatives - synonyms from the researcher for clear understanding asked to pass this question or requested more time to think even after alternatives – and more synonyms were given. This indicated that some items of the QTI could not be easily found in a real Turkish classroom. Some student remarks with respect to Uncertainty:

Student J:
"Uncertainty: A teacher displays inconsistent behaviour."

Student K:
"Uncertainty: when a teacher explains the topic in one way and asks questions in another way during the exam."

Teachers defined Uncertainty generally as an unplanned lesson or chaos in the classroom, elements that could not be found in the original QTI items. Some examples:

Teacher C:
"Uncertainty: Students' lack of confidence or self awareness and absence of responsibility for the lesson as a student. It is chaos in short."

Teacher D:
"Uncertainty: this occurs when a teacher does not have any plan and does not know what to do with the class."

A second result from the interviews was that in some cases students defined good teaching in terms of teacher knowledge and teaching methodology, rather than in terms of the relationship between a teacher and students. However, this only happened a few times and in most cases students used words that had a relationship flavour to them, indicating that interpersonal behaviour is important for Turkish students.

Step 3

New items were formulated after the interviews of Step 2 with students and teachers. Statements were evaluated in order to create a list of items and item alternatives that could be used in the Turkish version of the QTI. Statements that were not interpersonal in nature and referred to topics such as subject-matter knowledge, pedagogy (teaching for active and self-directive learning, clear instruction) were eliminated. The result was a list with 120 possible items (both new and original items). The resulting items were carefully re-examined with respect to their appropriateness of content and suitability for grade level. Two university EFL experts, two science teachers and one secondary psychology teacher helped with the evaluation process. With the outcomes of their feedback, the number of items was reduced to 80. Also, several background questions were added to the questionnaire, such as questions on gender, age, last report card grade received, school name, home background (family size, et cetera). All items were formulated with a 5-point Likert-type response scale, ranging from "Never/Not at all" to "Always/Very".

Then, this adapted version with 80 possible items was pre-tested with 96 students from 3 classes in one school in Bursa. Through reliability and factor analysis and other statistical analysis, the number of items was reduced to 69. Examples of items that were eliminated during this step are: 'S/he does not have prejudice towards students', 'S/he is unselfish', and 'S/he shows that s/he knows everything' and 'His/her jokes are understandable.

Step 4

A third round of piloting was organized in this step during the spring term of 2004, using the 69-item version with the following sample. The sample consisted of 674 students and 13 teachers in various subjects (Math, Turkish, Geography or a combination of these subjects). Teachers' professional experience ranged from 5 to 25 years. A total number of 24 classes (prep class[14], 9 and 10) of two different high schools in Bursa participated in the study.

[14] Starting with the 2005-2006 academic year, education in all high schools was extended to 4 years and this reorganization led to the renaming of the prep classes. Following this, other grades were named as 10 instead of 9, 11 instead of 10 and 12 instead of 11. One more year was directly added to the general high school program. This change covered the students who started high school education in the 2005-2006 academic year. All the steps of the study were finished before the change in high school program.

The sample chosen from the accessible population was a sample of convenience. Teachers' participation in the study was voluntary.

The sample consisted of 322 girls (47.8 percent) and 352 (52.2 percent) boys. Class size in these schools varied from 25 to 35 students. Of the students, 144 (21.4 percent) were located in prep class, 242 (35.9 percent) in grade nine and 288 (42.7 percent) students in grade ten.

Information with respect to various students' background characteristics was further available. Most of the students (over 75 percent) were reported to live in families of 3 to 4 persons, 2.5 percent of the students lived in families with over 7 persons. About 6.0 percent of the students lived in single-parent families, with only their mother or father as guardian. Of the sample, 90.0 percent was born in Turkey, 8.5 percent in Bulgaria, and 1.5 percent in Greece, Uzbekistan, Germany, Saudi Arabia, France and Switzerland. In terms of socio economic background, students reported that in most cases their mother was at home (no work; 56.5 percent) and in 28.9 percent of the cases the mother worked. Also, 27.0 percent of the mothers were educated at the university level, while 36.2 percent had followed only primary and secondary education. Of the fathers, 84.6 percent worked, 11.1 percent was retired and only 1.2 percent was unemployed. Almost half of the fathers (44.6 percent) were educated at the university level, while approximately 21.0 percent only had followed primary or secondary education. Students reported that they had many books at home (The question asking for the number of books was taken as an indicator for Socio – Economic Status (SES) from the TIMMS study, since it proved to be one of its best predictors of SES.); 43.0 percent reported to have more than one bookcase (50 books) at home, only 13.0 percent of the students reported to have hardly any books at home.

Quality of the questionnaire and its items (69-item version) was established through statistical analyses (see Appendix N for item results). Results from the analyses indicated that from a total set of 69 items, 7 items needed to be deleted because of problems with reliability (weak contribution to scale consistency) and discriminant validity. These items were: 'This teacher admits that s/he does not know anything' (Uncertain), 'We can decide where to sit in the class' (Student Freedom), 'This teacher warns students' (Dissatisfied), 'This teacher talks with a soft voice in class' (Uncertain), 'This teacher shouts to the class', (Strict), 'This teacher allows us to wear other clothes than the school uniform' (Student Freedom) and 'This teacher tells us we can do better' (Admonishing). Apparently, in some instances these behaviours were not

recognized by students, were interpreted differently, or were not very different between teachers or classes. The number of items was reduced to 62 after eliminating these items and the final form of the questionnaire was established.

For this 62 items Turkish version of the QTI in the pilot study, Cronbach's alpha of the eight scales was high (between .74 and .97). Intra class correlations of the scales ranged between .24 and .45, indicating that the instrument was capable of distinguishing between classes (Table 3.2).

Table 3.2
Scale analysis and mean scores for teachers and students

Scale	Alpha (class)	Intraclass correlation	Students' perceptions	Self (teacher) perception	Ideal (teacher) perception
DC – Leadership	.90	.32	.72	.84	.92
CD – Helpful/ Friendly	.97	.45	.67	.82	.90
CS – Understanding	.95	.32	.73	.87	.92
SC – Student Freedom	.74	.34	.50	.47	.47
SO – Uncertain	.93	.25	.19	.11	.09
OS – Dissatisfied	.91	.25	.27	.15	.15
OD – Admonishing	.87	.24	.31	.29	.22
DO – Strict	.88	.33	.39	.42	.38
DS – Influence			.38	.68	.69
CO – Proximity			1.00	1.45	1.69

Exploratory factor analyses indicated that two factors structured the eight scales. These two factors (with an Eigenvalue larger than 1) explained 86 percent of the variance and could be interpreted as an Influence (Factor 2 in Table 3.3) and Proximity (Factor 1) dimension. Moreover, in accordance with the Model for Interpersonal Teacher Behaviour (MITB) (see section 2.3.3), correlation between the two factors (dimensions) was statistically non-significant (correlation=.16; p=.19) (see Table 3.3 and Figure 3.1).

Table 3.3

Factor loadings (unrotated) of exploratory factor analysis on the scales of the QTI

	Factor 1	Factor 2
DC – Leadership	.89	.40
CD – Helpful/Friendly	.94	.01
CS – Understanding	.96	.10
SC – Student Freedom	.73	-.45
SO – Uncertain	-.81	-.43
OS – Dissatisfied	-.91	-.24
OD – Admonishing	-.83	.28
DO - Strict	-.64	.72

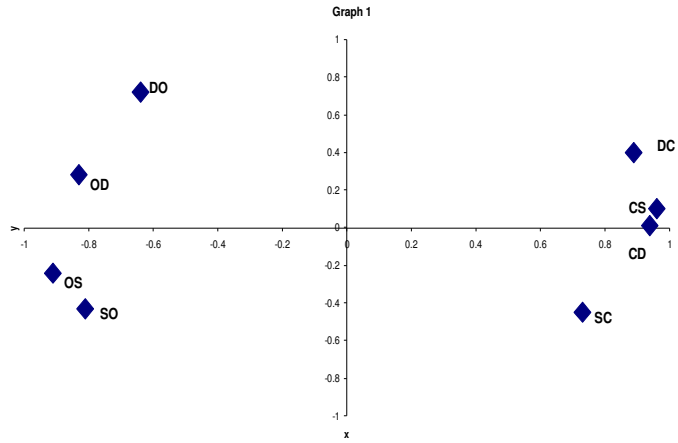


Figure 3.1

Graphical presentation of the class level factor loadings of the pilot sample ($N_{students}$ =674, $N_{teacher}$ =13, N_{class}= 24)

The average profile of teachers in the pilot sample as perceived by students (student perception) was determined (Table 3.2). Teachers were perceived as moderately dominant and very cooperative. Teachers were rated .38 on the Influence dimension, which is comparable to science teachers from the Netherlands and Brunei, but lower than teachers from the United States, Australia, India, or Singapore (den Brok, et al., 2006b; 2005c; Wubbels, & Levy,

1993a). Teachers scored 1.00 on the Proximity dimension, which is similar to teachers from Singapore and some American studies, but much higher than the amount of Proximity reported in other countries (e.g. den Brok, et al., 2006b; 2005d; Wubbels, & Levy, 1993a). The highly cooperative ratings for teachers can be a reflection of the fact that Turkey is a high-contact culture and is more collectivist than relatively individualistically oriented countries such as the Netherlands or the USA, the relatively high ratings for Influence may be a reflection of the higher power distance in Turkish society. Teachers' self-perceptions and teachers' ideal perceptions were higher on both dimensions than students' perceptions. This finding is similar to other studies investigating differences between teacher and student perceptions (den Brok, et al., 2006a; Wubbels, & Levy, 1993a; 1991).

Analyses also indicated that students' perceptions on the two dimensions had predictive validity: both dimensions and the eight scales were positively related to both cognitive and affective student outcomes (Table 3.4), similar to prior research (den Brok, et al., 2004; Brekelmans, et al., 2002).

Table 3.4
Correlations between QTI scales, dimensions and student outcome variables

	Enj.	Use.	Com	Int.	T.Eff.	Ex. Gr.
DC – Leadership	.58 *	.55 *	.31 *	.50 *	.23 *	.05
CD – Helpful/ Friendly	.70 *	.60 *	.42 *	.60 *	.26 *	.09 *
CS – Understanding	.58 *	.55 *	.37 *	.52 *	.22 *	.05
SC – Student Freedom	.33 *	.23 *	.27 *	.21 *	.09 *	.09 *
SO – Uncertain	-.42 *	-.43 *	-.19 *	-.34 *	-.11 *	-.07
OS – Dissatisfied	-.39 *	-.42 *	-.24 *	-.35 *	-.09 *	-.10 *
OD – Admonishing	-.35 *	-.31 *	-.25 *	-.25 *	-.02	-.11 *
DO – Strict	-.18 *	-.13 *	-.23 *	-.10 *	.11 *	-.08
DS - Influence	.32 *	.37 *	.06	.33 *	.20 *	-.00
CO - Proximity	.60 *	.55 *	.38 *	.50 *	.17 *	.10 *

Note: * = significant at .025 (two-sided)
Enj= Enjoyment, Use=Usefulness, Com= Competent, Int=Interest,
Ti. Eff= Time effort, Ex. Gr= Exam Grade

Step 5

Derived from the pilot studies mentioned in the above four steps, a 62 items Turkish version of the QTI was created at the end of the Academic Year 2003-2004. Similar to other versions, this new version has a 5-point response scale, ranging from "Never/Not at all" to "Always/Very" and is scored on the basis of eight sectors or two summarizing dimensions of Influence (or DS) and Proximity (or CO) (e.g. Telli, et al., 2005). The full form of the 62 items Turkish version of the QTI is given in Appendix I in bilingual form, indicating the items from the 64 items American version as well; its form as used in the main study is given in Appendix A. The distribution of items over scales is given in Appendix J. The questionnaire in its final form was thus based on rounds of pilot studies including open-ended questions and semi-structured interviews with students in order to include students' "language" to verbalize perceptions of teachers. These "free" descriptions of students showed that perceptions were mainly focused at the topic of this dissertation. In the light of the statistical outcomes, it was decided that the new version of the QTI was suitable for collecting information with large groups of students and teachers.

Looking back, the development of a specific Turkish adapted version of the QTI appeared necessary, since only about 55 percent of the original (American) items could be directly translated and copied into the Turkish version. Also, interviews indicated a (potentially) different meaning of some concepts, in particular of teacher uncertainty. If only translation and back-translation had been used, scales might have appeared reliable, but would have been only partially comparable to the Dutch and American versions. Reliability and validity of the questionnaire for the sample of the main study are provided in the forthcoming section.

3.3.1.2 Reliability and Validity of the Turkish QTI (Main Study)

This study has been conducted with a 62 items Turkish version of the Questionnaire on Teacher Interaction. In the second chapter (see section 2.3.5.2), detailed information for testing reliability and (in particular) validity of the Questionnaire on Teacher Interaction (QTI) (in terms of the circumplex assumptions, see section 2.3.3) was provided. As can be remembered from these assumptions of the circumplex model, there should be eight behavioural sectors (or scales), represented by two dimensions (or factors). That is why first an *exploratory* factor analysis was conducted on the (aggregated) scale scores in order to see if two dimensions were present in the data (see den Brok, et al.,

2006b; Rickards, den Brok, & Fisher, 2005). The results of this analysis indicated that 2 factors with an Eigenvalue larger than one could be extracted; explaining 76.5 percent of the variance (see Appendix O for a Scree Plot). Inspection of the factor loadings suggested two dimensions that could be labelled in terms of Influence (Factor 2 in Table 3.5) and Proximity (Factor 1).

Table 3.5
Factor loadings of exploratory factor analysis (maximum likelihood) on the scales of the QTI at the class level

	Factor 1	Factor 2
DC – Leadership	.82	.50
CD – Helpful/Friendly	.95	.10
CS – Understanding	.96	.15
SC – Student Freedom	.46	-.44
SO – Uncertain	-.71	-.31
OS – Dissatisfied	-.86	.05
OD – Admonishing	-.70	.38
DO – Strict	-.40	.89

A *multilevel confirmatory* factor analysis (with Mplus), testing a model with two, independent dimensions and free scale positions over the interpersonal circle (so-called irregular circumplex) confirmed findings of the exploratory factor analysis. In this analysis, no model was formulated for the student level (see den Brok, et al., 2006b; den Brok, et al., in press, for model testing details). Although some fit indicators of this model were satisfying (CFI=.96; RMSEA=.02) other fit measures showed that model fit could be further improved (Chi-squared=57.58 with df=18 and p=.000; TLI=.88; SRMR=.18). Model fit indicators thus showed that although two, independent dimensions may lie behind the data (as required by the MITB) some scales may have shifted from their original positions on the interpersonal circle. This is particularly true for Leadership (containing more Proximity than hypothesized), Understanding and Dissatisfied (containing both less Influence than hypothesized) scales.

Besides this, an *exploratory* factor analysis was conducted at the student level to obtain more insight into the data and to investigate whether the presence of a different structure applied for the class and student level, similar to previous research (see sections 2.3.3 and 2.3.6.1; e.g. den Brok, 2001; den Brok, et al.,

2006b). Three factors were found with an eigenvalue larger than one, explaining 71.1 percent of the variance (Table 3.6; see Appendix P for Scree Plot).

Table 3.6
Factor loadings of exploratory factor analysis (maximum likelihood) on scales of the QTI at the student level

	Factor 1	Factor 2	Factor 3
DC – Leadership	.80	.33	-.18
CD – Helpful/ Friendly	.90	.15	.18
CS – Understanding	.89	.13	.08
SC – Student Freedom	.30	.09	.64
SO – Uncertain	-.69	.20	.43
OS – Dissatisfied	-.73	.35	.13
OD – Admonishing	-.62	.55	.11
DO – Strict	-.29	.63	-.40

Den Brok (2001) showed that different structures might apply for the class and student level and reported that interpretation of the student level factors was difficult and hard and emphasized the need for more (qualitative) research. In his study, he stated that the interpretation of the factors at the class level was in line with the MITB. He underpinned several possible factors responsible for differences in students' perceptions: differences in treatment, different sensitivity of students to teacher's behaviour and different norms in interpreting and perceiving teacher behaviour. He named the three student level factors he found as *structured support*, *rejection* and *student autonomy*. The presence of three factors at the student level in the current data set is in line with his outcomes.

The author of this dissertation hypothesises that there might be another reason for the emergence of a third dimension or factor at the student level. The Influence dimension and the scales closest to this dimension (DO, DC, SC and SO) may be more open to student evaluation, while in the Proximity dimension and the scales closest to this dimension (CD, CS, OS and OD) history is more prevalent. Because of the somewhat collective nature of the Proximity dimension, evaluation may be less open to personal and individual factors than the Influence dimension. Obviously, this interpretation could be further tested in future research.

Next, the second assumption of circumplex models - two, independent interpersonal dimensions - was tested by computing a correlation between the two dimension scores. The correlation (at the class level) for the current sample was .33 (p=.001), indicating some association between the two dimensions. Inspection of the plot of factor loadings suggested that the correlation could have been caused by three scales occupying different positions on the interpersonal circle than hypothesised (as mentioned, these were: Leadership, Understanding and Dissatisfied). A correlation between the empirical dimension scores (based on outcomes of the confirmatory factor analyses) and theoretical dimension scores (based on the ideal circumplex) showed that both dimensions were replicated well by the irregular circumplex model; the correlation was .97 for Influence and .99 for Proximity. This means that the dimension scores can be used in subsequent analyses, despite irregularities found in model fit and scale positions and despite the empirical correlation found between the two interpersonal dimensions. Factor loadings of the irregular model are graphically displayed in Figure 3.2 for the study.

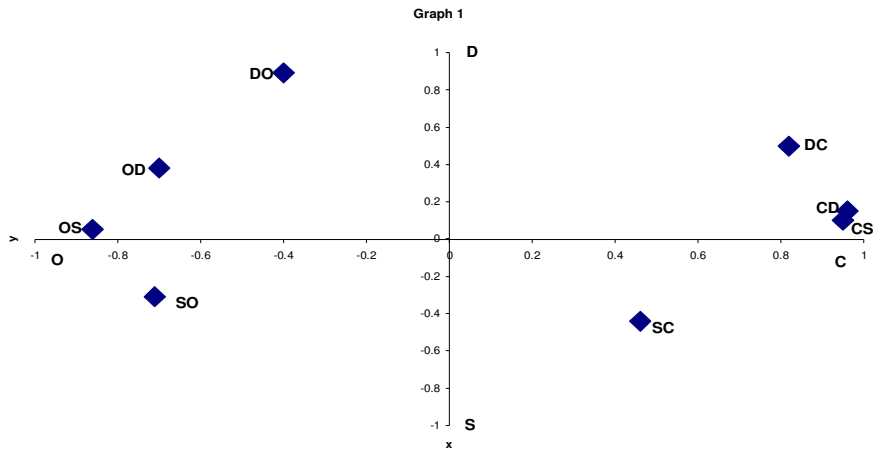


Figure 3.2
Graphical presentation of the class level factor loadings of the main study

Assumptions for the circumplex structure in terms of interscale correlations were studied as well. As was stated in Chapter 2, correlations between opposing scales should be smallest (most negative), while correlations between adjacent scales should be highest (positive) and correlations should decrease in (equal) steps if one moves from adjacent scales towards opposing

scales (e.g. Gurtman, & Pincus, 2000; Tracey, 1994; Tracey, & Schneider, 1995). The results of interscale correlations at the individual and class level showed that the present study satisfied most assumptions with only minor discrepancies (Table 3.7). These discrepancies are at the class level: the correlation between Leadership (DC) and Understanding (CS), the correlation between Student Freedom (SC) and Uncertain (SO), and the correlation between Uncertain (SO) and Admonishing (OD).

Table 3.7
Intercorrelations of the QTI scales using the classes as unit of analysis

	DC	CD	CS	SC	SO	OS	OD	DO
DC	**1**							
CD	.83**	**1**						
CS	**.86****	.94**	**1**					
SC	.15**	.48**	.41**	**1**				
SO	-.76**	-.65**	-.72**	**.10****	**1**			
OS	-.66**	-.79**	-.82**	-.27**	.75**	**1**		
OD	-.36**	-.57**	-.61**	-.27**	**.60****	.80**	**1**	
DO	12**	-.29**	-.25**	-.58**	.01**	.39**	.63**	**1**

Note: ** Correlation is significant at the 0.01 level (2-tailed) ($p < 0.01$)

Figure 3.3 illustrates the circumplex structure using the Helpful/Friendly (CD) scale's correlations to the other scales by using class scores. Adjacent scales of Leadership (DC) and Understanding (CS) correlate highest and positively. This correlation becomes smaller for scales located further and the directly opposite scale of Dissatisfied (OS) has the highest negative correlation.

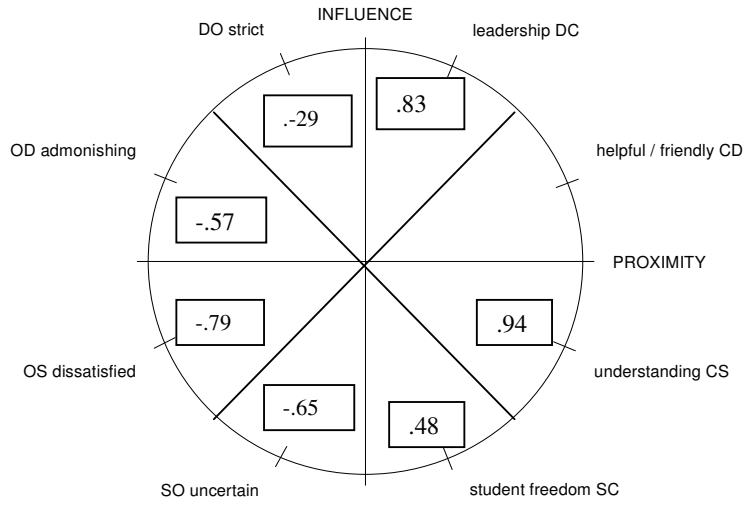


Figure 3.3
Profile of interscale correlations for the Helpful/Friendly scale using the class level as unit of analysis

Similar movements among sectors were detected in previous studies as well. Since the dimension scores usually are represented well - despite irregularities in sector scores and sometimes less reliable sector scores - it has been recommended to use dimension scores in analyses instead of scale scores (e.g. den Brok, et al., 2006b).

Next, Cronbach's alpha coefficient was established at both the individual and class levels. In order to measure the ability of QTI to differentiate between classes intra class correlations (ICC) were computed (using Mplus, a LISREL-type software package). The intra class correlation is the ratio of 'between' to 'total' variance and represents the proportion of variance in scale scores accounted for by class membership. Cronbach's alpha for the different QTI scales ranged from .44 to .83 when using the *individual* as the unit of analysis and from .66 to .94 when using the *class mean* as the unit of analysis (see Table 3.8). As expected, reliability estimates were higher in most instances when the class mean was employed as the unit of analysis. The results indicated that the instrument was reliable, since all reliability coefficients were above the .60 level suggested by Nunnally (Nunnally, 1967; 1978) and the .65 level suggested acceptable for research purposes by Wubbels, et al., (1993c). The percentage of variance in

scale scores at the class level (e.g. ICC) ranged between .12 and .24. Note that these percentages are lower than those in the pilot study. Nevertheless, they indicate that the scales can pick up differences between teachers and classes.

Table 3.8
Reliability (alpha) of QTI scales at the student and class level and variance at the class level (ICC)

Label Scale	Unit of analysis	Alpha	ICC
DC – Leadership	Individual	.75	
	Class	.88	.24
CD – Helpful/Friendly	Individual	.83	
	Class	.94	.24
CS – Understanding	Individual	.82	
	Class	.94	.22
SC – Student Freedom	Individual	.44	
	Class	.66	.16
SO – Uncertain	Individual	.75	
	Class	.92	.13
OS – Dissatisfied	Individual	.75	
	Class	.90	.12
OD – Admonishing	Individual	.69	
	Class	.86	.13
DO – Strict	Individual	.63	
	Class	.86	.18

The reliability values for the Turkish sample are comparable to those reported by Wubbels (1993b), and Wubbels and Levy (1991) for secondary students in the Netherlands, the USA and Australia. In all countries, the highest reliability was found for Helpful/Friendly and the lowest for Student Freedom (see den Brok, et al., 2006b).

In sum, although less favourable outcomes were reported in terms of validity and reliability for the main study as compared to the pilot study, the instrument seemed sufficiently reliable and valid for use in the main study. Given the minor irregularities and based on recommendations by previous work on reliability and validity, in this dissertation analyses will be conducted with the dimension scores, rather than the scale scores.

3.3.2 Operationalisation of Student Attitudes
(Test of Science Related Attitudes -TOSRA)

In this section, the Test of Science Related Attitudes (TOSRA) will be introduced, including its adaptation along with statistical information. Then, in section 3.3.3 the other, remaining variables will be described.

The TOSRA originally consisted of 7 scales and 70 items and was developed by Fraser (1981). The seven original scales were: social implications of science, normality of scientists, attitude to scientific inquiry, adaptation of scientific attitudes, enjoyment of science lessons, leisure interest in science and career interest in science. Each of the seven scales included 10 items. The TOSRA items are scored on a 5-point scale, ranging from strongly agree (5) to strongly disagree (1).

Since main interest of the study relied with subject-related attitudes, four scales from the original form of the TOSRA were selected: *attitude to scientific inquiry*, *enjoyment of science lessons*, *leisure interest in science*, and *career interest in science* (see Table 3.9).

Table 3.9
Scales and scale descriptions for the TOSRA

Scale	Scale description
Attitude to scientific inquiry	Acceptance of scientific inquiry as a way of thought
Enjoyment of science lessons	Enjoyment of science learning experiences
Leisure interest in science	Development of interest in science and science related activities
Career interest in science	Development of interest in pursing a career in science

The questionnaire was first *translated* into Turkish by the researcher and her supervisor (Dr. Cakiroglu). The next step involved an independent *back translation* of the Turkish version into English by two qualified, bilingual Turkish graduate students who were not involved in the original translation. Then, the researcher and her supervisor checked back translations and for some items,

necessary modifications in the Turkish translation were carried out. A pilot study was conducted with 399 eleventh grade high school students in the first term of the 2003 Academic Year. After the mentioned pilot study, a factor analysis was conducted and necessary modifications, such as deleting some of the items, were made. The final modified version of the TOSRA for the Turkish context in this study consisted of 32 items.

After this first pilot, within the same academic year the instrument was distributed among classes and students in a study conducted with 1983 ninth and tenth grade students from nine high schools. Data for the study were collected from 57 biology classes. Schools were selected conveniently from two city centres, Bursa and Ankara, two of the major cities in Turkey. All types of Turkish secondary education (Anatolian high schools, vocational–technical high schools and general high schools) were represented in the sample. The sample consisted of grade 9 (59.5 percent) and grade 10 students (31.9 percent), the majority of which were boys (50.1 percent). Reliability of the scales ranged from .62 to .85 in that study (Telli, et al., 2003). Some other Turkish studies also reported on the quality of the TOSRA with acceptable reliability, eta squared and scale inter correlations (Telli, et al., 2006a; Telli, et al, 2006b; Telli, Cakiroglu, & den Brok 2006c; Telli, et al., 2005).

Considering students' possible lack of attention after answering the QTI items, negative wording of some items was introduced (see Appendix A, Bölüm B). Students answered the TOSRA for the same class and teacher as they did for the QTI.

For computation of internal consistency, some of the TOSRA items were recoded, because they were negatively stated. These were: in attitude to scientific inquiry 5, 12, 25 and 30; in Enjoyment of science lessons 6, 13, 19, 26 and 31; in Leisure interest in science 7, 14, 20, 32 and 27 and in Career interest in science scale 4 and 11. Reliability of the scales ranged from .71 to .87 in this study (see Table 3.10). Average scale inter correlations and the ratio of variance at the class level (eta squared) for the present study are also given in Table 3.10. Analyses indicated that the TOSRA scales measure different subject attitudes (inter correlations were between .23 and .54), measure these attitudes reliably and that attitudes differ between classes (eta squared ranged between .10 and .13).

Table 3.10

TOSRA scales, sample item, reliability (alpha) and Eta squared

Scales	Sample item	N items	Alpha	Average scale inter correlation	Eta^2
Attitude to scientific inquiry	I would prefer to do my own experiments than to find out information from a teacher.	8	.71	.25	.11
Enjoyment of science lessons	Science lessons are fun.	10	.87	.54	.13
Leisure interest in science	I dislike reading books about science during my holidays.	8	.78	.54	.10
Career interest in science	Working in a science laboratory would be an interesting way to earn a living.	5	.74	.53	.12

Note: All correlations are significant at the 0.01 level (2-tailed)

For item distribution over scales and comparison with the original TOSRA items, see Appendices Q and R.

3.3.3 Other Variables

To correct the effect of the learning environment for other variables, several background variables were used in the analyses. In addition to students' perceptions of teacher interpersonal behaviour (e.g. DS or Influence and CO or Proximity) and student attitudes (Inquiry, Enjoyment, Leisure interest and Career interest), several other *student background characteristics* (e.g. gender, socio-economic background in terms of education level of the father and education level of the mother, mother and father employment status), *class variables* (e.g. grade level and class size), *school variables* (school type, region) and *teacher characteristics* (e.g. gender, years in the profession) were measured (and included). Independent variables (IV) of the study used in the (multilevel) analyses are given in Table 3.11.

Table 3.11

Variables used in (multilevel) analyses

Level	Variable	Nature	Data type	Description
Student	Gender	Categorical	Nominal	Dummy variable with girls indicated by '0' and boys with '1'.
	Report card grade	Continuous	Interval	Scale variable indicating recent test score, ranging between 0 and 5 (converted score from 0 to 100 score).
	Mother's / Father's education level	Categorical	Ordinal	Students indicated their mother's/father's highest education level with '1' illiterate, '2' primary school, '3' secondary school, '4' high school, '5' university and '6' graduate program.
	Number of books at home	Continuous	Ordinal	Scale variable indicating estimated number of books ranging in an upward order from '1' (about 50 books/one shelf) to '6' (several book cases).
Class	Grade level	Categorical	Interval	Variable indicating the grade level, ranging from 9 to 11, recoded into a variable running from 1 to 3, with a higher score indicating a higher grade level.
	Class size	Continuous	Interval	The number of students in the class.
	Class achievement	Continuous	Ordinal	Class average of report card grades.

Table 3.11 Continued

	Subject taught	Categorical	Nominal	Scale variable with physics indicated by '1', chemistry '2', biology '3'. Recoded into two dummy variables for physics (vs. rest) and chemistry (vs. rest).
	Percentage of girls	Continuous	Interval	Percentage of girls in the class as a number out of 100.
Teacher	Gender	Categorical	Nominal	Dummy variable with female indicated by '0' and male '1'.
	Experience	Continuous	Ordinal	Scale variable indicating number of years in the profession ranging in an upward order from '1' (less than 5 years) to '6' (more than 25 years).
School	Type	Categorical	Nominal	Dummy variable indicating if a school is general '0', or Anatolian '1'.
	Region	Categorical	Nominal	Variable indicating if a region is Marmara '1', Aegean '2', Central '3', East '4', Black Sea '5', Mediterranean '6' and South East '7'. This variable was recoded into a set of dummy variables, one for each region.

As mentioned, the dependent variables (DV) of the study were students' perceptions of their teachers' interpersonal behaviour. Interpersonal behaviour was used in three ways: in terms of the *scales* (reliability and validity analyses), in terms of the two *dimensions* (multilevel analyses) and in terms of a *typology*, based on eight profile categories.

The population and sample for the study will be described in the forthcoming section and this section will be followed by a section comparing the

sample to the Turkish population and discussing the representatively of the sample.

3.4 Sample Description

In total two cities for each region of Turkey were selected, ultimately thirteen cities participated in the study. A total number of 7484 science students in 272 classes of 55 secondary schools (Anatolian high school and general high schools) participated. The number of students from Anatolian high schools was 2022 (27.0 percent) and another 5462 students (73.0 percent) attended general high schools. In terms of gender distribution, 3703 (49.5 percent) girls and 3593 (48 percent) boys were sampled (188- 2.5 percent) students made no indication of gender). Of the students, 3889 (52.0 percent) were located in grade nine, 2206 (29.5 percent) in grade ten and 1389 (18.5 percent) students in grade eleven. Detailed information on some sample characteristics can be found in Table 3.12.

Table 3.12
Students' distribution over grade levels (Gr) and gender in terms of frequency (N) and percentage (%)

Gr	Girls		Boys		Missing		Total	
	N	%	N	%	N	%	N	%
9	2095	53.9	1692	43.5	102	2.6	3889	52.0
10	1000	45.3	1146	51.9	60	2.7	2206	29.5
11	608	43.8	755	54.4	26	1.9	1389	18.5
Total	3703	49.5	3593	48.0	188	2.5		

Students' distribution over the science subjects was as follows: a total number of 2576 (34.4 percent) for physics, 2389 (31.9 percent) for chemistry and 2519 (33.7 percent) for biology.

Information with respect to various other student background characteristics will be provided in the next few tables. In terms of socio-economic background (see Table 3.13), students reported that in most cases their mother was at home (no work, 72.8 percent), and for 17.6 percent of the students the mother worked. Also, 10.5 percent of the mothers received their highest education at the university level, while 56.2 percent had followed only primary and secondary education. Of the fathers, 76.0 percent worked, 1.7

percent was retired and 4.1 percent was unemployed. Furthermore, 21.9 percent of the fathers received their highest education at the university level, while approximately 40.1 percent had only followed primary or secondary education (see Table 3.13).

Table 3.13

Socio-economic background information on students' mothers and fathers

Mother Education Level	N	%	Mother Employment	N	%
Illiterate	727	9.7	No work	5446	72.8
Primary school	3163	42.3	Works	1320	17.6
Secondary School	1043	13.9	Not applicable	141	1.9
High School	1607	21.5	Retired	462	6.2
University	783	10.5	Other	41	.5
Graduate Programs	84	1.1			
Missing	77	1.0	Missing	74	1.0
Father Education Level	**N**	**%**	**Father Employment**	**N**	**%**
Illiterate	136	1.8	No work	307	4.1
Primary school	1885	25.2	Works	5691	76.0
Secondary School	1115	14.9	Not applicable	331	4.4
High School	2081	27.8	Retired	876	1.7
University	1641	21.9	Other	161	2.2
Graduate Programs	194	2.6			
Missing	432	5.8	Missing	118	1.6

Most of the students (54.9 percent) reported to live in families of 3 to 4 persons, 8.5 percent of the students lived in families with over 7 persons. A total number of 117 students (1.6 percent) did not answer this question. About 4.9 percent of the students lived in single-parent families, with only their mother or father as guardian (Table 3.14).

Table 3.14
The number of people within the family

Number of people	N	%
3 or less people	1193	15.9
4 people	2917	39.0
5 people	1873	25.0
6 people	751	10.0
7 or more	633	8.5
Missing	117	1.6
Total	7484	100

Students were asked for the number of books at home (as an approximation of socio-economic status-SES, taken from TIMMS); 22.3 percent reported to have more than two bookcases at home, only 17.1 percent of the students reported to have less than one book shelf (50 books) at home (see Table 3.15).

Table 3.15
The number of books at home

Number of books	N	%
Less than one book shelf	1279	17.1
One book self	1162	15.5
Two book shelves	731	9.8
One bookcase	1497	20.0
Two bookcase	973	13.0
More than two bookcase	1667	22.3
Missing	175	2.3
Total	7484	100

Note: One book shelf= (app.) 50 books

Of the sample, 97.0 percent was born in Turkey, 2.0 percent in Bulgaria, and 1.0 percent in different Balkan countries, European countries, Mediterranean countries or Middle Eastern countries.

Class size in the schools varied from 12 to 47 students, with an average of 27 students. In terms of class composition variables, the sample was diverse. The average percentage of girls and boys varied between classes, but no class consisted uniquely of girls or boys (mean 49.5 percent, standard deviation 50.0 percent on average).

A total number of 133 science (physics, chemistry and biology) teachers with a professional experience that ranged from 5 to 25 years participated in the study; average experience was 11 to 15 years (51 teachers or 38.3 percent), two teachers (1.5 percent) indicated their professional experience to be less than 5 years and nine teachers (6.8 percent) had been teaching for more than 25 years. The number of teachers in Anatolian high schools was 38 (28.6 percent) and the other 95 teachers (71. 4 percent) taught at general high schools. Their weekly teaching loads were between 21 and 25 hours (44.4 percent), with seven teachers indicating their weekly teaching hours to be less than 15 class hours (5.3 percent). Of the teachers, 99.2 percent was born in Turkey, one teacher was born in Bulgaria. A total number of 61 teachers (45.9 percent) were female and 71 (53.4 percent) male teachers participated in the study. One teacher did not provide any background information, including for gender. Teacher distribution over subjects was 44 (33.1 percent) for physics, 43 (32.3 percent) for chemistry and 46 (34.6 percent) for biology.

The distribution of students over provinces, regions and cities is provided in Table 3.16.

Table 3.16

Distribution of the sample over schools, teachers, classes, cities and regions

Region	City	N Sch.	N Tch.	N Cls.	N Std.	N Std in Reg.	% City	% Reg.
Marmara	Bursa	5	17	36	961	1300	12.8	17.4
	Yalova	2	6	12	339		4.5	
Aegean	İzmir	9	21	42	1127	1816	15.1	24.3
	Denizli	4	11	26	689		9.2	
Central Anatolian	Ankara	7	19	38	1148	1587	15.3	21.2
	Eskişehir	3	9	22	439		5.9	
Black Sea	Amasya	3	8	16	481	771	6.4	10.3
	Gümüşhane	2	6	12	290		3.9	
South East Anatolian	Diyarbakır	3	5	10	298	298	4.0	4.0
East Anatolian	Malatya	5	15	30	899	1310	12.0	17.5
	Elazığ	3	8	16	411		5.5	
Mediter-ranean	Isparta	8	6	12	307	402	4.1	5.4
	K.Maraş	1	3	6	95		1.3	
Total:		55	133	278	7484	7484	100	100

Note: Sch= Schools, Tch=Teacher, Cls= Classes, Std= Students, Reg= Region

The above mentioned data set was compared with the Dutch data set to examine perception differences between Dutch and Turkish students. As for the Dutch data set, it was created by selecting data from a larger QTI student perception data set for secondary education in the Netherlands, consisting of over 500,000 students and more than 15,000 teachers. First, the data set was reduced by selecting data pertaining to the same year of data collection as the Turkish data (2004-2005). This data set, still consisting of over 50.000 students, was further reduced by selecting only those classes that were taught science subjects (chemistry, physics, biology and mathematics) and those classes that belonged to grade levels 8 to 11.

The resulting data set contained student perceptions of 8503 students. These students were located in 27 schools and 301 classes, taught by 162 teachers. The complete 2004-2005 Dutch QTI data set was gathered from 206 schools mostly during school evaluations and teacher professional development activities and including selections or complete teams of teachers within these schools, which is approximately one third of the total population of Dutch secondary education schools. Moreover, the 2004-2005 data set contained data of teachers of all age groups and Dutch school types in similar amounts as those of the Dutch population (e.g. den Brok, et al., in press). The selection of science teachers from this data set can be regarded as a *random* selection. As such, the data set can be regarded as representative for the Dutch population of secondary education science teachers.

Unfortunately, only a few background characteristics (of only the students) were available for the Dutch data set, as this data set had not been gathered originally for research purposes but for school consultancy and teacher feedback purposes. Also, when comparing the sample with the Turkish sample, it should be kept in mind that sampling processes differed, which has in turn resulted in differences between data sets with respect to student background and class characteristics and these differences probably overlap with any differences found between countries with respect to QTI ratings. Nevertheless, because of the large sample sizes of both samples and the careful procedure of sampling employed, differences will represent strong signals for cultural differences.

From the available data the following characteristics can be provided for the Dutch sample in this dissertation study. In terms of school types, all Dutch school types were represented in the data, with 23.9 percent of the students in vocational education streams and the remaining 76.1 percent in general education. In terms of grade level, 37.1 percent of the students were located in grade eight, 24.2 percent of the students in grade nine, 28.5 percent of the students in grade ten and the remaining 10.3 percent in grade eleven. As for the student gender distribution, 51.4 percent of the students were boy, 48.6 percent of the students girl. Lastly, subject distribution was as follows: 17.6 percent for chemistry, 17.2 percent for physics, 38.0 percent for biology and 27.2 percent for mathematics.

Statistical analyses show that the Turkish sample contained relatively less students in grades 9 and 10, but more in grade 11 than the Dutch sample (χ^2 =376.11; p=.000), contained more girls and less boys than the Dutch sample

(χ^2 =13.55; p=.000) and relatively more physics and chemistry students, but less biology students than the Dutch sample (χ^2 = 1048.54; p=.000).

In the forthcoming section, sample characteristics of the study are compared to information of the Ministry of National Education (2004-2005 statistical outcomes) to establish representatives of the current Turkish sample.

3.4.1 Representativity of the Sample Compared to the Turkish Population

According to the Educational Statistics of Turkey 2004-2005, provided by the Ministry of National Education, the total number of high schools (general – Anatolian) in Turkey is 2106, comprising 443 Anatolian and 1663 general High schools containing approximately 1.559.713 students (827.071 boys and 732.642 girls). The percentage of Anatolian high schools is 21.0 in the population while this percent is 27.0 percent for the study. Thus, our sample contained more students from Anatolian high schools than the population (χ^2=160.97; p=.000). Comparisons between the sample and the population for schools, classes and teachers are given in the Table 3.17.

Table 3.17

Percentage of schools, classes and teachers according to region for sample and population

Region	% School		% Classes		% of Students	
	Turkey	Sample	Turkey	Sample	Turkey	Sample
Marmara	20.76	12.73	23.96	17.45	25.79	17.37
Aegean	16.42	23.64	14.10	25.82	12.08	24.27
Central Anatolian	18.84	18.18	18.74	21.82	17.89	21.21
Black Sea	13.43	9.09	13.02	9.45	10.63	10.30
South East	7.45	5.45	7.63	3.64	10.03	3.98
East	9.83	14.55	8.28	16.73	8.43	17.50
Mediterran-ean	13.27	16.36	14.27	5.09	15.13	5.37

In terms of schools, the sample contained less students from the Marmara, Black Sea, Mediterranean and South East Anatolia regions than the population, but more schools from the Aegean, Central Anatolia and East Anatolia regions (χ^2=2646.76; p=.000). This pattern is similar for the number of classes per region (χ^2=2065.68; p=.000) and number of students per region (χ^2=1319.72; p=.000). Thus, our sample is not distributed similarly according to region compared to the Turkish population.

The reasons for this unparallel distribution of the sample with the Turkish population have mainly two causes. First, although continuous contact was held with all schools, the researcher had difficulty in reaching some regions - the Black Sea, Mediterranean and South East (Anatolia) - due to distance from the researcher residence. As a result, problems in motivating and persuading teachers to take part in study occurred due to the absence of face-to-face contact and due to not being able to visit schools personally. The difference for the Marmara region is mostly related with the demographic characteristics and huge migration in İstanbul. The total number of schools are 507 in the Marmara region, with 233 schools located in İstanbul. This means that the schools in İstanbul correspond to almost half of the schools in the region. As a result, this study was able to keep the distribution similar at the province level, but quite different at the region level for Marmara.

Compared to the sample and Turkey as a whole, the sample contained a higher percentage of girls (53.1 percent for sample; 43.0 percent for Turkey) (χ^2

= 178.97;p=.000), a higher percentage of students located in Grade 9 (41.9 percent for Turkey; 53.9 percent for the sample), a lower percentage of students located in Grade 11 (19.0 percent for Turkey; 18.6 percent for the sample) and a lower percentage of students in Grade 10 compared to Turkey as a whole (χ^2 =358.96; p=.000). Apparently, teachers and schools were less willing to participate with last grade students due to necessary preparations for the University Entrance Examinations. Given the curriculum of the 9th and 10th grades – with more content and time pressure in grade 10 – most schools decided to participate with grade 9.

As for socio-economic status (SES), student reported the number of people per family mostly four (39.0 percent) or five people (25.0 percent). This is in line with the Province Development Performance Report 2003 that reported the average number of people per family as 4.5. The percentage of people with high school as their highest education level was 36.92 for Turkey as a whole, 21.5 percent for mothers in this sample and 27.8 percent for fathers. In terms of university graduation as the highest educational level, this percentage was 8.42 for Turkey as a whole, 10.5 for mothers and 21.9 for fathers in this sample. A statistical analysis showed that in our sample more students had parents with university education and less students with parents that had high school education as compared to Turkey as a whole (χ^2 =737.31; p=.000 for mother education level) (χ^2 =2023.24; p=.000 for father education level). This might be caused by the sampling in two cities, İzmir and Ankara. The percentage of university graduated people is relatively above the country average in these cities while other cities are average or very close to average.

In sum, our sample was different compared to the Turkish population in terms of gender, school types, grade levels, regions and socio-economic status of students' parents. This means that findings should be considered within the large sample collected and that no generalizations can be made to Turkey as a whole – as far as these characteristics are concerned. Nevertheless, given the large size of the sample, most findings will nevertheless provide a pretty accurate estimate for what might be going on in Turkish secondary education schools.

3.5 Data Analyses

In order to answer the research questions, a number of analyses were performed on the student data (actual form, classroom version). Inferential and descriptive statistics were used in the analyses. Descriptive statistics were used

both for presenting results in detail and to check assumptions for the inferential statistics. Means, standard deviations, skewness, kurtosis and histograms for each variable were created. The Statistical Package for the Social Sciences (SPSS) version 11 was used to do most of these initial analyses and to prepare the data for other types of analyses such as multilevel and confirmatory factor analyses.

To specify power and effect size for the present study, Alpha was set to 0.05 (the most used value in educational statistics), the probability of rejecting the null hypothesis or beta was set to 0.01. Therefore power was set to 0.99. With the help of the Cohen's table and using fixed alpha, power and effect size, the L value has been found and the required minimum sample size has been determined as 553[15] for the present study (Cohen, 1977).

Regarding the factor analyses in this study, while there is a general agreement that large samples are imperative for the stability of factor analytic results, there is no agreement about to what constitutes large and the rules of thumb for the determination of the sample size in relation to the number of variables. Nunnally (1978) for example advised that "a good rule is to have at least 10 times as many subjects as variables" (p. 421).Given the large sample of 7484 students (278 classes, 55 schools) of the study, this criteria was easily met.

The second and fourth research questions of the study justified and evoked the use of multilevel analysis of variance. It has been shown that non-randomly sampled data sets, such as the one in this study, may lead to *artificially increased* associations, since respondents (in classes) share similar experiences, history and stimuli (Hox, 1995; Muthen, 1994). Using regular analysis of variance in such cases leads to an overestimation of possible effects and higher standard errors (eg. Hox, 1995). Multilevel analysis can take the non-random sampling into account and provide better estimates of relationships between variables. Also, most previous studies on the QTI not using multilevel analyses investigated only one background variable at a time. Effects that have not been corrected for the presence (and effects) of other, (partially) overlapping variables, may also have been overestimated. In addition, no interactions between variables are investigated in most "standard" single level data analyses.

[15] L (the noncentrality parameter), K= number of IV, f^2 = .08 small, .15 medium and .33 high N= (L/ f^2) + K +1. For the current study:
(43.09 /.08) + 13 + 1=552.6

3.5.1 Analyses for the First Research Question

The first research question was:

What are Turkish students' perceptions of their science teachers' interpersonal behaviour?

- *What are teachers' perceptions of their own interpersonal behaviour?*
- *What (interpersonal) profiles can be discerned in class perceptions of these Turkish science teachers?*

Students' (average) perceptions of their teachers, teachers' self-perceptions and teachers' ideal perceptions were determined with descriptive analyses in SPSS (for the latter two no validity or reliability was established, since they were mainly gathered for teacher feedback). Graphical profiles, so-called 'interpersonal roses' were created with the Excel package from Microsoft Office.

With SPSS, it was determined which of the eight existing interpersonal types resembled each class of each participating teacher best. To this end, distances between a teacher's empirical scale scores and the scale mean scores of a profile were computed and a class was allocated to the type with the smallest average distance. With this procedure, it was possible to establish what kind of distribution of (earlier constructed) interpersonal types was present in the sample. The distribution found was compared with those reported in the literature.

To create a specific typology for the Turkey sample of teachers, a cluster analysis was performed (squared Euclidian distances, Ward method). The outcomes of the cluster analysis were verified with an analysis of variance (ANOVA) on the eight sector scores (with the constructed typology as the explanatory variable) to check if sufficient amounts of variance could be explained by the cluster outcomes. In order to interpret findings, outcomes of the Turkey classification were also represented graphically, both in terms of the eight sector or scale scores as well as in terms of the two interpersonal dimensions of influence and proximity.

3.5.2 Analyses for the Second Research Question

The second research question was:

What are the student, class and teacher variables affecting differences in Turkish students' perceptions of their science teachers' interpersonal behaviour?

Multilevel analyses of variance were conducted with MLN for Windows on the dimension scores of the QTI (DS and CO). Models consisted of three levels: school, class and student. Models were tested in a number of steps. First, an *empty model* (with no independent variables) was tested in order to obtain raw percentages of variance in the sector scores at the student, class, and school level. Next, a *model* with all *student variables* from Table 3.11 (see pages 114-115) was tested. Non-significant variables were deleted from the model until a model was achieved with significant student variables only. In the second step, *class and school variables* were added. Finally, *interactions* between variables were tested both within and across levels.

Coefficients for variables and their standard errors will be reported, as well as effect sizes for each coefficient[16]. Additionally,–2*loglikelihood, which is an indication for distance between model and data, will be presented. Lastly, the percentages of variance at the distinguished levels and the percentages of explained variance by variables will be reported.

3.5.3 Analyses for the Third Research Question

The third research question was:

What differences in perceptions of (science) teachers' interpersonal behaviour exist between Turkish students in Turkey and their Dutch counterparts in the Netherlands?

To compare perceptions between students in Turkey and the Netherlands, an analysis of variance (ANOVA) was conducted with SPSS. Because the focus for the third research question lies on perceptions of individual students, data were not analysed at the class level. Comparisons were made both for scale scores as well as for dimension scores. As noted, reported cultural differences may partially overlap with differences in sampling and sample characteristics (see section 3.4).

3.5.4 Analyses for the Fourth Research Question

The fourth research question was:

What associations exist between students' perceptions of their science teachers' interpersonal behaviour and their affective learning outcomes?

To answer this research question, multilevel analyses of variance were conducted in a similar fashion as for research question 2 (see section 3.5.2).

Thus, the TOSRA scale scores were used as the dependent variables and QTI dimension scores and student, class, teacher and school background variables were used as independent variables. Similar to the second research question, coefficients, standard errors and effect sizes were determined, overall model statistics and percentages of explained variance. In the analyses three levels were distinguished: school, class and student. Also, different models were tested, namely an empty model, a model with student characteristics, a model with other background characteristics and a model including QTI dimension scores.

3.6 Chapter Summary

This chapter described the way in which the study was conducted. First, the procedure of the study was introduced. Then, the instruments of the study, the QTI and TOSRA, were described, including their development and adaptation process. This process was more elaborate for the QTI than common in most studies creating a new language or country version, but warranted the emergence of a reliable and valid cultural adaptation. Thus, the development steps of the Turkish version of the QTI were explained and information about its reliability and validity were given. Drawn from all these, it was concluded that the 62-item Turkish version of the QTI could be used for further studies. Four scales of the TOSRA were translated. These scales appeared reliable and distinguished between students and classes. Next, the dependent and independent variables of the study were introduced and defined. Sample descriptions were given in detail and compared between the countries and with the country population. Due to the big sample size, it was concluded that the study would give a strong clue about cultural differences and the situation within Turkey, although both samples were not comparable and although the Turkish sample was not fully representative of the country. Last, the way for the analysis were described for each research question.

[16] Effect size = coefficient * (Std. dev Independent variable/std. dev dependent variable)

CHAPTER IV

RESULTS

4.1 Introduction

In the third chapter the way in which the study was conducted has been described. That chapter also included the development procedure of a culturally adapted Turkish version of the QTI, its reliability and validity, both for a pilot and for the main study. The instruments of the study and variables were introduced and information was provided on the Turkish and Dutch samples. Moreover, the representativity of the sample compared to the Turkish population and information on data analysis were presented.

In the current chapter, results of the analyses performed on student data to answer the research questions will be presented. First, a description of the missing data (section 4.2) will be provided and then the results of descriptive analyses (section 4.3) will be presented. These sections will be followed by the main outcomes (section 4.4) including testing of the null hypotheses. The chapter will end with a chapter summary (section 4.5), similar to previous chapters.

The forthcoming section is the first part of the chapter and will outline the general picture of missing data within the study.

4.2 Missing Data

Missing data analyses were conducted before starting with the descriptive and main analyses. In the questionnaires, some of the students left personal information open or did not provide an answer to some items of the scales, either the QTI or TOSRA. The percentage of missing data with respect to student background information has been presented during the sample description (see section 3.4) and was reported to be generally between 1.0 and 2.7 percent. The percentage of items with no response was calculated for each questionnaire item and it was found that this percentage was on average 1.5 percent for the QTI items and 1.8 percent for the TOSRA items. The distribution of missing data over the items is given for both sections in Appendices U and T and graphically in Figures 4.1 and 4.2. No systematic missing was detected over classes, schools, cities or regions by the researcher during data entering.

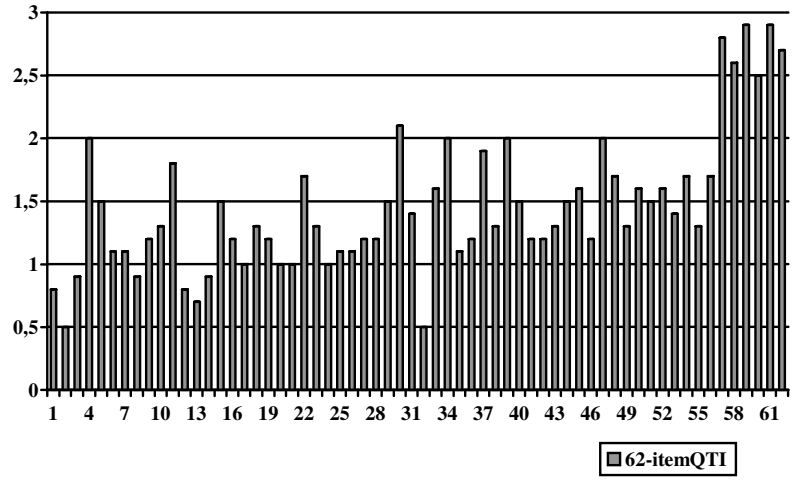


Figure 4.1
Histogram of the percentage of missing answers for each of the 62 items of the QTI

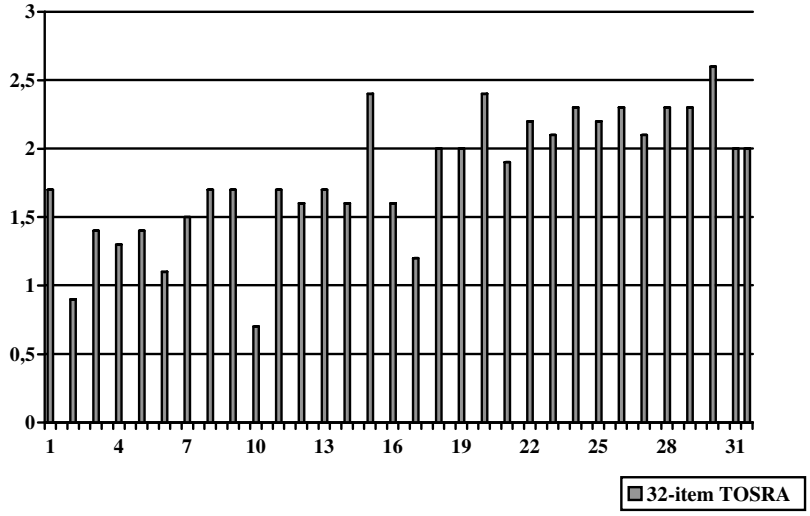


Figure 4.2
Histogram of the percentage of missing answers for each of the 32 items of the TOSRA

As can be seen (in Appendix U and Figure 4.1), there might be a small effect of time pressure or tiredness on students during completion, as the percentage of missing slightly increases towards the last few QTI items. Nevertheless, the percentage of missing answers is still small in those cases. A

similar trend is visible in the percentage of missing answers for the TOSRA items, though less pronounced (Figure 4.2 and Appendix T).

In sum, the results of the descriptive statistics showed that the percentage of missing on average was below 3 percent for the whole data set (background information, QTI and TOSRA). For the QTI and TOSRA, scale (and dimension) scores were based on only completed items. This means that for some students scale and dimension scores were based on a smaller number of items.

4.3 Descriptive Statistics

After the analysis of missing data, the next step in the analyses was to create a frequency table with means, standard deviations and other statistics for the items of both instruments - the QTI (see Appendix U) and TOSRA (see Appendix T). In this section, descriptive information will be given first for the QTI (section 4.3.1) and next for the TOSRA (section 4.3.2).

4.3.1 Descriptive Statistics for the QTI (Teacher Interpersonal Behaviour)

Average item means for each item in the QTI were calculated and outcomes are provided graphically in Figure 4.3. Note that item scores here range between 0 and 4, while scale scores were recoded from a range between 0 and 4 to a range between 0 and 1, with 0 indicating a score of 0 percent out of the scale maximum and 1 representing a score of 100 percent out of the scale maximum.

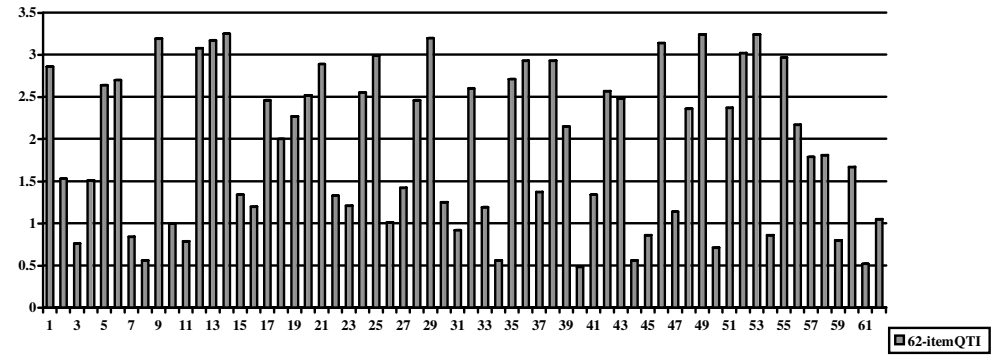


Figure 4.3
Average item mean scores for the 62 items QTI

To explore the nature of the science teachers' interpersonal behaviour, the average scale mean and standard deviation, skewness and kurtosis of each scale of the QTI were calculated (Table 4.1). Students generally perceived that their teachers displayed cooperative behaviours (Leadership, Helpful/Friendly, Understanding), rather than opposition behaviours (Uncertain, Dissatisfied, Admonishing). The mean score for scales at the class level was found as follows: the Leadership scale was rated on average as .71 where the maximum value was equal to 1, while the mean values for Helpful/Friendly and Understanding were .66 and .71, respectively. These scores correspond to 'often'. The Strict scale also received a high rating with .50. This means that Turkish students perceived their science teachers displayed cooperative behaviours together with strictness. On the other hand, the Uncertain, Dissatisfied and Admonishing scales were rated with scores lower than .35 on average, which mean that teachers displayed these behaviours 'sometimes' to 'hardly'. The Student Freedom scale obtained a rating below .50, but its rating was higher than those of Uncertain, Dissatisfied and Admonishing. This result reflects the tendency of Turkish science teachers not to allow their students much freedom in their lessons. The lowest rating belonged to the uncertain scale. This means that, according to students, science teachers seldom display uncertain behaviours in the classroom.

In terms of the two dimensions, it appeared that Turkish science teachers were perceived as somewhat dominant (DS=.53 on a possible score range between –3 and +3, Std.dev=.25) and highly cooperative (CO=.91, Std.dev=.46). This means that Turkish students perceive their science teachers display cooperative behaviours together with dominant behaviours.

Table 4.1

Scale means, standard deviation (SD), skewness and kurtosis values for the QTI scales with the class as unit of analysis (n= 278)

	QTI Scales	SD	Mean	Skewness	Kurtosis
DC	Leadership	.12	.71	-.73	.79
CD	Helpful/Friendly	.13	.66	-.52	.03
CS	Understanding	.12	.71	-.85	1.18
SC	Student Freedom	.08	.45	-.11	-.39
SO	Uncertain	.10	.18	1.30	2.13
OS	Dissatisfied	.09	.27	.55	-.03
OD	Admonishing	.09	.32	.42	.09
DO	Strict	.10	.50	.26	- .08

A graphical display of the scale means from Table 4.1 is presented in Figure 4.4.

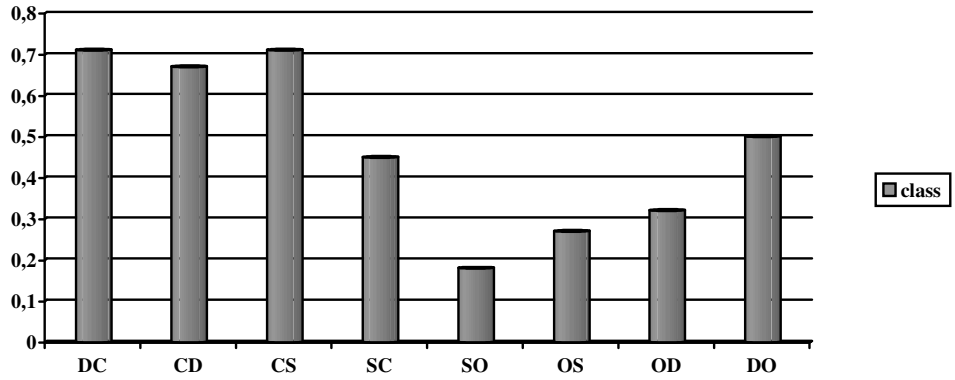


Figure 4.4

Average item means scores for the QTI scales with the class as unit of analysis

A sector profile was plotted by using the mean scores for eight scales for the class level to describe the average profile of teacher in the sample (Figure 4.5).

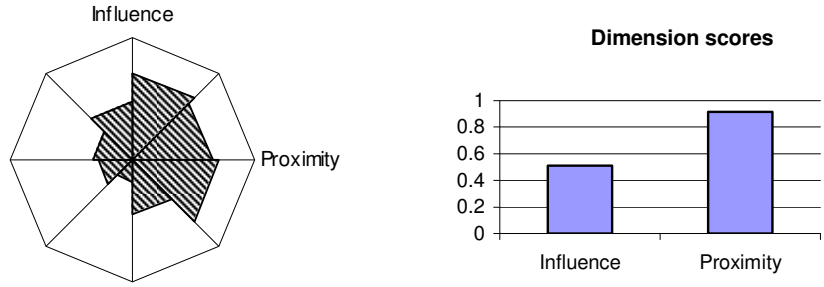


Figure 4.5
Graphical profile of the average interpersonal style and dimension scores of Turkish science classes (n= 278)

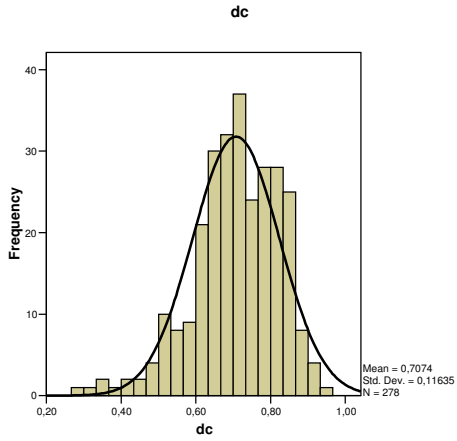
The outcomes of Table 4.1 and Figures 4.4 and 4.5 generally represent the profile of a Tolerant/Authorative teacher, although the score on Strict is higher than in previous studies in other countries (but similar to a previous study in Turkey, e.g. Telli, et al., 2005; Telli, et al., 2006a; Şimşeker, 2005; see section 2.3.6.1). Brekelmans and her colleagues (1993: p50) describe the Tolerant/Authoritative teacher as follows:

> *"Tolerant/Authoritative teachers maintain a structure which supports student freedom. They use a variety of methods, to which students respond well. They frequently organize their lessons around small group work. While the class environment resembles that of the Authoritative teacher (profile 2), the Tolerant/Authoritative teacher develops closer relationships with students. They enjoy the class and are highly involved in most lessons. Both students and teacher can occasionally be seen laughing, and there is very little need to enforce the rules. The teacher ignores minor disruptions, choosing instead to concentrate on the lesson. Students work to reach their own and the teacher's instructional goals with little or no complaints."*

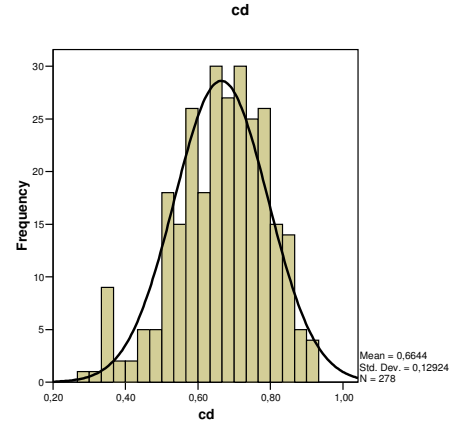
Obviously, for the Turkish context this description should be altered somewhat to include the higher perception of strictness and typical teaching methods or common interaction patterns in Turkey.

Figure 4.6 presents histograms plotted against the normal distribution curve related to the eight scales and two dimensions of the QTI. Although some of the histograms were right-skewed and some were left-skewed, they can be

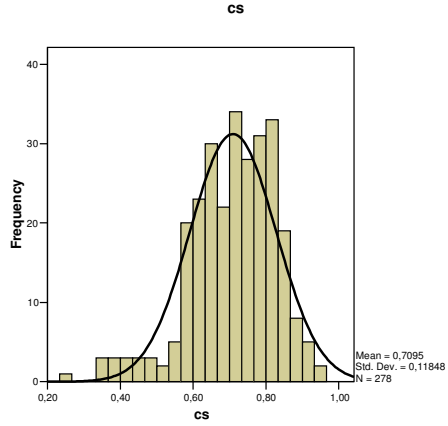
accepted as variables with a normal distribution. In terms of skewness and kurtosis values, all of the eight scales were between the -1 and +1 value, except for the Uncertain scale (see Table 4.1).



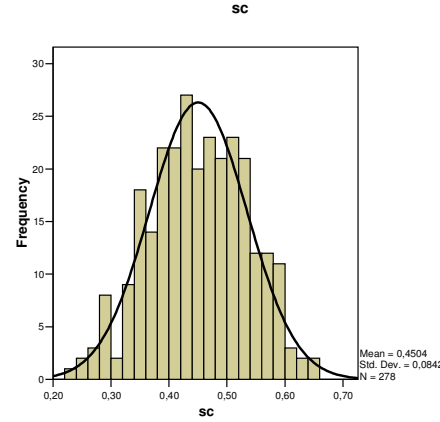
Leadership-DC



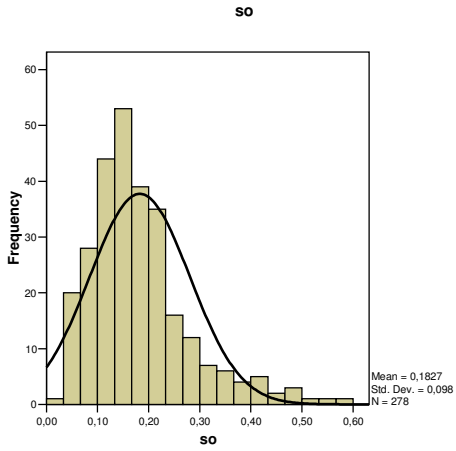
Helpful/Friendly-CD



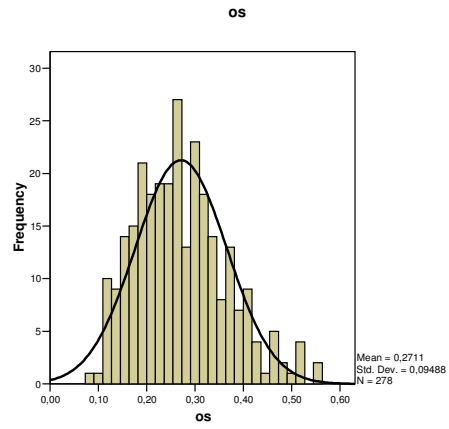
Understanding-CS



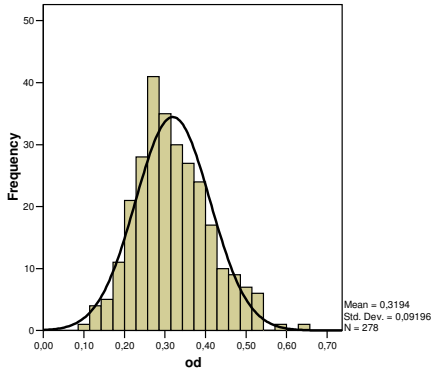
Student freedom-SC



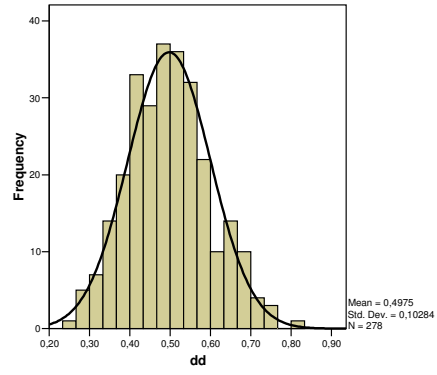
Uncertain-SO



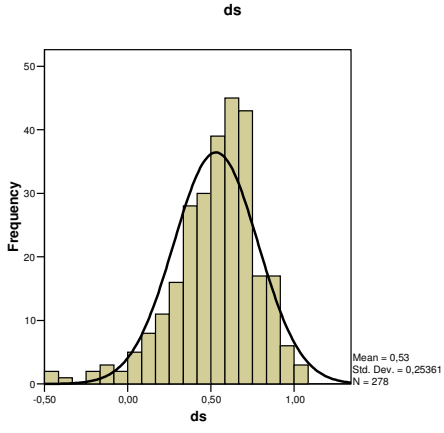
Dissatisfied-OS



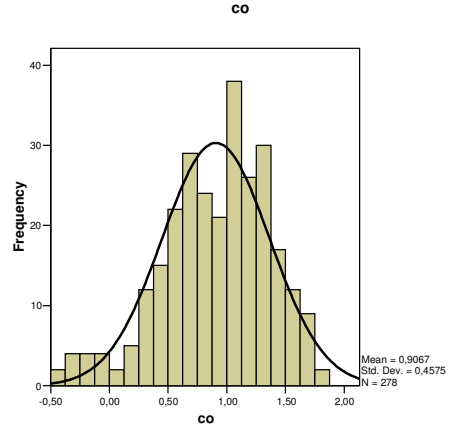
Admonishing-OD



Strict-DO (DD)



Influence-DS



Proximity-CO

Figure 4.6

Histograms with normal curves for the QTI scales and dimensions

In the next section, descripitive information will be provided for the TOSRA items and scales in similar manner as for the QTI.

4.3.2 Descriptive Statistics for the TOSRA (Student Attitudes)

Figure 4.7 shows the average item mean for the 32 items of the TOSRA. In the figure, the first half (4-31) are recoded items measuring negative attitudes towards science, while the second half (1-28) are positively formulated attitude items. As can be seen, while responses to all of the positive and negative items are almost on the scale medium, positively stated items were slightly above the medium while responses to negatively stated items were generally slightly below the medium.

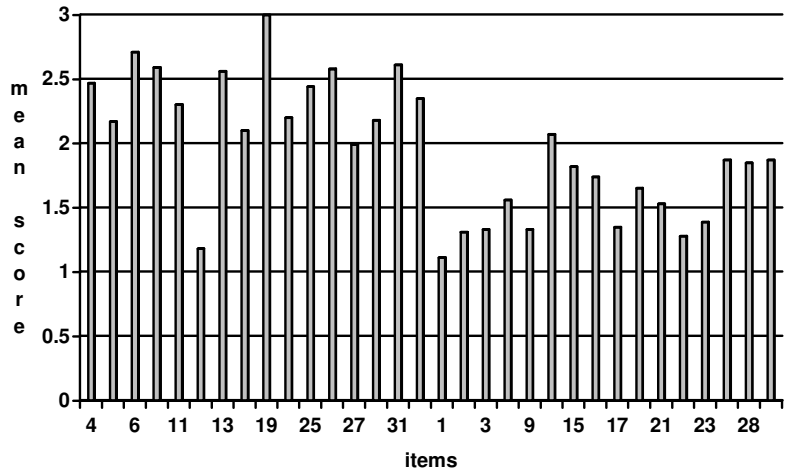


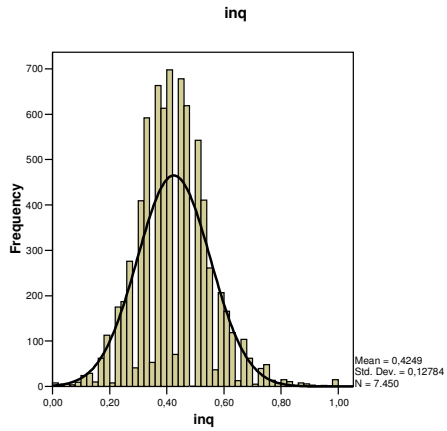
Figure 4.7
Average means scores for each of the 32 items TOSRA

To explore the nature of student attitudes a little further, means, standard deviations, skewness and kurtosis for each scale of the TOSRA were calculated (Table 4.2). The mean scores shown in Table 4.2 range between .42 and .54. The standard deviations for all scales were less than .15, suggesting that there is not a large diversity in students' attitudes towards science. In general, students reported neutral or even somewhat negative attitudes towards science.

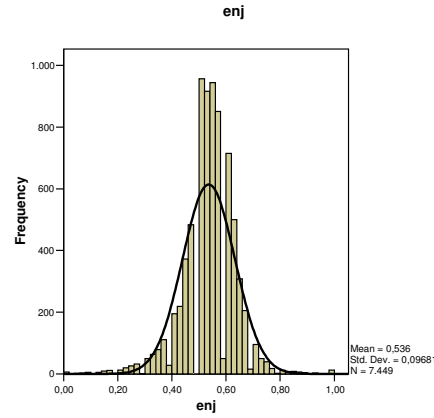
Table 4.2
Scale means, standard deviation (SD), skewness and kurtosis values for TOSRA scales

Scales	SD	Mean	Skewness	Kurtosis
Attitude to scientific inquiry	.13	.42	.46	1.26
Enjoyment of science lessons	.10	.54	-.51	3.37
Leisure interest in science	.12	.50	-.19	.67
Career interest in science	.12	.48	.22	1.80

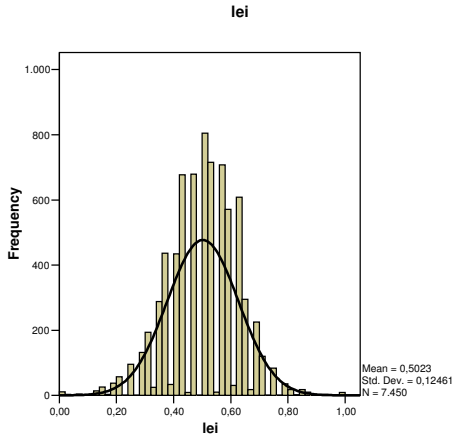
Figure 4.8 provides histograms plotted against the normal curve related to the four scales of TOSRA. As can be seen in the figures, distributions were approximately normal, even though for three of the scales kurtosis values were below 1.



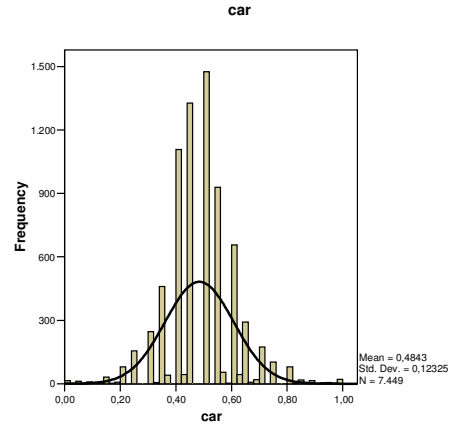
Attitude to scientific inquiry-INQ



Enjoyment of science lesson-ENJ



Leisure interest in science – LEI



Career interest in science – CAR

Figure 4.8

Histograms with normal curves for the TOSRA scales

Looking back at the results of the descriptive analyses, it can be concluded that data set is suitable for most psychometric purposes and further statistical analyses.

4.4 Main Results

In this part of the dissertation, outcomes of analyses for answering the research questions will be presented and the null hypotheses for the study will be tested in the light of these[17].

4.4.1 Null Hypothesis I

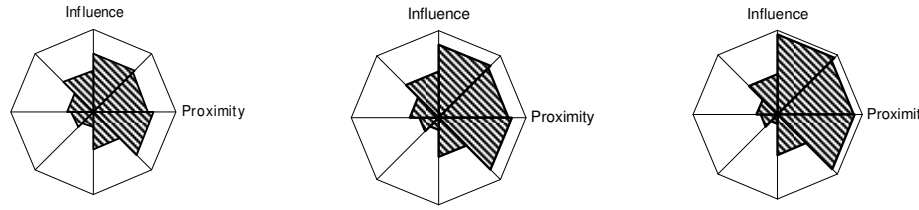
The first research question tested the following Null Hypothesis:

No different profiles will be found in Turkish students' perceptions of their science teachers' interpersonal behaviour.

- *The teacher perception of their own interpersonal behaviour will be similar with their students and their ideal perception.*
- *The profiles found in student perception data will fit perfectly into the existing interpersonal profiles (as developed in the Netherlands and U.S.).*

First, the average profile of teachers as perceived by students in sample (see section 4.3.1) was compared with teachers' self-perceptions and teachers' ideal perceptions. The results are presented in Table 4.5 and graphically displayed with interpersonal 'roses' in Figure 4.9. Generally, teachers' self and ideal perceptions were higher on both dimensions than students' perceptions. This finding is similar to other studies investigating differences between teacher and student perceptions (e.g. Wubbels, & Levy, 1993a; 1991; Wubbels, & Brekelmans, 1998; den Brok, et al. 2006a; Rickards, & Fisher, 1998; Şimşeker, 2005, Rakici, 2004) (see also section 2.2.2). So, teacher perceptions of their own interpersonal behaviour were not similar with their students and their ideal perceptions. Teachers generally had higher expectations for their ideal and rated themselves higher on Influence and Proximity than their students.

[17] This dissertation will not report on testing the assumptions for multivariate analyses of variance. Reason for this is that none of the analyses requires these assumptions. *Hypothesis 1* uses cluster analyses and frequencies or descriptives; *Hypotheses 2 and 4* use multilevel analyses that do not require meeting the assumptions of normality, linearity, multicollinearity and equity of variance-covariance, only a sufficiently large sample size, which is certainly the case here; *Hypothesis 3* uses univariate analyses of variance (on scales and dimensions), for which only the requirements of sample size and normality apply and that have been demonstrated in section 4.3. Also, the MITB requires covariance and collinearity by nature given the expected correlations between scales due to its circumplex ordering (see chapter 2, section 2.3.3).



Students' perception

Self perception (teacher)

Ideal perception (teacher)

Figure 4.9

Graphical profiles of average Turkish teachers' interpersonal behaviour

Table 4.3

QTI scale and dimension average scores for Turkish teachers

	Students' perceptions Mean(SD)	Self (teacher) perception Mean (SD)	Ideal (teacher) perception Mean (SD)
DC	.71 (.12)	.84 (.40)	.95 (.24)
CD	.66 (.13)	.80 (.36)	.90 (.29)
CS	.71 (.12)	.84 (.35)	.91 (.29)
SC	.45 (.10)	.45 (.39)	.48 (.42)
SO	.18 (.08)	.14 (.41)	.11 (.47)
OS	.27 (.10)	.22 (.39)	.20 (.43)
OD	.32 (.09)	.33 (.39)	.25 (.37)
DO	.50 (.10)	.53 (.45)	.48 (.49)
DS	.53 (.25)	.68 (.18)	.89 (.20)
CO	.91 (.46)	1.04 (.17)	1.12 (.18)

Note: SD=standard deviation; scale scores can range between 0 and 1; dimension scores can range between -3 and +3.

Then, mean scores on the scales for each class were compared to existing profiles to examine whether they fitted perfectly into the existing interpersonal profiles (as developed in the Netherlands and U.S.) or not, the second half of Null hypothesis I. Statistical analyses on class mean scores indicated that all existing interpersonal profiles could be detected in Turkish science classes but in

different percentages. Most common were the Authoritative and Tolerant/ Authoritative teacher (with 88 classes, 31.7 percent each), these two comprised 63.4 percent in total. These were followed by Directive teachers (69 classes, 24.8 percent). Other types were found in considerably smaller rate compare to these three: 8 Tolerant classes (2.9 percent), 4 Uncertain/Tolerant classes (1.4 percent), 8 Repressive classes (2.9 percent) and 10 Drudging classes (2.6 percent).

The outcomes of this study were compared to the results of a previous study in Turkey (Telli, et al., 2005), a large Dutch sample (specifically created for this study), a study on US/Dutch teachers combined (Wubbels, & Levy, 1993a) and an Australian sample (Rickards, et al. 2005) (see Table 4.4). In Table 4.6, it can be easily noticed that teachers' profiles in Turkish samples generally are Directive, Authoritative or Tolerant/Authoritative and that other profiles are considerably less common or totally absent. These three types are known for their high scores on cognitive and affective outcomes (e.g. Wubbels, & Levy, 1993a). Additionally, it can be noticed that three missing profiles (Tolerant, Uncertain/Aggressive and Repressive) in a previous Turkish study emerged in this sample, though in considerably smaller amounts than the first trio of profiles.

Comparing profile percentages of the Turkish sample with those of a large Dutch data set and the US/Dutch sample, it seems there are more Directive (24.8 percent), Authoritative (31.7 percent) and Tolerant/Authoritative (31.7 percent) teachers in the Turkish sample, while all other types are much less prevalent. The large Dutch sample contains more Authorative (23 percent) classes and the US/Dutch sample contains more Tolerant (23.5 percent) teachers than the Turkish sample. The highest number of Authorative and Tolerant/Authorative teachers can be found in the Australian sample, with 37.5 and 33.9 percent respectively. It seemed that several types were less common in the Turkish sample, such as the Tolerant, Uncertain/Aggressive and Uncertain/Tolerant types, whereas other types were much more common, such as the Authoritative and Tolerant/Authoritative types. Moreover, Rickards, den Brok,& Fisher (2003) reported a possible reason for the higher percentage of Authorative and Tolerant/Authorative teachers and the lower level of Uncertainty in Australian samples compared to the USA and the Netherlands; they argued this to be a result of a higher degree of respect and formality in Australian society, finding their origin in a historical strong link with the English system

(and which can still be seen in certain elements, such as school rules, school uniforms or mutual politeness in conversation).

Whether these findings resemble sampling differences (Dutch and American samples also included non-voluntary teachers), differences in QTI versions or cultural differences, cannot be determined in this study. It seems likely that all of these issues to some degree were responsible for the differences found.

Table 4.4

Percentages of occurrence of interpersonal profiles in a previous Turkish sample (Telli, et al., 2005), a large Dutch sample (present study), a combined US/Dutch sample (Wubbels, & Levy, 1993a) and an Australian sample (Rickards, et al., 2005).

Interpersonal profile	This Study	Turkish sample (2005)	Large Dutch Sample	US/Dutch sample	Australian sample
Directive	24.8	17	19	18.2	15.5
Authoritative	31.7	46	23	14.9	37.5
Tolerant/ Authoritative	31.7	29	14	10.4	33.9
Tolerant	2.9	-	19	23.5	6.0
Uncertain/ Tolerant	1.4	4	9	15.3	1.4
Uncertain/ Aggressive	1.1	-	3	6.5	1.1
Repressive	2.9	-	5	3.2	0.7
Drudging	2.6	4	8	0.3	3.9

As mentioned before, the average profile for Turkish teachers was similar to the Tolerant/Authoritative profile, but with a higher score for the Strict scale (see section 4.3.1). This average profile has been labelled as the "Turkish version of Tolerant/Authoritative teacher" (e.g. Telli, et al., 2006a). Looking at these results, it can be concluded that the existing interpersonal profiles are

distributed differently in the Turkish sample and that in terms of students' average perceptions a specific variant of the Tolerant/Authoritative teacher appeared.

While all teachers could be classified as belonging to one of the previously found types, the typology explained between 40 (Student Freedom) and 82 (Understanding) percent of the variance in scale scores (see Table 4.5). In terms of the two interpersonal dimensions, the existing typology could explain 47 percent of the variance in Influence and 88 percent of the variance in Proximity.

To investigate Turkish profiles from a different angle, a cluster analysis was performed on class average perception scores for the scales (squared Euclidian distances, Ward method). The results of the cluster analysis indicated that the best and most distinctive typology found in the data consisted of six types (see Table 4.5). In order to interpret these findings, outcomes of the Turkey classification were also represented graphically, both in terms of the eight sectors or scale scores as well as in terms of the two interpersonal dimensions of Influence and Proximity. Table 4.5 contains the frequency of teachers according to each of the six types and the percentages of variance explained by the cluster solution in each of the QTI scale scores. The Turkish typology with six profiles explained between 37 (Student Freedom) percent and 80 (Helpful/Friendly) percent of the variance in scale scores (see Table 4.5). It explained 52 percent of the variance in Influence and 83 percent of the variance in Proximity. These percentages are roughly similar to those of the existing US/Dutch based typology.

Table 4.5

Frequency of occurrence of teachers in terms of the six-cluster solution, percentage of variance explained in QTI scales

Type (Turkish typology)	Frequency	QTI scale	Percentage explained variance by Turkish Typology	Percentage explained variance by original QTI typology
Type -1	45	DC	72	68
Type -2	40	CD	80	79
Type -3	27	CS	77	82
Type -4	92	SC	37	40
Type -5	63	SO	58	65
Type -6	11	OS	70	75
		OD	57	55
Total	278	DO	49	39
		DS	52	47
		CO	83	88

Figure 4.10 provides a graphical display of the six types. The teachers from the sample are graphically displayed on the two dimensions of Influence and Proximity in Figure 4.11.

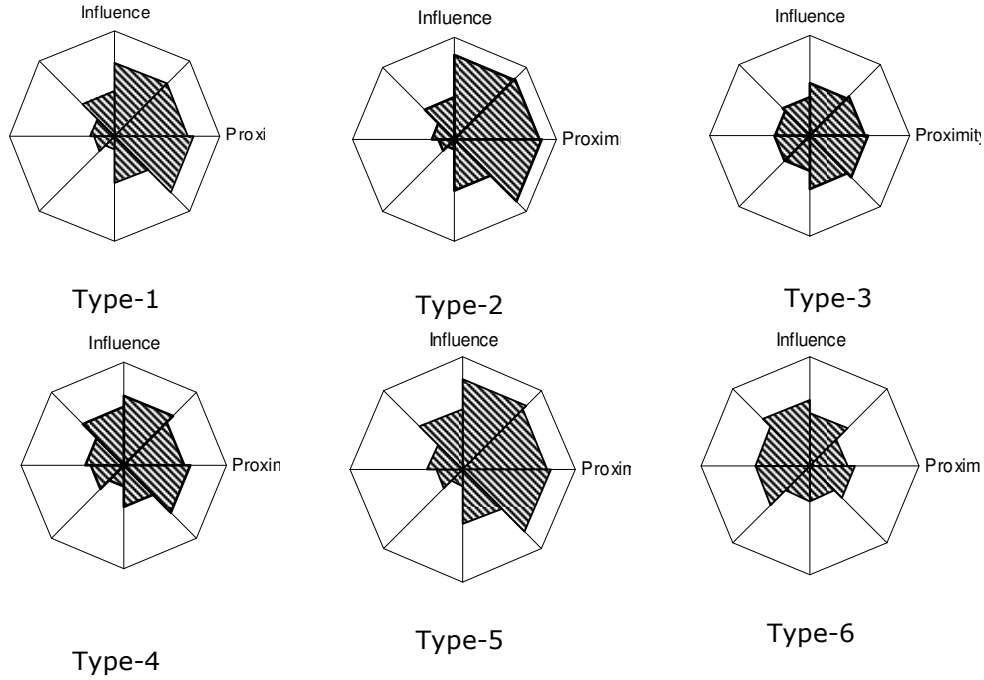
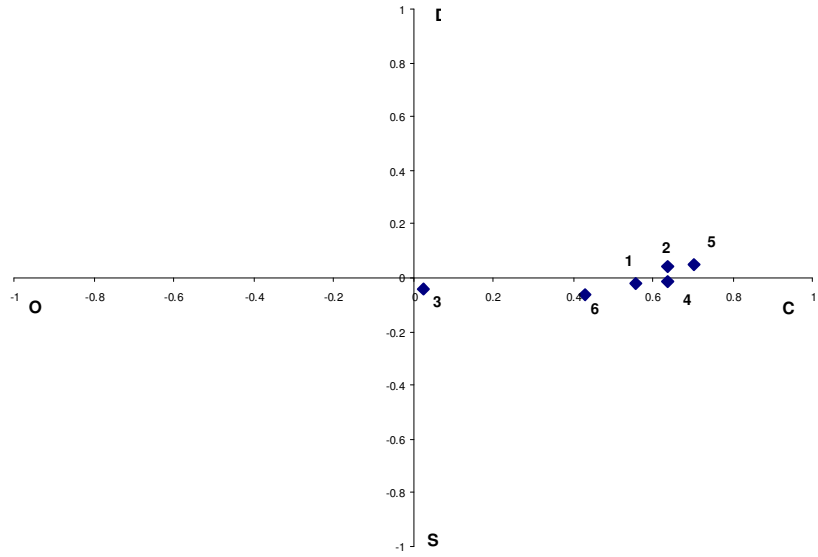


Figure 4.10

Graphical depiction of the sample cluster solution in terms of the eight QTI scales



Note: 1= Type1, 2=Type2, 3=Type3, 4= Type4, 5=Type5, 6=Type6

Figure 4.11

Graphical depiction of the teacher sample on the two interpersonal dimensions

A comparison of the Brekelmans and her colleagues (1993) typology and the Turkish typology (present study) indicated that many teachers could be classified in terms of similar types. Looking at the graphical patterns as displayed in Figure 4.10, profiles in both samples seemed relatively comparable. Thus, profiles resembled the Directive (Turkish Type 4), Authoritative (Turkish Type 5), Tolerant/Authoritative (Turkish Type 2), Tolerant (Turkish Type 1), Repressive (Turkish Type 6) and Uncertain/Tolerant (Turkish Type 3) profile. However, each type also had some uniqueness compared to the original typology and is described more in detail below.

Turkish Type 1 contained a high amount of strictness and a relatively small amount of student freedom. However, given the fact that amounts of admonishing, dissatisfied and uncertain were low in this type, it could not be classified as tolerant. This type seemed to combine characteristics of both the (original) Directive and Tolerant; it is labelled here as *Tolerant/Directive*.

Turkish Type 2 appeared as the general profile of the teacher in the sample (see 4.3.1, Figure 4.3). There are similar amounts of Leadership, Helpful/Friendly and Understanding compared to the original *Tolerant/Authorative* teacher but a higher score for strict.

Turkish Type 3 contained a high amount of leadership and a lower amount of student freedom than the original Uncertain/Tolerant profile. Given the fact that amounts of Admonishing, Dissatisfied, Understanding and Helpful are almost similar with the original and that only uncertain is rated somewhat higher, this profile can be classified as *Uncertain/Tolerant*.

Turkish Type 4 and *Turkish Type 5* are a good resemblance of the *Directive* and *Authorative* profiles, having slightly higher amounts of strict and slightly lower amounts of uncertain behaviour than the originals.

Turkish Type 6 resembles the *Repressive* teacher best, but contains less leadership and higher amounts of strictness compared to the other five Turkish types.

Because the Turkish typology explained similar or lower amounts of variance in scales (and dimensions) and because profiles to a large degree corresponded with the original US/Dutch typology, it seemed that the original typology is relatively stable and it thus seemed unnecessary to construct a new, specific Turkish typology, even though this study attempted so.

Concluding, teachers' perceptions of their own interpersonal behaviour were not similar with their students' and their own ideal perceptions. Therefore, the first part of Null Hypothesis I should be rejected.

No different profiles were found in Turkish students' perceptions of their science teachers' interpersonal behaviour than the existing interpersonal profiles (as developed in the Netherlands and U.S.), even though the profiles found in student perception data did not fit perfectly and occurred with different frequency in the sample compared to previous studies. Therefore, the second half of Null Hypothesis I should be accepted.

4.4.2 Null Hypothesis II

The second Null Hypothesis was stated as:

Student and class/teacher background variables will not affect students' perceptions of their science teachers' interpersonal behaviour (in Turkey).

Table 4.6 provides sample mean scores for DS and CO, as well as percentages of variance located at the teacher, class, and student level, estimated with multilevel analysis of variance. As can be seen, on average, Turkish secondary school teachers were regarded as both dominant and cooperative. Also, two-thirds of the variance was located at the student level, with only minimal variance at the class level and somewhat more the variance at the teacher level. These findings are in line with studies using multilevel analyses on American and Australian data (e.g. den Brok, et al., 2002a; Levy, et al., 2003; Rickards,et al., 2005).

Table 4.6

Mean DS and CO scores and percentages of variance at the teacher, class and student level (empty model)

	Influence (DS)	Proximity (CO)
Constant/mean (st. error)	.53 (.02)	.92 (.03)
Variance		
- Teacher	31.9 %	19.9 %
- Class	10.2 %	15.4 %
- Student	57.9 %	64.7 %
Total variance	.147 (or 100 %)	.527 (or 100 %)
-2*Loglikelihood	3280.73	12900.33

Table 4.7 provides an overview of the variables (see section 3.3.3) that had a significant impact on students' perceptions of their teachers' Influence (DS) and Proximity (CO) and lists both regular coefficients (strongly determined by their measurement scale) as well as effect sizes (which can be compared between different variables).

Table 4.7

Variables explaining students' DS and CO perceptions (final model)

	Influence (DS)		Proximity (CO)	
	Coefficients (st. error)	E.S.	Coefficients (st. error)	E.S.
Constant	.76 (.03)	-	.935 (.118)	-
Student				
- gender (boy=1)	-.034 (.007)	-.046	-.108 (.014)	-.122
- mother's education level	-.008 (.003)	-.042	-.015 (.006)	-.042
- inquiry (attitude)			-.273 (.052)	-.087
- enjoyment (attitude)	.287 (.023)	.250	.746 (.049)	.342
- leisure interest (attitude)			.144 (.051)	.064
- career interest (attitude)	-.071 (.022)	-.066		
Class				
- grade level	-.069 (.014)	-.224		
- biology (vs other subj)			.114 (.062)	.121
- hours per week			.095 (.041)	.165
Teacher				
Variance				
- explained	6.1 %		11.2 %	
- teacher	31.9 %		15.7 %	
- class	8.8 %		13.9 %	
- student	53.2 %		59.2 %	
-2*Loglikelihood	3042.10		12271.57	

E.S. =Effect Size

As can be seen in Table 4.7, the more positive student enjoyment and leisure interest, the higher the perception of the teacher is in terms of both Influence and Proximity. Career interest was related negatively to students' perceptions of Influence, while students' attitudes towards Inquiry were negatively associated with Proximity. The positive associations resemble the results of earlier studies (e.g. den Brok, 2001; Rickards, et al., 2005).

For gender, a negative relationship was found with both Influence and Proximity. This means that boys perceived their teachers as less dominant and cooperative than girls, which is in line with prior work (e.g. Levy, et al., 2003; Rickards, et al., 2005; Rakici, 2004; Şimşeker, 2005). Differences in perceptions were also reported with respect to education level of the mother: the higher the level of education of a student's mother, the lower their perceptions of teacher Influence and Proximity. At the class level, for proximity a positive connection was found with biology (versus other subjects) and the number of hours per week devoted to the subject. Thus, biology teachers were perceived as more cooperative than teachers of the other two subjects. Finally, class size only had an effect on influence: the larger the class, the less dominant the teacher was perceived. Earlier studies only found an association between proximity and class size (e.g. Levy, et al., 2003; Rickards, et al., 2005).

Looking at the effect sizes reported in Table 4.7, it seemed that enjoyment was the most relevant variable in explaining variance in students' perception of their science teachers' interpersonal behaviour for both dimensions of the QTI, Influence (DS) and Proximity (CO), with effect sizes of .250 and .342 respectively. The second most important variable appeared education level of the mother with a value of .042 for both dimensions. At the class level, the number of hours per week was found as an important variable in explaining proximity.

Combined, the variables only explained a relatively small amount of variance. Only 6.1 percent was explained in Influence (DS) and 11.2 percent in Proximity (CO). This percentage is similar to that of earlier studies (e.g. Levy, et al., 2003; Rickards, et al., 2006) and suggests that other variables may be necessary in order to explain differences in perceptions between students and their classes. A comparison between the empty model and the final model showed that almost 20 percent of the variance in Influence was explained at the class level (a drop from 10.2 to 8.8 percent) and that almost 25 percent was explained in Proximity at the teacher level (a drop from 19.9 to 15.7 percent).

However, hardly any variance was explained at the teacher level for Influence and at the class level for Proximity.

No teacher and school variables were found to be associated with students' perceptions. Similarly, no interaction effects were found.

In sum, it can be concluded that student, class and teacher background variables affected students' perceptions of their science teachers' interpersonal behaviour and that Null hypothesis II should be rejected.

4.4.3 Null Hypothesis III

The third Null Hypothesis was stated as follows:

There will no differences in perception of (science) teacher interpersonal behaviour between Turkish students in Turkey and Dutch students in the Netherlands.

Results of statistical analyses comparing perceptions between students in Turkey and the Netherlands for scale scores as well as for dimension scores are provided in Table 4.8. As can be seen in the table, Turkish students' perceptions were higher for Leadership (DC), Helpful/Friendly (CD), Understanding (CS) and Strict (DO) than those of their Dutch counterparts. The difference between these two groups was largest for Uncertain (SO) (Turkish average was .18, Dutch average was .44). The most similar scale rating between the countries was for Dissatisfied (OS) (Turkish average was .27, Dutch average was .28). In terms of dimension scores, Turkish students perceived more Proximity (CO) and Influence (DS) than Dutch students. The result of the analyses indicated statistically significant differences between Turkish and Dutch science students' perceptions, with the percentage explained by country (eta squared) varying between 2 (Admonishing) and 36 (Uncertain).

In the light of these outcomes, it can be fairly concluded that there is a difference between Turkish and Dutch students' perception of their science teachers' interpersonal behaviour and generally speaking, students perceived their science teachers in a positive light in both countries.

Table 4.8

Average QTI scale and dimension scores for Turkish and Dutch students

	Turkey Mean (SD)	the Netherlands Mean (SD)	F-value	P-value	Percentage explained by country
DC	.71 (.18)	.56 (.20)	2630.91	.00	14
CD	.67 (.21)	.59 (.18)	616.51	.00	4
CS	.71 (.20)	.65 (.17)	461.01	.00	3
SC	.45 (.15)	.53 (.14)	1230.11	.00	7
SO	.18 (.17)	.44 (.18)	9045.11	.00	36
OS	.27 (.17)	.28 (.16)	6.26	.01	0
OD	.32 (.17)	.37 (.16)	397.23	.00	2
DO	.50 (.17)	.40 (.14)	1726.30	.00	10
DS	.54 (.37)	.00 (.45)	6884.89	.00	30
CO	.92 (.73)	.65 (.67)	617.92	.00	4

When students' perceptions are examined at the subject level with respect to the two interpersonal dimensions, it can be concluded that for all subjects Turkish teachers are perceived higher on Influence and Proximity than their Dutch colleagues. When comparing subjects within countries, physics teachers are perceived lowest on both dimensions in Turkey, while they were perceived lowest of all subjects only for Influence in the Netherlands (and were perceived in between the two other subjects for Proximity). Chemistry teachers were perceived in between the other two subjects for both dimensions in Turkey, while they were perceived highest on Proximity and in between the other two subjects on Influence in the Netherlands. Biology teachers were perceived in between the other two subjects for Proximity and were perceived highest on Influence in the Netherlands, while they received the highest ratings of all subjects for both dimensions in Turkey. The percentage of variance explained by country (eta squared) was 32 for Influence and varied between 1 and 6 percent for Proximity depending on the subject (see Table 4.9).

Table 4.9

Means and Standard Deviation of Influence and Proximity dimensions over subjects in Turkey and the Netherlands

Subject		Turkey Mean (SD)	the Netherlands Mean (SD)	F-value	p-value	Percentage explained by country
Physics	DS	.50 (.40)	-.11 (.48)	1911.31	.00	32
	CO	.83 (.74)	.68 (.69)	53.74	.00	1
Chemistry	DS	.53 (.36)	-.01 (.42)	1818.48	.00	32
	CO	.90 (.75)	.68 (.61)	87.11	.00	2
Biology	DS	.58 (.75)	.04 (.41)	2650.21	.00	32
	CO	1.01 (.68)	.66 (.67)	381.49	.00	6
Mathematics*	DS	-	.02 (.44)	n. a.	n.a.	n.a.
	CO	-	.58 (.68)			

Note: n.a=not available

The last type of analysis to compare the two countries regarded the distribution of interpersonal profiles. This distribution is provided at the subject level for each country in Table 4.10.

Table 4.10

Frequency of teacher profiles over subjects in Turkey and the Netherlands

Interpersonal Profile	Turkey n_{class}=278				the Netherlands n_{class} =301				
	Phy.	Chm.	Bio.	Total	Phy.	Chm.	Bio.	Math.	Total
Directive	23	30	16	69	3	4	11	12	30
Authoritative	31	25	32	88	7	7	12	6	32
Tolerant/ Authoritative	22	27	39	88	8	8	21	10	47
Tolerant	7	0	1	8	17	17	35	25	94
Uncertain/ Tolerant	1	3	0	4	11	9	24	13	57
Uncertain/ Aggressive	1	0	2	3	4	1	7	6	18
Repressive	5	2	1	8	0	0	0	-	0
Drudging	5	2	3	10	3	4	11	5	23
Total	95	89	94	278	53	50	121	77	301

Note: Phy= Physics, Chm= Chemistry, Bio=Biology, Math=Mathematics

Comparing the frequency of teacher profiles in both samples, the first noticeable difference is in the most common profile(s). The most common profiles are the Authorative and Tolerant/Authorative (88 classes for each) in Turkey and these are followed by Directive teachers (69 classes). Compared to this trio, the frequencies of the rest are considerably lower. The picture seemed more balanced for the Dutch sample: the most common profile was the Tolerant profile (94 classes) followed by Uncertain/Tolerant (57 classes). One remarkable difference between these two samples was the Repressive teacher frequency: this profile was totally absent for the Dutch sample, it was found in the Turkish sample, in particular with physics teachers. These differences in profiles seem to emerge as well at the subject level.

Finally, Turkish science teachers were mostly Directive, Authorative and Tolerant/Authorative. This trio comprised 245 out of 278 classes (88.1 percent). However, only 109 classes out of a total of 301 (36.2 percent including mathematics teachers) belonged to these types in the Dutch sample. So, it is fair to conclude that there are differences in perceptions of science teacher interpersonal behaviour between Turkish students in Turkey and Dutch students in the Netherlands and that Null hypotheses III should be rejected.

4.4.4 Null Hypothesis IV

The last Null Hypothesis was stated as:

There will be no association between students' perceptions of their science teachers' interpersonal behaviour and their affective learning outcomes.

Table 4.11 provides sample mean scores for the TOSRA scales as well as the percentages of variance located at the teacher, class and student level. As can be seen, on average minimal variance could be found at the teacher and class levels, most variance was located at the student level. These findings are in line with studies using multilevel analyses on American and Australian data (den Brok, et al., 2004; den Brok, et al., 2005d; Fisher, Waldrip, & den Brok, 2005).

Table 4.11

Variance distribution for the TOSRA scales (empty model)

Variable	Mean (st. error)	Teacher (%)	Class (%)	Student (%)	-2*Log-likelihood
Inquiry	.574 (.003)	5.0 %	5.0 %	90.0 %	-7831.57
Enjoyment	.639 (.005)	4.7 %	7.0 %	88.3 %	-2614.06
Leisure	.576 (.004)	2.6 %	5.1 %	92.3 %	-3132.28
Career	.599 (.005)	2.1 %	6.3 %	91.6 %	-1633.33

Table 4.12 provides an overview of the variables that had a significant impact on students' attitudes and lists both regular coefficients as well as effect sizes.

Table 4.12

Outcomes of multilevel analyses on Inquiry and Enjoyment (final model)

(standard errors between brackets)

	Inquiry		Enjoyment	
	Coefficient	E.S	Coefficient	E.S.
Mean (=constant)	.354 (.009)	-	.067 (.008)	-
Student				
- gender (boy=1)	-.016 (.003)	-.057	-.008 (.003)	-.019
- mother's educ. level			.007 (.001)	$4.1768*10^{-4}$
- books at home	.003 (.001)	.038		
- inquiry (attitude)			.066 (.012)	.045
- enjoyment (attitude)	.068 (.012)	.100		
- leisure inter. (attitude)	.086 (.012)	.120	.472 (.010)	.449
- career inter. (attitude)	.065 (.010)	.102	.317 (.009)	.338
Class				
- grade level	.007 (.003)	.355		
- class size				
Teacher				
- t. gender (1=male)				
- school type (1=Anat)	043 (.006)	.023		
DS			.028 (.005)	.051
CO	-.012 (.003)	-.062	.032 (.003)	.113
Percentage variance				
Explained	10.0 %		62.8 %	
Teacher	0.0 %		0.0 %	
Class	5.0 %		0.0 %	
Student	85.0 %		37.2 %	
-2*log-likelihood	-.8478.11		-8807.29	

Table 4.13

Outcomes of multilevel analyses on Leisure interest and Career interest (final model) (standard errors between brackets)

	Leisure interest		Career interest	
	Coefficient	E.S.	Coefficient	E.S
Mean (=constant)	.115 (.008)	-	.057 (.012)	-
Student				
- gender (boy=1)	.008 (.003)	.020		
- mother's educ. level	-.004 (.001)	-.025		
- books at home	.002 (.001)	.018	.092 (.014)	.744
- inquiry (attitude)	.083 (.012)	.059	.451 (.013)	.289
- enjoyment (attitude)	.484 (.011)	.511	.350 (.013)	.329
- leisure inter. (attitude)				
- career inter. (attitude)	.249 (.010)	.279		
Class				
- grade level			.025 (.003)	.088
- class size			-.008 (.003)	-.029
Teacher				
- t. gender (1=male)			-.010 (.004)	-.023
- school type (1=Anat)	-.022 (.005)	-.050		
DS			-.019 (.005)	-.020
CO	.008 (.002)	.030		
Percentage variance Explained	59.0 %		52.1 %	
Teacher	0.0 %		0.0 %	
Class	0.0 %		0.0 %	
Student	41.0 %		47.9 %	
-2*log-likelihood	-8653.96		-6326.49	

As can be concluded from Tables 4.12 and 4.13, gender had a negative effect on Inquiry and Enjoyment but a positive effect on Leisure. This means boys had more interest in science as a leisure activity but less acceptance of scientific inquiry as a way of thought and less enjoyment of science learning experiences. The other variable found to be related with scientific attitudes was

mother education level. In this respect a positive relationship was found with Enjoyment, but a negative relationship with Leisure. The number of books at home was found to be positively related with all scales of TOSRA except the Enjoyment. Thus, the more advantaged the home background of a student, the more positive his/her science attitudes.

As for perceptions of teacher-student interpersonal relationships, a positive association was found between Influence and Enjoyment, but a negative association between Influence and Career interest. Thus, the more dominant the teacher was perceived, the more enjoyment students had in the subject, but the less career interest. A positive association was found between Proximity and Leisure interest and Proximity and Enjoyment, while a negative effect was found from Proximity on Inquiry. Positive associations between Proximity and student attitudes (and to some degree also between Influence and student attitudes) have been found universally in QTI research, both in studies using multilevel analyses as well as in studies using regular types of analyses (e.g. den Brok, et al., 2004; den Brok, 2001; den Brok, et al., 2005c; den Brok, et al., 2005d; Fisher, et al., 2006). Thus, to a large degree the findings for the present sample were in agreement with these findings. A specific and unique finding was the fact that students in Anatolian schools reported less Leisure interest in science than students from regular high schools.

Looking at the effect sizes reported in Table 4.12, it seemed that grade level (.355) and Leisure (.120) were the most important variables explaining Inquiry, while these variables were Leisure (.449) and Career Interest (.338) for Enjoyment. As for the dimensions of the QTI, Influence (DS) was connected with only Enjoyment, while Proximity (CO) had a connection with both the Inquiry and Enjoyment scales.

Examining Table 4.13 for different variables, the most strongly connected variables with Leisure were Enjoyment (.511) and Career Interest (.279); the number of books at home (.744) and Enjoyment (.329) were found as most relevant variables for Career Interest. Besides this, the Proximity (CO) dimension of the QTI was relevant to Inquiry and there was a negative connection between Influence (DS) and Enjoyment.

As for all variables, the amount of variance explained was between 10.0 percent (Inquiry) and 62.8 percent (Enjoyment). This means that quite a large amount of the differences in science attitudes between students could be explained by the included variables.

In sum, there appeared to be associations between students' perceptions of their science teachers' interpersonal behaviour and their affective learning outcomes. Thus, Null hypothesis IV of the study should be rejected.

The synopsis of the chapter will be given in the forthcoming section.

4.5 Chapter Summary

This chapter outlined the results of the analyses run on student data. The general picture of the descriptive statistic for the study concluded that the data set was suitable for most psychometric purposes and further statistical analyses.

Looking back at the general outcomes of the chapter, the first part of Null hypothesis I was rejected, since teacher perceptions of their own interpersonal behaviour were not similar with their students' and their own ideal perceptions, while the second part was accepted, even though the profiles found in student perception data did not fit perfectly into the existing interpersonal profiles (as developed in the Netherlands and U.S.). As far as students' perceptions of their science teachers' interpersonal behaviour and associations with student, class and teacher background variables was concerned, Null hypothesis II was rejected (thus: background variables did affect students' perception scores). Null hypothesis III of the study also was also rejected, because differences were found in perceptions of science teacher interpersonal behaviour between Turkish students in Turkey and Dutch students in the Netherlands. Lastly associations between students' perceptions of their science teachers' interpersonal behaviour and their affective learning outcomes were detected, resulting in a rejection of Null hypothesis.

The further interpretation of the finding of the analyses will be discussed in the upcoming chapter, along with limitations and implications of the study.

CHAPTER V
CONCLUSION, DISCUSSION AND IMPLICATIONS

5.1 Introduction

The last chapter of this dissertation will provide a summary of the main findings of this study, will evaluate the method used in terms of strengths and limitations and will provide suggestions for future research. First, a short summary of the background and theoretical framework of study will be presented (section 5.2). Next, a summary of the research results will be given (section 5.3) and discussed within the Turkish context (section 5.4). Limitations of the study will follow these, which are grouped under three topics: sample (section 5.5.1), instrumentation (section 5.5.2) and methodology (section 5.5.3). After this, implications (section 5.6) and recommendations for future research (section 5.7) will be suggested. The chapter will be concluded with recommendations for future research in Turkey and a chapter summary (section 5.8).

5.2 Summary of the Study Background, Theoretical Foundations and Setup of the Study

In summarizing the study, several points need to be highlighted. The *first chapter* started by providing the aims for the study and the need to conduct the study. This study was conducted with the aim of investigating Turkish secondary school students' perceptions of their science (physics, chemistry and biology) teachers' interpersonal behaviour, science teachers' profiles and variables affecting Turkish students' perceptions of their science teachers' interpersonal behaviour. Also, differences in perceptions between Turkish students and their Dutch counterparts were examined. Finally, students' subject-related attitudes were related to their perceptions of their teachers' interpersonal behaviour.

The reasons for conducting such a study were reported as follows. As can be remembered from the introduction and theoretical sections that the teaching-learning process is at the base of communication and social activity and that there are considerable numbers of students in science classes in Turkey due to the their job preferences as well as due to the idea that science education is a good pathway for obtaining a good job and position. According to the results of the second cycle (2000-2003) of the PISA project, the achievement of *Turkish*

students in both science and mathematics is not satisfying. So, outcomes of this study could supply new data from a classroom environments research perspective and could – as such - provide a new perspective to the science classroom. Many learning environments studies (and studies on interpersonal behaviour) have been conducted in Western countries with low-contact values, as such Turkey could provide additional cultural information with respect to the applicability and variability of teacher-student interpersonal behaviour across the world. Finally, this study might provide useful feedback to teachers for their professional development trajectories and for teacher education programs in Turkey as well as countries with many Turkish students and provide a base to compare these students' potential to those of the native students.

The study also provided information on the Turkish and the Dutch education systems, mainly focusing on the secondary education structure. There appeared several communalities between the two countries such as the appearance of the general structure, the presence of public and private schools at each level, the free of charge compulsory education at state schools, the official position of teachers (civil servant or contractual), the availability of teacher in-service training programs, the availability of special education for disabled students at the primary and secondary level and the setup of administrative control. Remarkable difference between the two systems are the beginning age for pre-primary education and primary education (much lower in the Netherlands), the length of the school year (longer in the Netherlands) and the social status of teachers (higher societal status in Turkey). Although the differences in the general education structure are minor, there were several differences with respect to the secondary education structure (see section 1.6 and Table 1.1 for a detailed description of both systems).

The *second chapter* reviewed relevant literature for the study. The literature review covered three major educational research areas, namely Learning Environments Research (LER), Research on Teacher-student Interpersonal Behaviour and Students Attitudes. The main focus in the study was on the Interpersonal Perspective (IPP) on teaching, which was conceptualised by using two theoretical components: the System Approach of Communication (see section 2.3.2) and the Model for Interpersonal Teacher Behaviour (see section 2.3.4). The rationale for choosing the Systems Approach to Communication to analyze teacher-student relationships was presented by Wubbels and his colleagues (1985b) as "teaching being a form of communication" and den Brok (2001) distinguished these two elements on the point of the time concept to

evaluate the teacher-student relationship - the MITB being suitable to study the teacher-student relationship at a certain point of time, the Systems Approach being useful to study the relationship over a certain time span. Wubbels, Créton and Hooymayers (1985b, see Wubbels, & Levy, 1993a) developed the Model for Interpersonal Teacher Behaviour (MITB) and an instrument that measured interpersonal behaviour in terms of this model, the Questionnaire on Teacher Interaction (QTI). In this model (as well as the questionnaire), interpersonal behaviour is described along two dimensions - a Dominance/Submission (DS or influence) dimension and a Cooperation/Opposition (CO or proximity) dimension - and eight behavioural sectors labelled as Leadership (DC), Helpful/Friendly (CD), Understanding (CS), Student Freedom (SC), Uncertain (SO), Dissatisfied (OS), Admonishing (OD) and Strict (DO). Besides the theoretical elements of the interpersonal perspective on teaching, the Questionnaire on Teacher Interaction (QTI) was introduced with a discussion of the circumplex structure behind it and the historical development of the instrument, its applications and an overview of research with the QTI from all over the world.

Research with the QTI has shown that a relatively stable typology of interpersonal profiles exists, containing eight different profiles: Directive teachers, Authoritative teachers, Tolerant/Authoritative teachers, Tolerant teachers, Uncertain/Tolerant teachers, Uncertain/Aggressive teachers, Repressive teachers and Drudging teachers. Other research has shown that both Influence and Proximity are strongly and positively related to student achievement and students' subject-related attitudes. Several background variables appeared to have an effect on students' perceptions of Influence and proximity, such as teacher and student gender, age and experience, subject taught, class size, grade level, type of education and – not surprisingly – teacher and student ethnic background.

It was concluded that there is a need to develop a reliable and valid form of the QTI for high-contact cultures and that Turkey could serve this purpose well. For this study, a translated and adapted version of the QTI was created purposely and this process, together with the setup of the study, was described in *chapter three*. The development of the Turkish version of QTI covered 1.5 years of concentrated work, consisting of many steps with combined research methods. Its reliability and validity, both for the pilots and the main studies were discussed. Data for the study were gathered from 7484 secondary school physics, chemistry, and biology students (grades 9 to 11) in 278 classes, taught by 133 teachers from 55 schools in thirteen cities from seven regions of Turkey

and were collected with the Turkish version of the QTI (Telli, et al., 2005) and an translated version of TOSRA (Telli, et al., 2003). The data set was compared to a Dutch data set that contained 8503 mathematics, physics, chemistry and biology students, located (grades 8 to 11) in 27 schools and 301 classes, taught by 162 teachers. Respondents answered the Dutch version of the QTI (Wubbels, & Levy, 1993a). The data were collected in the 2004-2005 Academic Year. Students completed the instrument(s) in their countries official language, Turkish in Turkey and Dutch in the Netherlands. The Dutch and Turkish sample appeared to differ in terms of some student background variables, such as grade level and gender. Moreover, the Turkish sample appeared not fully representative of the Turkish population with respect to student gender, socio economic background, grade level, educational type, province, region and city distribution. Nevertheless, given the large size of the sample(s), results were argued to provide strong signals for what might be going on in Turkey and in terms of a cross-cultural comparison.

Data collected from students and teachers in the Turkish sample were mainly analysed at the class level, except for research question III, since the focus of this research question was on perceptions of individual students. To analyse the data, descriptive statistics and multilevel analysis of variance were used. For the country comparison students' perceptions on the QTI scales were aggregated to the class level (in both samples) and then compared to an existing QTI typology as well.

5.3 Summary of Analysis Results

This section of the chapter will provide a summary of the findings with respect to the four research questions, starting with and including a discussion of the reliability and validity of the newly developed Turkish QTI version.

5.3.1 Quality of the Turkish Adapted Version of the QTI

The newly developed and culturally adapted Turkish 62 items version of the QTI was constructed with follow-up pilot studies, interviews with students and teachers (for details on its development, see section 3.3.1). The MITB belongs to a special branch of models, called circumplex models. These models have specific assumptions that can be tested (see sections 2.3.3 and 2.3.5.3) and that were tested during the pilot and main study. Alpha reliability at class level was better in the pilot study (varying from .74 for Student Freedom to .97 for Helpful/friendly) than in the main study, although reliability outcomes of the

main study could also be regarded as acceptable (varying from .66 for Student Freedom to .94 for Helpful/Friendly and Understanding). This difference between the pilot and the main study might be caused by the considerably large sample with data collected at various places with different people administering the questionnaires. Additionally, previous studies with secondary school students in the Netherlands, the USA and Australia (Wubbels, 1993a; Wubbels, & Levy 1991) reported similar values for class level alpha reliability for the scales, the lowest score for Student Freedom and the highest score for Helpful/Friendly.

A comparison of the eta-squared statistics of the Turkish version of the QTI to the American, Australian and Dutch versions of the QTI also indicated that the instrument is of high quality and able to distinguish between classes.

Table 5.1
The amount of variance accounted for by class membership (Eta squared) in four countries

Label	Dimension	USA (a)	Australian (b)	the Netherlands	Turkey
DC	Leadership	.41*	.48**	.46	.36
CD	Helpful/ Friendly	.22*	.33**	.44	.35
CS	Understanding	.28*	.29**	.37	.31
SC	Student Freedom	.29*	.28**	.36	.30
SO	Uncertain	.38*	.38**	.41	.30
OS	Dissatisfied	.19*	.20**	.36	.28
OD	Admonishing	.25*	.25**	.38	.29
DO	Strict	.43*	.30**	.30	.37

Note: * $p < 0.01$ ** $p<0.001$; (a) Wubbels & Levy (1991: p10); (b) Henderson, et al.,1995: p7); the Netherlands and Turkey pertain to current study

Considering the assumptions of the circumplex model for main study, first an *exploratory* factor analysis was conducted and inspection of the factor loadings suggested two dimensions that could be labeled in terms of Influence

and Proximity. A *multilevel confirmatory* factor analysis (with Mplus) confirmed findings of the exploratory factor analyses and model fit indicators thus showed that although two, independent dimensions may lie behind the data (as requested by the MITB), some scales may have shifted from their original positions on the interpersonal circle. This is particularly true for Leadership (containing more Proximity than hypothesized), Understanding and Dissatisfied (containing both less Influence than hypothesized) scales. Next, the second assumption of circumplex models - two, independent interpersonal dimensions - was tested and a correlation between the two dimension scores was computed. An indication for some association between the two dimensions was found, which is contradictory to circumplex assumptions. Inspection of the plot of factor loadings, based on the factor analysis, suggested that the correlation could have been caused by the three scales occupying different positions on the interpersonal circle than hypothesised. A correlation between empirical dimension scores (based on outcomes of the confirmatory factor analyses) and theoretical dimension scores (based on ideal circumplex) showed that both dimensions were replicated well by the irregular circumplex model. This meant that the dimension scores could be used in subsequent analyses, despite irregularities found in model fit and scale positions and despite the empirical correlation found between the two interpersonal dimensions. Assumptions for the circumplex structure in terms of inter scale correlations were studied as well. The results of interscale correlations at the individual and class level showed that the present study satisfies most assumptions, with only minor discrepancies.

5.3.2 Missing Data and Descriptive Analyses

Missing data and descriptive analyses for both of the instruments (see section 4.2 and section 4.3) displayed satisfying outcomes for further analyses with the data showing in no case more than 3 percent of the data missing for an instrument, in most cases the number of missing for an item, scale or dimension was close to or smaller than 1 percent. Data on the QTI and TOSRA scales showed that most scales and their resulting dimensions were normally distributed and that skewness and curtosis values were within their expected range (sections 4.3.1 and 4.3.2), providing further support for the sufficient quality of the data for further analyses.

In terms of the two dimensions of the QTI, it appeared that Turkish science teachers on average were perceived as somewhat dominant and highly cooperative. This means that Turkish students perceived their science teachers

as displaying cooperative behaviours (CO=.91) together with dominant behaviours (DS= .53, also see section 4.3.1).

Also, mean scores on the TOSRA (attitudes) showed that there were no large differences in students' attitudes towards science and, in general, students reported neutral or even somewhat negative attitudes (see section 4.3.2). This result might be caused partially by the general science curriculum in Turkish high schools and the expectations from students of their science lessons in the current sample. Generally, Grade 9 is a relevant starting point for students' science education, not only because it is the start of science education in the form of three school subjects (physics, chemistry and biology), but also because their report card grade scores are the key determinant for being admitted to the science education subject profile in Grade 10. The high number of Anatolian high school students in the sample, who are generally accepted as more competitive than students from other high schools and the high number of Grade 9 students in the sample compared to the population might be a cause for these findings. Many students in the sample might (due to the above mentioned reasons) feel more stressed and might have developed neutral or somewhat negative attitudes towards science. For Grade 10 students, their low attitudes might be evaluated in light of the course load, which is highly concentrated/dense and difficult in terms of science content.

Moreover, it should be added that lecturing is a common practice in most (Turkish) science lessons and that students have few opportunities to be involved in practical activities or experiments. Questions asked by students with respect to such teaching practices are 'Why are we learning this? How can this knowledge and information be used? When….? Where.…?' When students can not find answers due to existing teaching methods, they might easily start to think everything taught is a waste of time. So, investigating the learning activities that affect students' attitudes jointly with students' perceptions of their teachers' interpersonal behaviour should also be a focus of future research.

Another relevant factor to explain low attitudes might be the student entering puberty and resisting against school (including the science subjects and their teachers).

5.3.3 Answers to Research Question I

The outcomes for the first research question were collected under three main topics in section 4.4.1. One was students' perception of their teachers' interpersonal behaviours, teachers' self and ideal perceptions. The second was

comparing the mean scores on the scales for each class to existing profiles to examine whether they fitted into these. Thirdly, Turkish profiles were attempted to be defined by conducting cluster analyses (see section 4.4.1).

Comparing the outcomes of the study with previous studies that reported students' perception of teacher interpersonal behaviour on the two dimensions of QTI (e.g. the Netherlands, Australia, the United States, Singapore, Brunei, and India; see section 2.3.5.2), positive dimension scores were found, similar to those other countries (den Brok, et al., 2006b). It seemed that students generally perceive more dominance than submissiveness and more cooperation than opposition in their classes. For example, secondary science teachers from the Netherlands (e.g. Brekelmans, et al., 2002; den Brok, et al., 2004) are rated slightly positive on the Influence (scores range between .20 and .30) and Proximity dimensions (scores between .35 and .60), but in a lower rate than American (e.g. den Brok, Levy, Rodriguez, & Wubbels,2002c; Levy, et al., 1997; Wubbels, & Levy, 1991) science teachers (.50 to .60 on Influence). American teachers' scores on the Proximity dimension are similar to those of Dutch teachers. Australian secondary science teachers (e.g. den Brok, et al., 2006b; Evans, & Fisher, 2000; Fisher, & Rickards, 1999) are usually perceived high on the Influence dimension compared to American science teachers, but are perceived higher on the Proximity dimension (scores range between .90 and 1.15). Singaporean teachers (e.g. den Brok, et al., 2006b) have been rated as more cooperative (dimension score of 1.28) than others, but their dominance scores are comparable to American and Australian science teachers. Bruneian teachers (e.g. den Brok, et al., 2006b) are also among the most dominant teachers while they are perceived similar to Dutch teachers in terms of cooperativeness. Teachers from India have dimension scores of around .5 for both dimensions (den Brok, et al., 2005c) (also see section 2.3.5.2). Turkish teachers find themselves somewhere in between these groups of teachers, but are perceived higher than average on the proximity dimension. This might be a reflection of the high-contact nature of the Turkish culture.

Compared to related literature, differences between students' actual and teachers' (actual and preferred) perceptions in the present study were similar to these findings (see sections 2.2.2 and 4.4.1). Teachers' perceptions of their own interpersonal behaviour have been reported not to be similar to their students' and their ideal perceptions (e.g. den Brok, et al., 2006a). Teachers usually had higher expectations for their ideal and rated themselves higher on Influence and Proximity than their students and in most of the studies considerable differences

were reported (e.g. den Brok, et al., 2002c; Fisher & Rickards, 1999).Research analysing teacher perceptions and looking into the classroom more from a teachers' point of view would help to provide more explanations for 'why these perceptions are different' from those of their students'. On the other hand, it seems acceptable that everyone is trying their best, but that this not immediately leads to achieving these ideals or a perfect match with students' perceptions. Some differences, finally, might also be the result of different psychological processes of teenagers and adults.

As for the second half of this research question, there was considerable difference in frequency of occurrence of the eight profiles in Turkey, the large Dutch sample, the US/Dutch and Australian samples. Moreover, a variant of the Tolerant/Authorative teacher was found in this Turkish sample (see Table 4.4). These outcomes can be summarised as 'the parties respecting each other', which is a key for healthy communication in the classroom. Student teachers as well as experienced teachers should be aware of the differences between their own views and those of their students to achieve more effective communication with their future classes.

Additionally, an attempt to form a Turkish typology for secondary schools using cluster analysis showed the universal stability of the eightfold Dutch/US typology. Only minimal deviances from the existing profiles could be detected and no need could be provided for the emergence of new styles (see Table 4.5). Future research using data of one large school with all teachers and their students participating could provide more support for the need to define specific Turkish profiles, since such a sample would include non-voluntary participating teachers as well, and also more classes with less fruitful interpersonal climates, thus leading to a larger variance in teacher-student interpersonal behaviour.

5.3.4 Answers to Research Question II

The relations between students' perceptions of their teachers and their own characteristics (e.g. gender, age, report card grade) as well as characteristics of the teacher (e.g. gender, years in profession) and class (e.g. class size, teacher gender, teacher experience) have been analysed in previous studies as well. It has been reported that depending on the distribution of these characteristics, students' perceptions in terms of QTI scales or dimensions could vary and accordingly possible differences with respect to earlier work on scales, dimensions or profiles might occur (see section 2.3.6.3). These variables (see Table 3.11) were analysed in the second research question of the study (also

see Table 4.7) for the Turkish sample. Similar to previous work (e.g. den Brok, et al., 2002c; Levy, et al., 2003; den Brok, et al. 2006b) some variables, e.g. gender and class size, were found to be directly related with students' perception of their teacher's interpersonal behaviour (see section 4.4.2). In contradiction with previous findings (e.g. den Brok, et al. 2002c; 2003b; Levy, et al., 2003; Levy, et al.,1996), differences with respect to education level of the mother in students' perceptions were also reported for this sample. This result might be a cultural finding, unique to Turkish society. In Turkish society, women usually have lots of responsibility, for example with respect to the family and children, but also in financial issues. Due to the strong role of the mother, and the responsibilities given to daughters at home, girls can develop their self confidence earlier than boys, which may have an effect on their own subject-related attitudes as well as on their perceptions of their teachers.

Results of this study also indicated differences in perception according to the subject taught. The biology teachers were perceived highest on both interpersonal dimensions. This might be related to the topics taught, which might link and connect better to students' personal experiences and interests (such as the human body, worms and insects, health care, first aid and infectious diseases, SARS or the bird flu) and provoke more personal communication and more frequent interaction between teachers and students. On the other hand, the lower scores on both dimensions for physics and chemistry teachers might be caused by the teaching methods involved in the subject, such as a higher number of small tasks and assignments and more calculus, leading to more corrections and corrective behaviours by teachers.

The negative association between class size and the two interpersonal dimensions is in line with previous work (e.g. Levy, et al., 2003) and seems logical, as larger classes usually leave less time to teachers to interact personally with all students and require more classroom management and dominance behaviours with students.

The present study was also the first of its kind to use multilevel analyses and dimension scores for the QTI to investigate differences in students' perceptions of teacher-student interpersonal behaviour in Turkey and provided support for many associations reported in previous studies. This study explained only a small amount of variance in ratings of Influence and Proximity. This might have been caused by sample characteristics or context, and even by the method of analysis multilevel analyses usually lead to lower amounts of (explained) variance at the class level as they correct for the non-random nature of the

data). Future studies are also needed to confirm the stability of these findings and more variables should be included to explain the remainder of the variance in the two dimensions of the QTI.

5.3.5 Answers to Research Question III

Analysis for research question III showed differences in perceptions of science teacher interpersonal behaviour between Turkish students in Turkey and Dutch students in the Netherlands. Generally speaking, Turkish teachers were perceived higher on Influence and Proximity than their Dutch colleagues. This highly cooperative rating for Turkish teachers can be a reflection of the fact that Turkey is a high-contact culture and is more collectivist than the Netherlands, which is relatively individualistically oriented and a low-contact culture. This may have led to a stronger focus of Turkish students on their teachers' cooperative behaviours compared to the Dutch students, but perhaps also to teachers displaying more cooperative behaviours in Turkish classrooms.

Besides this, it can be also explained from the behaviour expected from Turkish teachers in the classroom and the status that teachers enjoy in Turkish society. Teachers in societies usually enjoy respect from both families and students. Especially over the last five years, teaching has become a popular occupation in Turkish society, perhaps also because it is a job not under high unemployment risk. Turkish teachers demonstrate strong leadership behaviour in the classroom and they are usually well prepared. Although conflicts and arguments are common from time to time, especially with older students and inexperienced teachers, teachers usually (are expected to) have the last word. Moreover, while having with high control and strength over their classrooms, teachers are expected to behave in a calm manner. Additionally, arguments are mostly concluded with an agreement between teacher and student(s) without taking much time. Teachers are expected to manage their classroom in a way that reduces disorder and the risk for burn-out (teachers) or school leaving (students), to be well prepared for instruction and to evaluate students as neutral as possible. Besides having high control, Turkish teachers are usually the first person aware of the personal problems of their students. Students might directly ask help, guidance or explain their problems to their teachers. Dutch teachers, on the other hand, enjoy much lower status in the Dutch society and Dutch students are expected to discuss issues with their teachers and to show own initiative as much as possible.

Additionally, in both countries students' positive perceptions of their science teachers could also be inferred from the frequency of occurrence of the first three profiles in the eightfold typology. Following these similarities, positive teacher–student relationships seemed important in both countries. The findings were similar to those on profiles and dimensions in previous studies. Therefore, the QTI might be equally valuable in Turkey as in other countries as a feedback instrument for teachers for their professional development.

Given the international relevance of this topic and the fact that citizens will cross the boarders of their countries more often, it would be very interesting and fruitful to gather information on the cultural effects on students' perceptions in different countries. By understanding how students' view their teachers in other countries and how their perceptions compare to those of students in our own country teachers and teacher educators may be helped in building healthy teacher-student relationships.

5.3.6 Answers to Research Question IV

The relationship between interpersonal teacher behaviour and student achievement as well as the student subject-related attitudes is a popular research topic for scientists in many domains, such as learning environments research, school and teacher effectiveness research, research on learning and instruction and communication education research (e.g. den Brok et al., 2004; see section 2.3.6.2) and also made up the last research question of the current study. The data set was analysed for Turkish students' perceptions and their attitudes towards science measured with the TOSRA (also see sections 2.4, 3.3.2).

After correction for students' background characteristics (e.g. gender, education level of the mother and the number of books at home) students' perceptions of their teachers' interpersonal behaviour appeared to be related to the attitude scales of the TOSRA (see section 4.4.4). Also, quite a large amount of the differences in science attitudes between students could be explained by all included variables, a major part covered by other attitudes (showing the interconnected nature between subject-related attitudes). A specific and unique finding was the fact that students in General High schools reported less Leisure interest in science than students from Anatolian high schools.

Our outcomes lead us to the conclusion that interpersonal behaviour is of similar importance for both school types, something that seems logical given the enormous international support for the link between interpersonal behaviour and

student outcomes regardless of the educational context (e.g. Wubbels, et al. 2006). However, the fact that some negative associations were found was surprising, since all previous studies, including those in Turkey, showed positive associations between the interpersonal dimensions and student attitudes (e.g. Telli, et al., 2005, Telli, et al., 2006c, also see section 5.3.2). Moreover, in one study den Brok and his colleagues (2004) reported a stronger association between Influence and Proximity and students' subject- related attitudes (e.g. enjoyment, perceived relevance, anxiety and willingness to invest effort) for Moroccan and Turkish students than for Dutch and these findings suggested that for non-Western students' teacher interpersonal behaviour may have been more relevant to their subject-related attitudes than for Western students. Further research into this phenomenon is necessary, but one possible explanation may lie in the low attitudes found in this study and the low percentages of variance located in the TOSRA scales at the class level. Considering the cultural sensitivity (but also cultural problems) of the TOSRA reported in previous studies (e.g. Mahapa, 2001, see also section 3.3.1), there is a clear need for more elaborated process than translation and back translation to adapt the TOSRA (better) to the Turkish context.

5.4 Discussion and Interpretation for the Turkish Context

The report prepared for the National Educational Development Project (NEDP) World Bank Project of YÖK (1998) concluded that 'communication skills' are the most important skills prospective teachers should posses and that project specified these skills as giving clear and understandable explanations and instructions, establishing effective classroom interaction (student/ teacher, students/student and teacher/student interaction), use of voice, effective verbal and nonverbal behaviours (e.g. posture, eye contact, gestures etc). Also, Doyran (2000) reported from her student interviews that teachers' behaviours were among the most important factors to enhance student motivation, thus leading students to success. She concluded that when students had good interactions with their teachers, they wanted to study and follow the lessons more. Otherwise, they lost their concentration and interest in the topic and class. Moreover, the importance of healthy communication between teacher-students was emphasized in many parts of this dissertation at both the national and international level (also see section 2.3.5.2, section 2.3.6.3).

Interaction in the classroom is the focus of this study in the form of students' perceptions of their teachers' interpersonal behaviour. Their effects on

outcomes were investigated and the effect of student, class and teacher background characteristics on students' perceptions within the Turkish context was determined (see section 4.4). Meanwhile, the outcomes of this study indicated that a reliable and valid adaptation of the QTI was created for the Turkish context and that it is suitable for use in further studies in Turkey (see section 3.3.1).

The outcomes of this study are important for researchers as well as teachers in Turkey. For *researchers*, they (might) provide a new method (and perspective) for studying science classrooms to explain attitudes and achievement and to investigate teachers' skills and roles to achieve this. Collecting information on teacher's and students' perceptions of teacher interpersonal behaviour can provide empirical support for activities in science teacher education and professional development programs in Turkey. Therefore, outcomes of the study can help in building more positive teacher-student relationships through reflection. Also, this study clearly shows the importance of student perception and attitudes in predicting teacher-students interpersonal behaviour and serves as a valuable comparative study for future studies.

For *teachers*, the items, scales, dimensions and the typology can be used as feedback tools for professional development by comparing their own scores with their ideals or the perceptions of their students. Teachers can also try to determine to which interpersonal profile they fit best (see section 2.3.5.3, section 4.4.1, Appendix C). Feedback by means of the typology provides an instant picture of teaching and summarizes the classroom situation just one word. Besides this, student motivation and achievement have been linked with the various profiles as well as with other variables (see section 2.3.6.1). The importance of this instant picture could be more emphasized. In this way, schools and teachers are provided with benchmarks that may help them in determining their own goals and policy, as well as their vision on teaching. Feedback can be given graphically as well as in terms of item text and numbers.

Moreover, longitudinal studies and studies with student teachers could also add valuable feedbacks both for researchers and teachers. Combining and comparing findings from the past and present in terms of teacher interpersonal behaviour might bring directions for the training of beginning teachers.

Our current experiences with the Turkish version as a teacher feedback tool are positive, teachers appear to recognize themselves and like the model and the feedback received. Not only did they compliment receiving a much detailed report and did they devote much time to understand the process and

outcomes, they also indicated the importance of this type of feedback for their professional development. They named the teacher's report as a "mirror of themselves" in the classroom. Also, teachers mostly repeated the importance of such feedback for themselves for their professional development and they wished they would have had such reports earlier (during their career). Some of the teachers even asked to write down their names for participation in further studies. One more point that also attracted the researcher's attention was that some teachers recommended participation in these kind of studies during first years of the teaching career by reasoning that young teachers need more guidance and help within the classroom, while others emphasized the importance of such studies for experienced teachers by reasoning that a teacher should have a personal style and should be self-aware of strong and weak points. From this point of view, the researcher concluded that teachers should be supported with instruments like the QTI in in-service training programmes throughout their teaching profession. In fact, use of the QTI is common practice in many teacher education institutes in the Netherlands and Australia and teachers are encouraged to include QTI reports (and reflections on these) in their portfolios. Along this line, it can be argued that teachers should have regular feedback during every step of their teaching career.

Meanwhile, this study also showed the emergence of a "Turkish version of Tolerant/Authoritative teacher" (see also Telli, et al., 2006a; section 4.4.1). Future research using videotaped lessons could help to show in what way and to what extent the Turkish version of this profile should be described with different observations and classroom examples and processes compared to the existing Tolerant/Authoritative teacher (see Appendix C). Such data would also provide indications for the adequacy of the text and observations of the other profiles for the Turkish context. Even though no different typology could be found based on the quantitative data, it can not be ruled out that these profiles are the result of different processes, strategies and classroom processes in the Turkish context than in the US/Dutch context.

Results of this study also indicated differences in perception according to the subject taught. Further studies with different science subjects as well as other school subjects (such as modern languages or the social sciences) could be conducted to provide a full picture of teacher-student interpersonal behaviour in the country and validate current findings. Such research would be valuable, since past research showed inconsistent findings with respect to school subject

differences in teacher-student interpersonal behaviour (e.g. Levy, et al., 2003; Wubbels, et al., 2006).

Also, further research into the differences between school types is necessary, since some differences were detected between general and Anatolian high schools (and in a paper by the researcher and her supervisors, differences were found between vocational and general educations as well, see Telli et al. 2006b). By collecting information on teachers' and students' perceptions of science teacher interpersonal behaviour in different schools, science teacher education and professional development programs might receive support for (adequate) activities. Also, results of this study and such future studies may help to shape a desired pedagogy and classroom climate in different schools and may help to show where different emphasis is needed for teachers in each of these school types.

5.5 Limitations

It is almost impossible to avoid limitations or relative weaknesses in any study conducted with all standardized instruments (e.g. Mehrens, & Lehmann, 1991: p380). So, the main purpose of this section is to evaluate the strengths and weaknesses or limitations that the study suffered from. These are outlined in three subsections and introduced in the forthcoming part.

5.5.1 Sample Limitations

The present study was subject to some sample limitations that are briefly discussed below. The original plan for the study was to administer the questionnaire(s) to two different classes of each science teacher (physic, chemistry and biology) in each school, with one teacher participating from each of the three science subjects. Unfortunately, this could not always be realized. Thus, the number of teachers and their participating classes varied from school to school and from region to region. Schools participated with different numbers of teachers (between one and six) and with different numbers of teachers per subject. So, the number of teachers, subjects and classes was not homogeneously distributed across schools. In some schools the number of students in science classes was not sufficient to complete the questionnaire for 3 different teachers in 6 different classes. Some classes completed the questionnaires twice (see section 3.2.2).

Secondly, the instruments themselves were subject to uncontrolled biases of the participants (teachers and students) since participation and selection of

classes was voluntary. During data collection, teachers decided with which classes they would participate. They may have chosen classes with 'good contact' and this may have led to the high dimension scores in this sample (see section 3.2.3, section 4.4.1).

Thirdly, the sample of the study does not fully represent the Turkish population (see section 3.4) with respect to a number of variables, such as grade level, distribution of girls and boys, distribution of public and Anatolian high schools, distribution of region and educational level of the parents. Therefore, the results can not be totally generalized to the country population as a whole. There might as a result be (minor) variations between the sample and the population when it comes to teacher-student interpersonal behaviour. On the other hand, there is a centralized science curriculum (national curricula) and centralized teacher appointment system throughout the country, which makes the school culture in this study schools very similar to those in other places and schools in Turkey. Moreover, given the large data set collected in different cities and all regions of Turkey, the outcomes provide a strong signal for what might be going on in Turkey as a whole and the data forms a strong base for further research.

5.5.2 Instrumentation Limitations

Some of the limitations of the study were raised in the operationalisation process of several variables.

Students' perceptions were restricted to teachers' behaviour in the classroom and the interpersonal perspective on teaching, but effects of teaching in terms of eliciting learning activities, instructional behaviour, or other teaching methods such as laboratory work were not included. Neither were teachers studied outside their classrooms.

In a more specific way, the limitation of each instrument can be outlined as follows. For the QTI, the fact that some scales were less reliable or not located at their expected places in the circumplex is a limitation; this is also true for the significant correlation between the dimensions. These are limitations in validity and it remains uncertain how much they have affected profiles or dimension scores. They warrant further improvement of the QTI on specific points in future research that can also supported with more qualitative data.

As for the TOSRA, this instrument was only translated and not adapted with the same rigour as the QTI. Low percentages of variance were found at the class level and scores were low compared to most other countries in the world.

This suggests measurement problems and measurement error and warrants for further adaptation and improvement for future research.

Data for teachers were uniquely collected via the (teacher) QTI (actual and preferred perceptions) version. Any other teacher data, such as teacher social skills, basic teaching skills and teacher knowledge and cognitions were not included. This was also true for variables such as classroom management strategies, the number of in-service courses teachers followed or information like academic position (e.g. B.S. or M.S.). Thus, some variables were not included in this study, while other (teacher and student) variables were not included in the analyses due to time and complexity considerations.

5.5.3 Methodological and Analysis Limitations

Although the importance of combined research techniques was emphasized in the literature review (see section 2.2.2), to verify the stability of the findings and provide suggestions and explanation for findings and differences with previous studies, this advise could only be followed during the pilot studies (Bursa) due to time constraints. So, the study mainly used quantitative (questionnaire) data. Adding analyses on interviews and videotaped lessons in future research might provide and enable a broader and more comprehensive description of teacher-student interpersonal behaviour and help to explain trends found in the data. These data could also provide explanations for the dislocation of scales in the interpersonal circumplex (see section 2.3.5.2, section 4.4.1). Similarly, Turkey and the Netherlands could only be compared in terms of quantitative data (students' perceptions of their teachers' interpersonal behaviours) but not in terms of observed strategies, practical knowledge of teachers and reasons for deciding for certain classroom processes.

In the pilot studies qualitative data for teachers (video recording and interviews) were gathered, but mainly for feedback and motivation purposes for teachers. Also, the researcher could use these data to follow the effects of her study on participating teachers and helped her to get inspiration (see section 3.2.4). Obviously, analyses on these data could provide clues as to the effect of verbal and nonverbal behaviour (see section 2.3.6.1). The interviews with students were used only to support construct validity.

5.6 Implications of the Study

This section briefly summarizes the above findings and sets an agenda for implications at the practical and theoretical level.

5.6.1 Practical Implications

The findings of this study are significant for researchers, teachers, teacher educators and policy makers. The results indicate that perceptions of teacher's interpersonal behaviour may vary as a result of students' background characteristics (e.g. number of books at home, class size and composition, culture, gender or even with the educational level of mother). According to scholars one of the ways to help teachers in establishing teaching methods that support all students is to know and collect information about such differences (e.g., Nieto, 1996). Also, such knowledge is important for teachers to become aware of being perceived differently by students with different backgrounds and experiences. The QTI can be considered as a way to check the interpersonal situation in the classroom both from a student and a teacher point of view, and as a diagnosing instrument to investigate the classroom condition. Given the strong connection between students' perceptions of their teachers' interpersonal behaviour (see section 2.3.6.2) and their cognitive and affective outcomes, the QTI findings are also important for curriculum developers and policy makers.

At the international level, the existing work mainly focuses on typical Western countries such as the Netherlands, the United States or Australia (den Brok, & Levy, 2005a), the contribution of a study from Turkey might bring more varied outcomes that would enable researchers and practitioners to better understand effects of cultural background characteristics of students. Apart from further research in Turkey, cross–cultural studies comparing Mediterranean, Balkan and Middle Eastern countries might also help to explain relationships between culture, perceptions and interpersonal styles of teachers, especially as a variation within cultures that can be considered as more collectivist, as accepting more power distance and more uncertainty avoidance than some Western countries that previously used the QTI.

5.6.2 Theoretical Implications

The analyses show that the structure of students' perception at the individual level is different from the class level (see section 3.3.1.2). More research with observation data, both with respect to individual students as well as their classes should be conducted to shed light on this point. Obviously, better understanding students' perceptions at the individual level for explanations of their perceptions would also provide links between student outcomes and their perceptions of interpersonal behaviour.

5.7 Recommendations for Future Research

The QTI with its strong theoretical framework provides an opportunity to compare perceptions in the classroom situation from different points of view. Obviously, studies with the QTI for different education levels and with larger, more representative samples would bring more stable outcomes and feedback to teacher education programs. That is why developing and adapting the QTI for different educational levels (e.g. higher education, primary education) is necessary and helps in establishing more long-term research.

Also, longitudinal studies with the QTI could be undertaken, which may provide more insight into students' perceptions of their science teachers in terms of career developments or stability of perceptions over the course of a school year. Also, longitudinal studies, starting with the initial schooling of students with regular intervals could provide a student QTI data bank over years and this might also be used to determine changes in the students' perceptions of their teacher interpersonal behaviour in different conditions, such as in different age groups, schools, subject matter etc. This might also provide deeper insight into student level data. A similar data bank for teachers starting from their student teacher time might be helpful and guide teachers over their teaching career. Such a study has been setup in the Netherlands (with some teachers participating over 25 years) and shows interesting patterns for individual teachers in terms of their development in Influence and Proximity (see, for example, Brekelmans, Wubbels, & van Tartwijk, 2005).

Additionally, the QTI could be used in assessing changes that result from the introduction of new curricula or teaching methods and in checking whether science teachers' interpersonal behaviour is seen differently by students of different gender, ability and background. Such studies might be conducted within the development and pilot process of new programs as well as to follow current curriculum programs. This way the QTI might help to explain effects of changes detected in students' perceptions or students' responses to these changes. Combining the QTI with other instruments (culture specific) aimed at other teaching perspectives could also provide more information to explain variance, affective student attitudes and other effects of teacher interpersonal behaviour.

Of course, questions for future research should focus more on why there are differences between students and teachers in their perceptions. Studies on

this topic would provide more insight into communication problems within classrooms and possible solutions to resolve these.

5.8 Chapter Summary

In this chapter, a summary of the research results was given and discussed within the Turkish context and in the light of previous findings. The limitations of the study were carefully analysed and a more elaborated adaptation process for the TOSRA, similar to that of the QTI, was suggested. Apart from this, the importance of QTI outcomes for teacher education programs, in-service teacher training and curriculum development or other renewal projects was discussed.

QTI studies are a relatively new phenomenon in Turkey. Studies on students' perceptions of their interpersonal problems might give valuable feedback to the Turkish education system, to evaluate classroom conditions and to provide data from different perspectives to solve science education's ongoing problems.

REFERENCES

Açıkgöz, K. Ü. (1990). Öğretim elemanlarının değerlendirilmesinde kullanılabilecek geçerli ve güvenilir bir araç: Öğretmene İlişkin Öğrenci Algıları Ölçeği (ÖİÖAÖ). (A reliable and valid instrument to be used in the evaluation of the instructors: Questionnarie on students' perceptions related to teachers). Unpublished manuscript.

Adam, J. (2000, April). *Development of an Instrument to evaluate school level environments in special sector: The Special School - Level Environment Questionnaire.* Paper presented at the annual meeting of the American Education Research Association, New Orleans.

Aldridge, J. M., Fraser, B. J., & Huang, T. C. I. (1999). Investigating classroom environments in Taiwan and Australia with multiple research methods. *Journal of Educational Research, 93,* 48-57.

Anderson, C. S. (1982). The search for school climate: A Review of the research. *Review of Educational Research, 52,* 368-420.

Andersen, P. A. (1997). *Cues of culture: The basis of intercultural status report on minorities in higher education.* Washington DC: ACE, Office of Minority Concerns.

Anderson, G. L., & Walberg, H. J. (1968). Classroom climate and group learning. *International Journal of Educational Sciences, 2,* 175-180.

Anderson, G. J., & Walberg, H. J. (1974). Learning environments. In H. J. Walberg (Ed.), *Evaluating Educational Performance: A Sourcebook Of Methods, Instruments and Examples* (pp. 81-98). Berkeley, CA: McCutchan Publishing.

Au, K. H., & Kawakami, A. J. (1994). Cultural congruence in instruction. In E. R. Hollins, J. E. King, & W. C. Hayman (Eds.), *Teaching diverse populations: Formulating a knowledge base.* Albany: State University of New York Press.

Bain, J. D., McNaught, C., Mills, C.,& Lueckenhausen, G. (1998). Describing computer-facilitated learning environments in higher education. *Learning Environments Research, 1,* 163-180.

Banks, J. A. (1995). Multicultural education: Historical development, dimensions, and practice. In J. A. Banks & C. A. Banks (Eds.), *Handbook of Research on multicultural education*. New York: Macmillan.

Ben-Chaim, D., & Zoller, U. (2001). Self-perception versus students' perception of teacher personal style in college Science and Mathematics courses. *Research in Science Education, 31*, 437-454.

Benjamin, L. S. (1974). Structural analysis of social behaviour. *Psychological Review, 81,* 392–327.

Bennet, S. N. (1976). *Teaching style and pupil progress.* London: Open Books.

Bennett, C. (1995). *Comprehensive Multicultural Education: Theory and practice (3rd ed.)*. Massachusetts: Allyn and Bacon.

Berliner, D. (1986). In pursuit of the expert pedagogue. *Educational Researcher, 15* (7), 5–13.

Blackburn, R., & Renwick, S. J. (1996). Rating scales for measuring the interpersonal circle in forensic psychiatric patients. *Psychological Assesment, 8,* 76-84.

Brekelmans, M. (1989). I*nterpersonal teacher behaviour in the classroom.* [In Dutch]. Utrecht: W. C. C.

Brekelmans, M., den Brok, P., van Tartwijk, J., & Wubbels, Th. (2005). An interpersonal perspective on teacher behaviour in the classroom. In L. V. Barnes (Ed.), *Contemporary Teaching and Teacher Issues* (pp. 197-226). New York: Nova Science Publishers.

Brekelmans, M., Levy, J., & Rodriguez, R. (1993). A typology of teacher communication style. In T. Wubbels & J. Levy (Eds.), *Do you know what you look like?* (pp.46-55). London: The Falmer Press.

Brekelmans, M., Holvast, A.,& van Tartwijk, J. (1992). Changes in teacher communication styles during the professional career. *The Journal of Classroom Interaction,* 27, 13-22.

Brekelmans, M., Sleegers, P., & Fraser, B. J. (2000). Teaching for active learning. In P. R. J. Simons, J. L. van der Linden, & T. Duffy (Eds.), *New learning* (pp.227-242). Dordrecht: Kluwer.

Brekelmans, M., van den Eeden, P.,Terwel, J., & Wubbels, Th. (1997). Student characteristics and learning environment interactions in mathematics and physics education: a resource perspective. *International Journal of Educational Research, 27, 283-292.*

Brekelmans, M., & Wubbels, Th. (1991). Student and teacher perceptions of interpersonal teacher behaviour: a Dutch perspective. *The Study of Learning Environments, 5*, 19-30.

Brekelmans, M., Wubbels, Th., & den Brok, P. (2002). Teacher experience and the teacher-student relationship in the classroom environment. In S. C. Goh & M. S. Khine (Eds.), *Studies in educational learning environments: An international perspective* (pp. 73-100). Singapore: New World Scientific.

Brekelmans, M. Wubbels, Th., & van Tartwijk, J. (2006). *Teacher–student relationships across the teaching career.* Paper presented at the Annual Meeting of the American Association Research Association (AERA), San Fransisco.

Brekelmans, M., Wubbels, Th., & van Tartwijk, J. (2005). Teacher-student relationships across the teaching career. *International Journal of Educational Research, 43*, 55-71.

Briar, S., & Bieri, J. (1963). A factor analytic and trait interference study of the Leary interpersonal checklist. *Journal of Clinical Psychology, 19,* 193-198.

Brophy, J. E., & Good, T. L. (1986). Teacher behaviour and student achievement. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (3rd Ed.) (pp. 328-375). New York: MacMillan.

Brown, R. (1965). *Social psychology*. New York: The Free Press.

Browne, M. W. (1992). Circumplex models for correlation matrices. *Psychometrika, 57*, 469-497.

Byrne, D. B., Hattie, J. A., & Fraser, B. J. (1986). Student perceptions of preferred classroom environment. *Journal of Educational Research, 80,* 10-18.

Burgoon, J. K. & Hale, J. L. (1987). Validation and measurement of the fundamental themes of relational communication. *Communication Monographs, 54,* 19 -41.

Bozan, M. (2004). Region administration and educational region concept [In Turkish]. *Milli Eğitim Dergisi* (vol.161). Retreived November 27, 2005 from http://www.meb.gov.tr.

Çakar, Y. (1994). *The Construction of the Perceived Teacher Behaviour Inventory (PTBI)*. Unpublished master thesis Istanbul: Bogazici University. Istanbul, Turkey.

Cakiroglu, J., Telli, S., & Cakiroglu, E. (2003). *Turkish High School Student's Perceptions of Learning Environment In Biology Classrooms and their Attitudes toward Biology.* Paper presented at the Annual Meeting of the American Association Research Association, Chicago.

Carter, L. F. (1954). Evaluating the performance of individuals as members of small groups. *Personal Psychology, 7,* 477–484.

Çetinkanat, A. C. (1998). Teacher canditate and teacher communication skills from the inspectorates' point of view [In Turkish], *Eğitim Yönetimi, 14,* 209-221.

Cohen, J. (1977). *Statistical Power Analysis for Behavioural Sciences* (Revised ed.). New York: Academic Press Inc.

Coll, R. K., Taylor, N., Fisher, D., & Ali, S. (2000). *An application of the QTI and CUCEI in a multicultural tertiary context.* Research paper. Brisbane: Queensland University of Technology.

Coll, R., Taylor, N., & Fisher, D. L. (2002). An application of the Questionnaire on Teacher Interaction and College and University Classroom Environment Inventory in a Multicultural Tertiary Context. *Research in Science and Technology Education, 20*, pp. 165-183.

Comstock, J., Rowell, E., & Bowers, J. W. (1995). Food for thought: teacher nonverbal immediacy, student learning and curvilinearity. *Communication Education, 44*, 251-266.

Creemers, B. P. M. (1994). *The effective classroom.* London: Cassell.

Créton, H. A., & Wubbels, Th. (1984). *Discipline problems with beginning teachers.* [In Dutch]*.* Utrecht: W.C.C.

Créton, H. A., Wubbels, Th., & Hooymayers, H. (1993). A systems perspective on classroom communication. In T. Wubbels & J. Levy (Eds.), *Do you know what you like? Interpersonal relationship in education.*(pp.1-12). London: The Falmer Press.

D'Apollonia, S., & Abrami, P. (1996). *Variables moderating the validity of students ratings of instruction: a meta analysis.* Paper presented at the annual meeting of the American Educational Research Association, New York.

Dart B., Burnett, P., Boulton - Lewis, G., Campbell, J., Smith, D., & McCrindle, A. (1999). Classroom environment and students' approaches to learning. *Learning Environments Research,* 2, 137-156.

den Brok, P. J. (2001). *Teaching and student outcomes. A study on teachers' thoughts and actions from an interpersonal and a learning activities perspective.* Utrecht: W.C.C.

den Brok, P., Brekelmans, M., & Wubbels, Th. (in press). Multilevel issues in studies using students' perceptions of learning environments: the case of the Questionnaire on Teacher Interaction. Accepted for publication in *Learning Environments Research*.

den Brok, P., Brekelmans, M., Levy, J., & Wubbels, Th. (2002b). Diagnosing and improving the quality of teachers' interpersonal behaviour. *The International Journal of Educational Management, 4*, 176-184.

den Brok, P., Brekelmans, M., & Wubbels, Th. (2004). Interpersonal teacher behaviour and student outcomes. *School Effectiveness and School Improvement*, 15, 407-442.

den Brok, P., Brekelmans, M., & Wubbels, Th. (2005b). *Validity Testing in Research on Student Perceptions of Learning Environments.* Paper presented at the bi-annual conference of the European Association for Research on Learning and Instruction (EARLI), Nicosia, Cyprus.

den Brok, P., Bergen, T., & Brekelmans, M. (2006a). Convergence and divergence between teachers' and students' perceptions of instructional behaviour in Dutch secondary education. In D. L. Fisher & M. S. Khine (Eds.), *Contemporary approaches to research on learning environments: world views* (pp.125-160). Singapore: World Scientific.

den Brok, P., Bergen, T., & Stahl, R.(2002a). *Students perceptions of teachers' regulatory behaviours during learning activities.* Paper presented at the annual meeting of the American Educational Research Association (AERA), New Orleans.

den Brok, P., Fisher, D., & Koul, R. (2005c). The importance of teacher interpersonal behaviour for secondary science students in Kashmir. *Journal of Classroom Interaction, 40*, 5-19.

den Brok, P., Fisher, D., & Scott, R. (2005d). The importance of teacher interpersonal behaviour for student attitudes in Brunei primary Science classes. *International Journal of Science Education, 27*, 765-779.

den Brok, P., Fisher, D., Brekelmans, M., Rickards, T., Wubbels, Th., Levy, J., & Waldrip, B. (2003a, April). *Students' perceptions of secondary teachers' interpersonal style in six countries: a study on the validity of the Questionnaire on Teacher Interaction*. Paper presented at the annual meeting of the American Educational Research Association, Chicago. ERIC document: ED475164.

den Brok, P., Fisher, D., Brekelmans, M., Wubbels, T., & Rickards, T. (2006b). Secondary teachers' interpersonal behaviour in Singapore, Brunei and Australia: a cross-national comparison. *Asia-Pacific Journal of Education, 26*, 79-95.

den Brok, P., & Levy, J. (2005a). Teacher-student relationships in multicultural classes: Reviewing the past, preparing the future. *International Journal of Educational Research, 43*, 72-88.

den Brok, P. J., Levy, J., Rodriguez, R., & Wubbels, Th. (2002c). Perceptions of Asian-American and Hispanic-American teachers and their students on interpersonal communication style. *Teaching and Teacher Education,* 18, 447-467.

den Brok, P., Levy, J., Wubbels, Th., & Rodriguez, M. (2003b). Cultural influences on students' perceptions of videotaped lessons. *International Journal of Intercultural Relations, 27*, 355-374.

den Brok, P., Wubbels, Th., van Tartwijk, J., Veldman, I., & Dekovic, M. (2006d). *Multicultural students' perceptions of the interpersonal behaviour of their teachers and their parents.* Paper presented at the Annual Meeting of the American Association Research Association (AERA), San Francisco, CA.

Dorman, J., (2003). Cross-national validation of the What is Happening in this Class? (WIHIC) questionnaire using confirmatory factor analysis*. Learning Environments Research, 6*, 231-245.

Doyle, W. (1979a). Making managerial decisions in classroom. In Duke (Ed.), *Classroom Management* (Seventy-eighth Yearbook of the National Society for the Study of Education, Part 2). Chicago, IL: University of Chicago Press.

Doyle, W. (1979b). Classroom effects. *Theory into Practice, 18,* 138-144.

Doyle, W. (1986). Classroom organization and management. In M. C. Wittrock (Ed.), *Handbook of Research on Teaching* (3rd ed.) New York: Macmillian.

Doyran, F. (2000). *The Effects of Perceived Teacher Non–Verbal Behaviours, Teacher Behaviours and Preferred Learning Styles on English Proficiency Level.* Unpublished doctoral dissertation Ankara: Middle East Technical University. Ankara, Turkey.

Dunkin M., & Biddle, B. (1974). *The study of teaching.* New York: Holt, Rinehart & Winston.

Educational Statistics of Turkey 2004-2005 (2005). Devlet Kitapları Müdürlüğü Basımevi, Ankara- 2005.

Ekinci, S. (1999). *Öğrencilerin Sınıf Atmosferine İlişkin Beklenti ve Algılarıyla Akademik Başarıları Arasındaki İlişki*. [in Turkish] Unpublished master thesis Kayseri: Erciyes University, Kayseri, Turkey.

Ericsson, K. A., & Simon, H. A. (1993). *Protocol analysis: verbal reports as data* (revised edition). Cambridge, MA: MIT Press.

EURYDICE (The information network on education in Europe) *2006 Summary Sheets on Education Systems in Europe* Retrieved, May 15, 2006 from http://www.eurydice.org

Evans, H. M. (1998). *A study of students' cultural background and teacher student interpersonal behaviour in Science Secondary Classrooms in Australia*. Unpublished doctoral dissertation, Curtin University, Perth, Australia.

Evans, H., & Fisher, D. L. (2000). Cultural differences in students' perceptions of science teachers' interpersonal behaviour. *Australian Science Teachers Journal,* 46, 9-18.

Everitt, B. (1980). *Cluster analysis.* New York: Halsted Press.

Eyibakışlı, B. (1991). *A reliability Study of the Teacher Behaviour Observation Scale (TeBOS)*. Unpublished master thesis Istanbul: Bogazici University. Istanbul, Turkey.

Fabrigar, L. R., Visser, P. S., & Browne, M. W. (1997). Conceptual and methodological issues in testing the circumplex structure of data in personality and social psychology. *Personality and Social Psychology Review, 1*, 184-203.

Felder, R. M., & Brent, R. (2000). *Effective teaching, workshops notes*. METU, Ankara.

Ferguson, P. D., & Fraser, B. J. (1998). Changing in learning environment during the transition from primary to secondary school. *Learning Environments Research,* 1, 369-383.

Fisher, D., den Brok, P., & Rickards, T. (2006). Factors influencing students' perceptions of their teachers' interpersonal behaviour: A multilevel analysis. In D. L. Fisher & M. S. Khine (Eds.), *Contemporary approaches to research on learning environments: World views* (pp. 51-74). Singapore: World Scientific.

Fisher, D. L., & Fraser, B. J. (1981). Validity and use of My Class Inventory. *Science Education, 65,* 145- 156.

Fisher, D. L., & Fraser, B. J. (1983). A comparison of actual and preferred classroom environment as perceived by science teachers and students. *Journal of Research in Science Teaching, 20,* 55–61.

Fisher, D. L., Fraser, B. J., & Wubbels, Th. (1993). Associations between school learning environment and teacher interpersonal behaviour in the classroom. In T. Wubbels & J. Levy (Eds.), *Do you know what you look like?* (pp.103-112). London: The Falmer Press.

Fisher, D. L., Goh, S. C., Wong, A. F. L., & Richards, T. (1996). *Perceptions of interpersonal teacher behaviour in secondary science classrooms: a cross-national study.* Paper presented at the conference of the Educational Research Association, Singapore.

Fisher, D. L., Henderson, D., & Fraser, B. J. (1995). Interpersonal behaviour in senior high school biology classes. *Research in Science Education, 25*, 125-133.

Fisher, D. L., & Rickards, T. (1999, January). *Teacher–student interpersonal behaviour as perceived by science teachers and their students.* Paper presented at the second international conference on Science, Mathematics and Technology Education, Taipei, Taiwan.

Fisher, D. L., & Rickards, T. (2000). Teacher-student interpersonal behaviour as perceived by science teachers and their students. In D. Fisher & J. Yang (Eds.), *Improving classroom research through international cooperation* (pp.391-398). Taiwan: National Taiwan Normal University.

Fisher, D. L., Rickards, T., Goh, S. C., & Wong, A. (1997). *Perceptions of interpersonal teacher behaviour in secondary science classrooms: comparisons between Australia and Singapore.* Paper presented at the International Conference on Science, Math and Technology Education, Hanoi.

Fisher, D., Waldrip, B., & den Brok, P. (2005). Students' perceptions of primary teachers' interpersonal behaviour and of cultural dimensions in the classroom environment. *International Journal of Educational Research, 43*, 25–38.

Fisher, T. H. (1973). The development of an attitude survey for junior high science. *School Science and Mathematics, 73,*647-652.

Foa, U. G. (1961). Convergence in the analysis of the structure of interpersonal behaviour. *Psychological Review, 68,* 341-353.

Fraenkel, J. R., & Wallen, N. E. (1996). *How to design and evaluate research in education*. (3rd ed.).New York: McGraw- Hill Inc.

Fraser, B. J. (1978). Development of a test of science related attitudes. *Science Education, 62,* 509-515.

Fraser, B. J. (1979). Evaluation of science–based curriculum. In H. J. Walberg (Ed.), *Educational environments and effects: Evaluation, policy and productivity* (pp. 218-234). Berkeley, CA: McCutchan.

Fraser, B. J. (1981). *Test of Science Related Attitudes Handbook* (TOSRA). Melbourne, Australia: Australian Council for Educational Research.

Fraser, B. J. (1986). *Classroom environment.* London: Croom Helm.

Fraser, B. J. (1988). *Study of learning environments, Volume 4.* Perth, Western Australia: Curtin University of Technology.

Fraser, B. J. (1989). *Assessing and improving classroom environment* (*What* Research Says to the Science and Mathematics Teacher, No.2). Perth, Australia: Curtin University of Technology.

Fraser, B. J. (1990). Students' perceptions of their classroom environments. In K. Tobin, J. B. Kahle, and B. J. Fraser (Eds.), *Windows Into Science Classrooms: Problems Associated With Higher-Level Cognitive Learning* (pp. 199-221). London: The Falmer Press.

Fraser, B. J. (1994). Research on classroom and school climate. In D. Gabel (Ed.), *Handbook of research on science teaching and learning* (pp.493-541). New York: Macmillan.

Fraser, B. J. (1998a). The birth of a new journal: Editor's introduction. *Learning Environments Research, 1,* 1-5.

Fraser, B. J. (1998b). Science learning environments: Assessment, effects and determinants. In B.J. Fraser & K.G. Tobin (Eds.), *the international handbook of science education* (pp. 527-564). Dordrecht, the Netherlands: Kluwer Academic Publishers.

Fraser, B. J. (1998c). Classroom environment instruments: Development, validity and applications. *Learning Environments Research, 1*, 7-33.

Fraser, B. J. (2002). Learning environments research: yesterday, today and tomorrow. In S. C. Goh, & M. S. Khine (Eds.), *Studies in educational learning environments, an international perspective* (pp.1-25). Singapore: World Scientific.

Fraser, B. J., Anderson, G. J., & Walberg, H. J. (1982). *Assessment of learning environments: Manual for Learning Environment Inventory (LEI) and My Class Inventory (MCI)* (3rd version). Perth, Australia: Western Institute of Technology.

Fraser, B. J., & Butts, W. L. (1982). Relationship between perceived levels of classroom individualization and science-related attitudes. *Journal of Research in Science Teaching, 19*, 143-154.

Fraser, B. J., & Chionh, J. H. (2000, April). *Classroom environment, self – esteem, achievement and attitudes in geography and mathematics in Singapore.* Paper presented at the annual meeting of the American Education Research Association New Orleans, L.A.

Fraser, B. J., & Fisher, D. L. (1982). Predicting students' outcomes from their perception of classroom psychosocial environment. *American Education Research Journal, 19*, 468-518.

Fraser, B. J., & Fisher, D.L. (1983). Use of actual and preferred classroom environment scales in person-environment fit research. *Journal of Educational Psychology, 75,* 303-313.

Fraser, B. J., Fisher, D. L., & McRobby, C. J. (1996). *Development, validation and use of personal and class forms of a new classroom environment instrument.* Paper presented at the Annual of the American Educational Research Association, New York, USA.

Fraser, B. J., Giddings, G. J., & McRobbie, C. J. (1992). *Assessing the Climate Of Science Laboratory Classes* (What Research Says, No. 8). Perth: Curtin University of Technology.

Fraser, B. J., & Rentoul, A. J. (1982). Relationship between school-level and classroom level environment. *Alberta Journal of Educational Research, 28*, 212–225.

Fraser, B. J., & Tobin, K. (1991). Combining qualitative and quantitative methods in classroom environment research. In B. J. Fraser & H. J. Walberg (Eds.), *Educational environments: Evaluation, antecedents and consequences* (pp. 271- 292). London: Pergamon Press.

Fraser, B. J., Treagust, D. F., & Dennis, N. C. (1986). Development of an instrument for assessing classroom psychosocial environment at universities and colleges. *Studies in Higher Education, 11*, 43-54.

Fraser, B. J., & Walberg, H. J. (1981). Psychosocial learning environment in science classrooms: A review of research. *Studies in Science Education, 8,* 67- 92.

Fraser, B. J., & Walberg, H. J. (1991). *Educational Environments: Evaluation, antecedents and consequences.* Oxford: Pergamon Press.

Fraser, B. J., Walberg, H. J., Welch, W. W., & Hattie, J. A. (1987). Synthesis of educational productivity research. *International Journal of Educational Research, 11,* 145-252.

Fraser, B. J., & Wubbles, Th. (1995). Classroom environments. In B. J. Fraser & H. J. Walberg (Eds.), *Improving science education* (pp. 117-144). Chicago: National Society for the Study of Education.

Gaines, S. O., Panter, A. T., Lyde, M. D., Steers, W. N., Rusbult, C. E., Cox, C. L., & Wexler, M. O. (1997). Evaluating the circumplexity of interpersonal traits and the manifestation of interpersonal traits in interpersonal trust. *Journal of Personality and Social Pschology, 73,* 610-623.

Gavora, P., Mares, J., & den Brok, P. (2005). Slovak adaption of the Questionnaire on Teacher Interaction (QTI). *Pedagogicka Revue, 57*, 44–63.

Gay, G. (2002). Culturally responsive teaching in special education for ethnically diverse students: setting the stage. *Qualitative Studies in Education*, 15, 613-629.

Genn, J. M. (1984). Research into the climates of Australian schools, colleges and universities: Contributions and potential of need–press theory. *Australian Journal of Education, 28,* 227- 248.

Getzels , J. W., & Thelen, H. A. (1960). The classroom as unique social system. In N. B. Henry (Ed.), *The dynamics of instructional groups: Socio psychological aspects of teaching and learning* (59th yearbook of the national Society for the Study of Education, Part 2) (pp.53-81).Chicago: Universty of Chicago Press.

Giles, H., & Franklyn – Stokes, A. (1989). Communicator characteristics. In M. Asante & W. Gudykunst (Eds.), *Handbook of international and intercultural communication.* Newbury Park, CA: Sage.

Goh, S. C. (1994). *Interpersonal teacher behaviour, classroom climate and student outcomes in primary mathematics classes in Singapore.* Unpublished doctoral dissertation, Curtin University, Perth, Australia.

Goh, S. C., & Fraser, B. J. (1995, April). *Learning environment and student outcomes in primary mathematics classrooms in Singapore.* Paper presented at the Annual Meeting of the American Association Research, San Francisco, C.A.

Goh, S. C., & Fraser, B. J. (1996). Validation of an elementary school version of the Questionnaire on Teacher Interaction. *Psychological Reports, 79*, 515-522.

Gorham, J., & Zakahi, W. R. (1990). A comparison of teacher and student perceptions of immediacy and learning: monitoring process and product. *Communication, 39,* 354 – 379.

Green, M. R. (1982*). Elementary teachers' attributional styles and their science teaching performance*. ERIC Document No.: ED2124470.

Grossman, H. (1995). *Teaching a diverse society*. Boston: Allyn & Bacon.

Gumperz, J. J. (1982). *Discourse Strategies*. London: Cambridge University Press.

Gür, A. (2001) An adaptation study of the Classroom Environment Scale (Sınıf Ortamı Ölçeğinin Uyarlama Çalışması) , Unpublished master thesis. İzmir: 9 Eylül University. İzmir, Turkey.

Gurtman, M. B., & Pincus, A. L. (2000). Interpersonal adjective scales: confirmation of circumplex structure from multiple perspectives. *Personality and Social Psychology Bulletin, 26*, 374-384.

Haladyna, T., Olsen, R. & Shaughnessy, J. (1982). Relations of student, teacher and learning environment variables to attitudes toward science. *Science Education, 66*, 671-687.

Hall, E. T. (1966). *The hidden dimension*. Garden City, NY: Doubleday.

Hecht, M. L., Anderson P. A., & Ribeau, S. A., (1989). The cultural dimension of Non- verbal communication. In M. K. Asenta, & W. B.Gudykunst (Eds.), *Handbook of international and intercultural communication* (pp.163-185). Newbury Park: Sage.

Harkin, J., Davis, P., & Turner, G. (1999). The development of a communication styles questionnaire for use in English 16-19 education. *Westminster Studies in Education, 22*, 31-47.

Hartshorne, H., & May, M. A. (1928). *Studies in the Nature of Character: Studies in Deceit*. New York: Macmillan.

Henderson, D. G. (1995). *A study of the classroom and laboratory environments and student attitude and achievement in senior secondary biology classes*. Unpublished doctoral dissertation. Perth: Curtin University of Technology.

Henderson, D. G., Fisher, D. L., & Fraser, B. J. (1995, April). *Associations between learning environments and student outcomes in biology.* Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco.

Henderson, D., Fisher, D. L., & Fraser, B. J. (2000). Interpersonal behaviour, laboratory learning environments, and student outcomes in senior biology classes. *Journal of Research in Science Teaching, 37*, 26-43.

Hofstede, G. (1984). *Culture's consequences*. Newbury Park, CA: Sage Publications.

Hofstede, G. (1991). *Cultures and organizations: Software of the mind*. London: McGraw-Hill.

Hofstede, G. & Hofstede, G. J. (2004). *Cultures and Organizations: Software of the Mind: Intercultural Cooperation and Its Importance for Survival* New York: McGraw-Hill.

Hox, J. J. (1995). *Applied Multilevel Analysis*. Amsterdam : TT Publications.

Hui, C.H., & Villareal, M. J. (1989). Individualism–collectivism and psychological needs: Their relationship in two cultures. *Journal of Cross–Cultural Psychology, 20*, 310 – 323.

Hui, C. H., & Triandis, H. C. (1985). Measurement in cross-cultural psychology: a review and comparison of strategies. *Journal of Cross-Cultural Psychology, 16*, 131-152.

Jacobs, D. T. (2003). *Shifting Attention from "Discipline Problems" to "Virtue Awareness" in American Indian and Alaska Native Education*. ERIC Document No.: ED480732.

Jegede, O. J., & Okebukola, P. A. O. (1988). Educatory of the sociocultural factors in science learning. *International Journal of Education, 2*, 70 – 85.

Jegede, O. J., & Okebukola, P. A. (1991). Differences in sociocultural environment perceptions associated with gender in science classrooms. *Journal of Research in Science Teaching, 29*, 1-7.

Kachru, Y. (1988). Cognitive and cultural styles in second language acquisition. *Annual Review of Applied Linguistics, 9*, 149 -163.

Kısakurek, M. A. (1985). *Üniversitelerimizde Yenileşme: Programlar ve Öğretim Açısından* [In Turkish] .Ankara: AÜ Eğitim Fakültesi Yayınları.

Kim, H. B., Fisher, D. L., & Fraser, B. J. (2000). Classroom environment and teacher interpersonal behaviour in secondary science classes in Korea. *Evaluation and Research in Education, 14*, 3-22.

Klopfer, L. E. (1976). A structure for the affective domain in relation to science education. *Science Education, 60,* 299- 312.

Kremer-Hayon, L., & Wubbels, T. (1992). Interpersonal relationships of cooperation teachers and student teachers' satisfaction with supervision. *Journal of Classroom Interaction, 27*, 31-38.

Korur, F. (2001). *The Effects of Teachers' Characteristics on High School Students' Physics Achievement, Motivation and Attitudes.* Unpublished master thesis. Ankara: Middle East Technical University. Ankara, Turkey.

Köknel, Ö. (1994). *Understanding Human Beings.* [in Turkish]. İstanbul: Altın Kitaplar.

Kyriakides, L. (2005). Drawing from teacher effectiveness research into teacher interpersonal behaviour to establish a teacher evaluation system: a study on the use of student ratings to evaluate teacher behaviour. *Journal of Classroom Interaction, 40*, 44-66.

La France, M., & Mayo, C. (1978). *Moving bodies: non-verbal communication in social relationships*. Monterey: Brooks/Cole Publishing Company.

Laforgia, J. (1988). The affective domain related to science education and its evaluation. *Science Education, 72,* 407–421.

Lapointe, J., Pilote, C., & Legault, F. (1999). *Validation française du Questionnaire on Teacher Interaction en contexte québécois.* Paper presented at the Congres annuel de la Société Québécoise pour la Recherche en Psychologie (SQRP), Quebec.

Leary, T. (1957). *An interpersonal diagnosis of personality*. New York: Ronald-Press.

Lee, O. (1995). Subject matter knowledge, classroom management, and instructional practices in middle school science classrooms. *Research in Science Teaching, 32*, 423–440.

Le Roux, J. (2002). Effective educators are culturally competent communicators. *Intercultural Education, 13,* 37–48.

Levy, J., den Brok, P., Wubbels, Th., & Brekelmans, M. (2003). Students' perceptions of interpersonal aspects of the learning environment. *Learning Environments Research,* 6, 5-36.

Levy, J., Créton, H., and Wubbels, Th. (1993). Perceptions of interpersonal teacher behaviour. In T. Wubbels & J. Levy (Eds.), *Do you know what you look like? Interpersonal relationships in education* (pp. 29 – 45). London :London: The Falmer Press.

Levy, J., Wubbels, Th., & Brekelmans, M. (1992a). Student and teacher characteristics and perceptions of teacher communication style. *Journal of Classroom Interaction,* 27, 23-29.

Levy, J., Wubbels, Th., & Brekelmans, M. (1996). *Cultural factors in students' and teachers' perceptions of the learning environment*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, C.A.

Levy, J., Wubbels, Th., Brekelmans, M., & Morganfield, B. (1997). Language and cultural factors in students' perceptions of teacher communication style. *International Journal of Intercultural Relationships, 21*, 29-56.

Levy, J., Rodriguez, R., & Wubbels, Th. (1992b). Teacher communication style and instruction. *The Study of Learning Environments, 7,* 11- 18.

Lewin, K., (1936). *Principles of Topological Psychology*, McGraw, New York.

Lonner, W. J. (1980). The search for psychological universals. In H.C. Triandis & W.W. Lambert (Eds.). *Handbook of cross cultural psychology*. (vol.1) (pp.143-204). Boston: Allyn and Bacon.

Lowyck, J. (1994). Teaching effectiveness: an overview of studies. *Tijdschrift voor Onderwijsresearch*, *19,*17-25.

Mackay, L.D. (1971). Changes in physics student in three states over a two year period. In R.P. Tisher (Ed.), *Research* (pp.109–118). Melbourne, Australia: Australian Science Education Research Association.

Mahapa, S. S. (2001, March). *'Off–Shelve instruments: perceptions of high school learners on the science centre as a learning environment.* Paper presented at the annual meeting of the National Association of Research in Science Teaching, St Louis, USA.

Margianti, E. S., Fraser, B. J., & Aldridge, J. M. (2002, April). *Learning environment attitudes and achievement: Assessing the perception of Indonesian university students.* Paper presented at the annual meeting of the American Education Research Association, New Orleans, L.A.

Matsuda, M. (1989). Working with Asian parents: Some communication strategies. *Topics in Language Disorders, 9*, 45-53.

McCroskey, J. C., Richmond, V. P., Sallinen, A., Fayer, J. M., & Barraclough, R. A. (1995). A cross-cultural and multi-behavioural analysis of the relationship between non-verbal immediacy and teacher evaluation. *Communication Education, 44*, 281-291.

McRobbie, C. J., Fisher, D. L., & Wong, A. F. L. (1998). Personal and class forms of classroom environment instruments. In B. J. Fraser & KG. Tobin (Eds.), *International Science Education (part one)* (pp. 581- 594). London: Kluwer Academic Publications.

McRobbie, C., & Fraser, B. J. (1993). Associations between student outcomes and psychosocial science environment. *Journal of Educational Research, 87*, 78-85.

Mehrabian, A. (1981). *Silent messages: implicit communication of emotions and attitudes.* Belmont: Wadsworth Publishing Company.

Mehrens, W. A., & Lehmann, I. J. (1991). *Measurement and evaluation in education and psychology* (4th ed.). Fort Worth: Holt, Rinehart, and Winson, Inc.

Memişoglu, S.P. (2004).*Communication and Group interaction in the Classroom* [In Turkish]*.* Ankara: PegemA.

Moore, K. D. (1989). *Classroom teaching skills: A primer*. New York: Random House.

Moos, R. H. (1974). *The Social Climate Scales: An Overview*. Palo Alto, CA, Consulting Psychologists' Press.

Moos, R. H. (1976). *The Human Context: Environmental Determinants of Behaviour*. New York: John Wiley and Sons.

Moos, R. H. (1979). *Evaluating Educational Environments.* San Francisco, CA: Jossey-Bass. Publishers.

Moos, R. H. (2002). The mystery of human context and coping: An unravelling of clues. *American Journal of Community Psychology, 30*, 67-78.

Moos, R. H., & Trickett, E. J. (1974). *Classroom Environment Scale Manual* (1st ed.). Palo Alto, CA: Consulting Psychologist Press.

Murray, H. A. (1938). *Explorations in Personality*. New York: Oxford University Press.

Muthen, B. (1994). Multilevel covariance structure analysis. *Sociological Methods & Research,* 22, 338-354.

Neill, S., & Caswell, C. (1993). *Body language for competent teachers.* London: Routledge.

Neuliep, J. W. (1995). A comparison of teacher immediacy in African-American and Euro-American college classrooms. *Communication Education, 44*, 267-280.

Newby, M., & Fisher, D. L. (2000). A model of the relationship between computer laboratory environment and student outcomes in university courses. *Learning Environments Research, 3*, 51-66.

Newcomb, T. M. (1929). *The Consistency of Certain Extrovert-Introvert Behaviour Patterns in 51 Problem Boys*. New York: Columbia University Teachers College Bureau of Publications.

Nguyen, L. (1986). Indochinese cross-cultural adjustment and communication. In M. Dao & H. Grossman (Eds.), *Identifying, instructing and rehabilitating Southeast Asian students with special needs and counselling their parents*. ERIC Document No: ED273068.

Nieto, S. (1996) *Affirming diversity: The sociopolitical context of multicultural education*. New York: Longman.

Nobles, W. W. (1985). *Africanity and the Black family*. Oakland, Ca: Black Family Institute Publication.

Nunnally, J. C. (1967). *Psychometric theory.* New York *:* McGraw Hill.

Nunnally, J. C.(1978). *Psychometric theory*. (2nd Edition ed.). New York: McGraw Hill.

Oberholster, F. R. (2001). *Teacher behaviours as predictors of students' sense of community.* Dissertation. Manila: Adventist International Institute of Advanced Studies.

Ogbu, J. U. (1992). Understanding cultural diversity and learning. *Educational Researcher, 21*, 5 -14.

Okçabol, R., & Gök (2003) *A research for Teacher Education* [In Turkish] Ankara: Eğitim-Sen.

Osgood, C.E. (1971). Exploration in semantic space: a personal diary. *Journal of Social Issues, 27,* 5–64.

Pektaş, S. (1988). *The effects of nonverbal teacher behaviours on instruction*. [In Turkish] Unpublished doctoral dissertation. Ankara University: Ankara.

Pianta, R., & Nimetz, S. L. (1993). *The student-teacher relationship scale: Results of a pilot study (research reports).* ERIC Document No: Ed.308961.

Pincus, A. L., & Gurtman, M. B. (1995). The three faces of interpersonal dependency: structural analyses of self-report dependency measures. *Journal of Personality and Social Psychology, 69*, 744-758.

Pincus, A. L., Gurtman, M. B., & Ruiz, M. A. (1998). Structural analysis of social behaviour (SASB): circumplex analysis and structural relations with the interpersonal circle and the five-factor model of personality. *Journal of Personality and Social Psychology, 74*, 1629-1645.

Pinderhughes, E. (1989). *Understanding race, ethnicity & power: the key to efficacy in clinical practice*. New York: The Free Press.

PISA (2003). *Program for International Student Assessment project second cycle 2000-2003 Report* Retrieved, April 20, 2006 from http://earged.meb.gov.tr/olcmedeg/ulsars/p%C4%B1sa/PISA2003bas%C4%B1nbildirisi.pdf.

The Province Development Performance Report 2003 (2003). Retrieved, August 10, 2006 f*rom* http://www.dpt.gov.tr/bgyu/ipg/ipg.html.

Powell, R. G., & Harville, B. (1990). The effects of teacher immediacy and clarity on instructional outcomes: an intercultural assessment. *Communication Education, 39*, 369-379.

Rakici, N. (2004). *Eight grade students' perceptions of their science learning environment and teacher interpersonal behaviour.* Unpublished master thesis. Ankara: Middle East Technical University. Ankara, Turkey.

Ramsaym, W. & Ransley, R. (1986). A method of analysis for determining dimensions of teaching style. *Teaching and Teacher Education,* 2, 69-79.

Rawnsley, D. G. (1997). *Associations between classroom learning environments, teacher interpersonal behaviour and student outcomes in Secondary Mathematics classrooms*. Unpublished doctoral dissertation. Perth: Curtin University of Technology.

Rentoul, A. J., & Fraser, B. J. (1979). 'Conceptualization of enquiry-based or open classroom learning environments'. *Journal of Curriculum Studies 11*, 233-245.

Riah, H., Fraser, B. J., & Richards, T. (1997, June). *Interpersonal teacher behaviour in chemistry classes in Brunei Darussalam's secondary schools.* Paper presented at the conference for Innovations in Science and Mathematics Curricula, Brunei.

Rickards, T. (1998). *The relationship of teacher–student interpersonal behaviour with students sex, cultural background and student outcomes.* Unpublished doctoral dissertation, Curtin University, Perth, Australia.

Rickards, T., den Brok, P., & Fisher, D. (2005). The Australian science teacher: A typology of teacher-student interpersonal behaviour in Australian science classes. *Learning Environments Research, 8*, 267-287.

Rickards, T., den Brok, P. & Fisher, D. (2003). *What does the Australian teacher look like? Australian typologies for teacher-student interpersonal behaviour.* Proceedings Western Australian Institute for Educational Research Forum 2003.

Rickards, T., & Fisher, D. L. (1997). *A report of research into student attitude and teacher student interpersonal behaviour in a large sample of Australian secondary mathematics classrooms.* Paper presented at the annual meeting of the Mathematics Education Research Group of Australia, Rotorua, New Zealand.

Rickards, T. & Fisher, D. L. (1998). *Teacher-Student Interactions in Science Classes: Differences Between the Perceptions Of Teachers and their Students.* Proceedings Western Australian Institute for Educational Research Forum 1998.

Robinson, T. (1993). The intersections of gender, class, race, and culture: On seeing clients whole. *Journal of Multicultural Counselling and Development, 21*, 50 -58.

Rodriguez, M. (1999). *The Influence of Culture on Students' Perceptions of Teachers' Communication Style.* Unpublished doctoral dissertation, George Mason University, Fairfax, Virginia, USA.

Rosenschein, B. (1970). Evaluation of classroom instruction. *Review of Educational Research, 40,*279–300.

Sanders, J. A., & Wiseman, R. L. (1990). The effects of verbal and nonverbal teacher immediacy on perceived cognitive, affective and behavioural learning in the multicultural classroom. *Communication Education, 39*, 341-353.

Samovar, L. A., & Porter, R. E. (1995). *Communication between cultures* (2nd ed.). Belmont, CA: Wadsworth Publishing Company.

Scott, R. H., & Fisher, D. L. (2000). *Validation and use of a Malay translation of an elementary school version of the QTI.* Paper presented at the 2nd International Conference on Science, Math and Technology Education, Taipei.

Segall, M. H., Dasen, P. R., Berry, J. W., & Poortinga, Y. H. (Eds.) (1990). *Human behaviour in global perspective: An introduction to cross cultural psychology.* New York: Pergamon.

Shuell, T. J. (1996). Teaching and learning in a classroom context. In D.C. Berliner, & R.C. Calfee (Eds.), *Handbook of educational psychology* (pp. 726-763). New York: MacMillan.

Shulman, L. (1986). Paradigms and research programs in the study of teaching: a contemporary perspective. In: M. C. Wittrock, (Ed.), *Handbook of research on teaching (3rd ed.)* (pp.3 -36). New York: Macmillan.

Şimşeker, M. (2005). *Eight grade students' perceptions of their mathematics teachers' interpersonal behaviours*. Unpublished master thesis. Ankara: Middle East Technical University. Ankara, Turkey.

Slater, P. E. (1962). Parental behaviour and the personality of the child. *Journal of Genetical Psychology, 101,* 53-68.

Soerjaningsih, W., Fraser, B. J., & Alldridge, J. M. (2002). *Instructor-student interpersonal behaviour and student outcomes at the university level in Indonesia.* Paper presented at the annual meeting of the American Educational Research Association, April, New Orleans.

Somers, T., Brekelmans, M., & Wubbels, Th. (1997). *Development of student teachers on the teacher-pupil relationship in the classroom*. Paper presented at the bi-annual meeting of the European Association of Research on Learning and Instruction, Athens, Greece.

Squire, K. D., MaKinster, J. G., Barnett, M., Luehmann, A. L., & Barab, S. L. (2003). Designed curriculum and local culture: Acknowledging the primacy of classroom culture. *Science Education, 87*, 468–489.

Sussman, N. M., & Rosenfeld, H. M. (1982). Influence of culture, language, and sex on conversational distance. *Journal of Personality and Social Psychology, 42*, 66 -71.

Stefani. L. A. (1997). The influence of culture on classroom communication. In L. A. Samovar & R. E. Porter (Eds.), *Intercultural communication: A reader* (8th ed.). Belmont, CA: Wadsworth Publishing Company.

Stern, G. G. (1970). *People in context: Measuring person-environment congruence in education and industry.* New York: Wiley.

Stern, G. G., Stein, M. I., & Bloom, B. S. (1956). *Methods in personality assessment.* Glencoe, IL: Free Press.

Strack, S. (1996). Special series: Interpersonal theory and the interpersonal circumplex: Timothy Leary's Legacy, *Journal of Personality Assessment*, *66,* 211-307.

Talton, E. L., & Simpson, R. D. (1987). Relationships of attitude toward classroom environment with attitudes toward and achievement in science among tenth grade biology students, *Journal of Research in Science Teaching, 24*, 507-525.

Taşkafa, G. (1989). As teachers we are evaluating our students constantly: have you ever thought how our students evaluate us? [In Turkish]. *Cagdas Egitim, 14*, 27-30.

Taylor, N.T., & Macpherson, C. M. (1992a). Developing the Standardized Test of Achivement in Science for Fiji. *Journal of Science and Mathematics Education in South East Asia, 15*, 19 -30.

Taylor, N. T., & Macpherson, C. M. (1992b). Primary science in Fiji: some reflections on activity–based lessons. *Journal of Science and Mathematics Education in South East Asia, 15*, 40- 45.

Taylor, P. C., Fraser, B. J., & Fisher, D. L. (1997). Monitoring constructivist classroom learning environments. *International Journal of Educational Research, 27*, 293-302.

Teh, G., & Fraser, B. J. (1994). An evaluation of computer-assisted learning in terms of achievement, attitudes and classroom environment. *Evaluation and Research in Education, 8*, 147-161.

Telli, S., & Cakiroglu, J., (2002). *Student's Perceptions of Learning Environment in Biology Classrooms and their Attitudes toward Biology.*(in Turkish). Poster presented at the biannual Meeting of National Science and Mathematics Education Congress, METU, Ankara, Turkey.

Telli, S., Cakiroglu, J., & den Brok, P. (2006b). *Teacher-student interpersonal relationship in general and vocational schools science classes in Turkey*. Poster presented at the annual meeting of the American Educational Research Association (AERA), San Francisco, C.A.

Telli, S., Cakiroglu, J., & den Brok, P. (2006c). Turkish secondary education students' perceptions of their classroom learning environment and their attitude towards Biology. In D. L. Fisher & M. S. Khine (Eds.), *Contemporary approaches to research on learning environments: world views* (pp. 517-542). Singapore: World Scientific.

Telli, S., den Brok, P., & Cakiroglu, J. (2005). *Perceptions of teacher interpersonal behaviour in Turkish secondary schools*. Paper presented at the bi-annual conference of the European Association for Research on Learning and Instruction (EARLI), Nicosia, Cyprus.

Telli, S., den Brok, P. , & Cakiroglu, J. (2006a). *Teacher–Student Interpersonal Behaviour in Science Classes in Turkey.* Paper presented at the annual meeting of the National Association for Research in Science Teaching (NARST), San Francisco.

Telli, S, Rakici, N., Cakiroglu, J. & (2003). *Learning Environment And Students' Attitudes Towards Biology.* Paper presented at the meeting of 4th ESERA Conference Noordwijkerhout, the Netherlands.

Ting-Toomey, S. (1999). *Communicating across cultures*. New York: The Guildford Press.

Tracey, T. J. (1994). An examination of complementarity of interpersonal behaviour. *Journal of Personality and Social Psychology, 67*, 864-878.

Tracey, T. J., & Schneider, P. L. (1995). An evaluation of the circular structure of the checklist of interpersonal transactions and the checklist of psychotherapy transactions. *Journal of Counselling Psychology, 42*, 496-507.

Triandis, H. C. (1994). *Culture and social behaviour*. New York: McGraw-Hill.

Trickett, E. J., & Moss, R. H. (1973). Social environment of junior high and high school classrooms. *Journal of Educational Psychology, 65,*93-102.

Tobin, K. (2000). Catalyzing changes in research on learning environments: Regional editor's introduction. *Learning Environments Research, 2*, 223-224.

Tobin, K., & Fraser, B. J. (1998). Qualitative and quantitative landscapes of classroom learning environments. In B. J. Fraser & K. G. Tobin (Eds.), *International handbook of science education* (1 st ed.), (pp. 623–640). Dordrecht, the Netherlands: Kluwer.

Truckenmiller, J. L., & Warner Schaie, K. (1979). Multilevel structural validation of Leary's interpersonal diagnosis system. *Journal of Consulting and Clinical Psychology, 47,* 1030-1045.

Veenman, S. (1984). Problems of beginning teachers. *Review of Educational Research, 54*, 143-178.

van Amelsvoort, J. (1999). *Perspective on instruction, motivation and self-regulation*. [In Dutch] Unpublished Doctoral Dissertation. Nijmegen: Katholieke Universiteit Nijmegen.

van Tartwijk, J. (1993). *Sketches of teacher behaviour: the interpersonal meaning of non-verbal teacher behaviour in the classroom*. [in Dutch] Utrecht: W. C. C.

van Tartwijk, J., Brekelmans, M., Wubbels, Th., Fisher, D. L., & Fraser, B. J. (1998). Students' perceptions of teacher interpersonal style: the front of the classroom as the teacher's stage. *Teaching and Teacher Education, 14*, 1-11.

Wagner, C. C., Kiesler, D. J., & Schmidt, J. A. (1995). Assessing the interpersonal transaction cycle: convergence of action and reaction interpersonal circumplex measures. *Journal of Personality and Social Psychology, 69,* 938 – 949.

Walberg, H. J. (1969). Class size and the social environmental of learning. *Human Relations, 22,* 465-475.

Walberg, H. J. (1981). A psychological theory of educational productivity. In F. Farley and N. Gordon (Eds.), *Psychology and education: The state of union* (pp.81-108). Berkeley, CA: McCutchan.

Walberg, H. J. (1984). Improving the productivity of America's schools. *Educational Leadership, 41*, 19-27.

Walberg, H. J. (1986). Synthesis of research on teaching. In M.C. Wittrock (Ed.), *Handbook of research on teaching (3rd. ed.)* (pp. 214-229). Washington, DC: American Educational Research Association.

Walberg, H. J., Fraser, B. J., & Welch, W. W. (1986). A test of a model of educational productivity among senior high school students. *Journal of Educational Research, 79*, 133 – 139.

Watzlawick, P., Beavin, J. H., & Jackson, D. (1967). *The Pragmatics of Human Communication*, New York, Norton.

Waxman, H., & Ellet, C. D. (Eds.). (1990). *Study of learning environments, Volume 6.* Perth, Western Australia: Curtin University of Technology.

Waxman, H. C., & Huang, S. L. (1998). Classroom learning environments in urban elementary, middle and high schools. *Learning Environments Research, 1*, 95-113.

Wiggins, J. S., Philips, N., & Trapnell, P. (1989). Circular reasoning about interpersonal behaviour: evidence concerning some untested assumptions underlying diagnostic classification, *Journal of Personality and Social Psychology, vol. 56*,. 296-305.

Wong, A. F. L., & Fraser, B. J. (1996). Environment – attitudes associations in the chemistry laboratory classroom. *Research in Science and Technological Education, 64,* 29 – 40.

Woolfolk, A. E., & Brooks, D. M. (1985). The influence of teachers' non - verbal behaviours on students' perceptions and performance. *The Elementary School Journal, 85*, 513 – 528.

Wootton, M. (1992). Not using your voice: non – verbal communication skills in teaching. *On your own in the classroom (series).* Institute of Education Library : University of London.

Wubbels, Th. (1985a). Cross-national study of learning environments. In B. J. Fraser (Ed.), *The Study of Learning Environments, volume 7* (pp.112-120). Perth: Curtin University of Technology.

Wubbels, Th. (1993b). Teacher-student relationships in science and mathematics classes. In B. J. Fraser (Ed.), *Research implications for science and mathematics,* (Vol. 1, Key Centre Monograph No: 5) (pp.65-73). Perth: Curtin University of Technology.

Wubbels, Th., & Brekelmans, M. (1998). The teacher factor in the social climate of the classroom. In B. J. Fraser and K. G. Tobin (Eds*.),* International Handbook of Science Education (pp.565–580). Dordrecht, the Netherlands: Kluwer.

Wubbels, Th., Brekelmans, M., den Brok, P. J., & van Tartwijk, J. (2006). *An interpersonal perspective on Classroom Management in Secondary Classrooms in the Netherlands.* Handbook of Classroom Management: Research, Practice, and Contemporary Issues, (pp. 1161-1191). New York: Lawrence Erlbaum Associates.

Wubbels, Th., Brekelmans, M., & Hermans, J. (1987b). Teacher behaviour: an important aspect of the learning environment. *The Study of Learning Environments, 3*, 10–25.

Wubbels, Th., Brekelmans, M., & Hooymayers, H. P. (1991). Interpersonal teacher behaviour in the classroom. In B. J. Fraser and H. J. Walberg (Eds.), *Educational Environments: Evaluation, Antecedents, and Consequences* (pp. 141-160). Oxford, England: Pergamon Press.

Wubbels, Th., Brekelmans, M., van Tartwijk, J., & Admiraal, W. (1997). Interpersonal relationships between teachers and students in the classroom. In H. C. Waxman and H. J. Walberg (Eds.). *New Directions For Teaching Practice And Research* (pp.151-170). Berkeley, CA: McCutchan Publishing Company.

Wubbels, Th., Créton, H. A., Brekelmans, J. M. G., and Hooymayers, H. P. (1987c). De perceptie van de leraar-leerlingrelatie; constructie en kenmerken van een instrument. [The perception of the teacher-pupil relationship; construction and characteristics of an instrument.] *Tijdschrift voor Onderwijsresearch, 12*, 3-16.

Wubbels, Th., Creton, H. A., & Hooymayers, H. P. (1985b). *Discipline problems of beginning teachers: Interactional teacher behaviour mapped out.* Paper presented at the Annual Meeting of the American Association Research Association (AERA), Chicago, IL.

Wubbels, Th., Créton, H. A., & Hooymayers, H. P. (1987a). A school-based teacher induction programme. *European Journal of Teacher Education, 10*, 81-94.

Wubbels, Th., Créton, H. A., & Hooymayers, H. P. (1992). Review of research on teacher communication styles with use of the Leary Model. *Journal of Classroom Interaction, 27*, 1-12.

Wubbels, Th., Créton, H. A., Levy J., & Hooymayers, H. P. (1993c). The Model for interpersonal teacher behaviour. In T. Wubbels & J. Levy (EDS.) *Do you know what you look like? Interpersonal Relationships in Education* (pp.13-28). London: The Falmer Press.

Wubbels, Th., & Levy, J. (1991). A comparison of interpersonal behaviour of Dutch and American teachers. *International Journal of Intercultural Relations, 15*, 1-18.

Wubbels, Th., & Levy, J. (1993a). *Do You Know What You Look Like?* London: The Falmer Press.

Yılmaz, A. (2001). Teacher- Student Interaction in the Classroom and its Effect on Learning and Social Development. [In Turkish] *Eğitim Yönetimi, 7,147-158.*

YÖK/Dünya Bankası (1998). *Cooperation of faculty and school*. [In Turkish] Ankara: YÖK.

Yuen, H. K. (1999). Communication styles of tertiary teachers. In J. James (Ed.), *Quality in teaching and learning in higher education* (pp.3-8). Hong Kong: Hong Kong Polytechnic University.

Zandvliet D. B., & Straker L. M. (2001). Physical and psychosocial aspects of the learning environment in information technology rich classrooms. *Ergonomics, 44,* 838 -857.

APPENDIX A

INSTRUMENTS OF THE STUDY[18]

62-ITEM TURKISH VERSION OF THE QTI-STUDENT FORM

Bu çalışmada **62 soru** bulunmaktadır. Cevaplarınızı lütfen her soru için ayrılan bölüme işaretleyiniz. **Lütfen bütün sorulara cevap veriniz.**Bu ölçekte ders öğretmeninizin sınıftaki davranışlarını tanımlamanız isteniyor.**Bu bir test değildir.** Öğrenmek istediğimiz sizin görüşlerinizdir.

Her cümle için sizin cevabınıza karşılık gelen sayıyı yuvarlak içine alınız. Örneğin:

	Hiçbir zaman				Her zaman
Serttir.	0	1	2	3	4

Eğer öğretmeninizin her zaman sert olduğunu düşünüyorsanız 4' ü yuvarlak içine alınız. Eğer öğretmeninizin hiç bir zaman sert olduğunu düşünmüyorsanız 0'ı yuvarlak içine alınız. Aralarda kalan görüşleriniz için 1, 2, 3'ü seçebilirsiniz. Eğer fikrinizi değiştirmek istiyorsanız üzerine çarpı işareti koyunuz ve yeni bir numara seçiniz.

Okulunuzun adı :----------

1. Sınıfınız : ❑ 9 ❑ 10 ❑ 11

2. Şube : ❑ A ❑ B ❑ C ❑ D

❑ E ❑ F ❑ G ❑ H ❑------

3. Cinsiyet : ❑ Kız ❑ Erkek

4. Doğum tarihiniz (yıl olarak): _____

5. Bu ders için ders öğretmeninizden aldığınız en son sınav notu nedir?

(100 üzerinden -örneğin 80/100) *lütfen yazınız*:_____

		Hayır	Çok Az	Fikrim Yok	Oldukça	Çok Fazla
6.	Öğretmeninizin derslerinde zevk alıyor musunuz?	0	1	2	3	4
7.	Öğretmeninizin dersini genel olarak faydalı buluyor musunuz?	0	1	2	3	4
8.	Öğretmeninin sınıfında kendinizi yeterli ve becerili hissediyor musunuz?	0	1	2	3	4
9.	Öğretmeninizin dersini ilgi çekici buluyor musunuz?	0	1	2	3	4
10.	Öğretmeninizin dersi için haftalık olarak ne kadar zaman ayırıyorsunuz? (okulda ve evde, toplam olarak)	0	1	2	3	4

[18] Bölüm A is the 62-item Turkish version of the QTI. Bölüm B is the 32- item Turkish version of the TOSRA.

11. Evde sizin ile birlikte toplam kaç kişi yaşıyor?

❑ 3 ya da daha az ❑ 4 ❑ 5 ❑ 6 ❑ 7 ya da daha fazla

12. Anne babanızla aynı evde mi yaşıyorsunuz?

❑ Sadece babamla ❑ Sadece annemle ❑ Her ikisi ile birlikte

❑ Büyükanne/büyükbaba ile birlikte ❑ Yurtta

❑ Diğer *(lütfen yazınız)*:_____

13. Hangi ülkede doğdunuz? ❑ Türkiye ❑ Diğer *(lütfen yazınız)*:

14.Eğer Türkiye doğumlu değilseniz, ne kadar zamandır Türkiye'de yaşamaktasınız?

❑ l yıldan az ❑ 1 ya da 2 yıl ❑ 3, 4 ya da 5 yıl

❑ 6 – 10 yıl ❑ 10 yıldan fazla

15. Anneniz hangi ülke doğumlu? ❑ Türkiye ❑ Diğer *(lütfen yazınız)*: _____

16. Babanız hangi ülke doğumlu? ❑ Türkiye ❑ Diğer *(lütfen yazınız)*: _____

17. Anneniz çalışıyor mu?

❑ Çalışıyor ❑ Çalışmıyor ❑ Düzenli bir işi yok

❑ Emekli ❑ Diğer *(lütfen yazınız):* _____

18. Babanız çalışıyor mu?

❑ Çalışıyor ❑ Çalışmıyor ❑ Düzenli bir işi yok

❑ Emekli ❑ Diğer *(lütfen yazınız):* _____

19. Annenizin Eğitim Durumu

❑ Hiç okula gitmemiş

❑ İlkokul

❑ Ortaokul

❑ Lise

❑ Üniversite

❑ Yüksek lisans (Mastır- Doktora)

20. Babanızın Eğitim Durumu

❑ Hiç okula gitmemiş

❑ İlkokul

❑ Ortaokul

❑ Lise

❑ Üniversite

❑ Yüksek lisans (Mastır- Doktora)

21. Evinizde yaklaşık olarak kaç tane kitap var?

❑ Bir raftan az (50 kitaptan az) ❑ Bir raf (50 kitap) ❑ İki raf

❑ Bir kitap dolabı ❑ İki kitap dolabı ❑ İki kitap dolabından fazla

22. Öğretmeninizin branşı nedir? ❑ Fizik ❑ Kimya ❑ Biyoloji

BÖLÜM A

Dersinize giren öğretmenin sınıftaki davranışlarıyla ilgili görüşleriniz:

	ÖĞRETMENİM SINIFTA.....	Hiç Bir Zaman	Çok Az	Bazen	Sıklıkla	Her Zaman
1.	İyi bir liderdir.	0	1	2	3	4
2.	Serttir.	0	1	2	3	4
3.	Kararsız görünür.	0	1	2	3	4
4.	Bizden etkilenebilir.	0	1	2	3	4
5.	Arkadaş canlısıdır.	0	1	2	3	4
6.	Bize güvenir.	0	1	2	3	4
7.	Bizim hiç bir şey bilmediğimizi düşünür.	0	1	2	3	4
8.	Bize tepeden bakar.	0	1	2	3	4
9.	Dersle ilgili konularda konuşmaktan zevk alır.	0	1	2	3	4
10.	Ondan korkarız.	0	1	2	3	4
11.	Sınıfta kuralların dışında davrandığımız zaman ne yapacağını bilemez.	0	1	2	3	4
12.	Hoşgörülüdür.	0	1	2	3	4
13.	Güvenebileceğimiz bir kişidir.	0	1	2	3	4
14.	Söyleyecek bir şeyimiz varsa, bizi dinler.	0	1	2	3	4
15.	Ona saçma bir şey sorduğumuzda bizi duymazlıktan gelir.	0	1	2	3	4
16.	Asabidir.	0	1	2	3	4
17.	Sınıftaki gergin ortamı yumuşatır.	0	1	2	3	4
18.	Dersini kesmekten çekiniriz.	0	1	2	3	4
19.	Sınıfta şaka yapmamıza izin verir.	0	1	2	3	4
20.	Şaka kaldırır.	0	1	2	3	4
21.	Sabırlıdır.	0	1	2	3	4
22.	Bizim çalışmalarımızın sonuçlarından hoşnutsuz görünür.	0	1	2	3	4

	ÖĞRETMENİM SINIFTA.....	Hiç Bir Zaman	Çok Az	Bazen	Sıklıkla	Her Zaman
23.	İğneleyicidir.	0	1	2	3	4
24.	Bize rehberlik yapar.	0	1	2	3	4
25.	Sınıfı susturur.	0	1	2	3	4
26.	Konuşurken gergindir.	0	1	2	3	4
27.	Bazen dersi keserek başka şeyler hakkında konuşur.	0	1	2	3	4
28.	Dersten herkes hoşnuttur.	0	1	2	3	4
29.	İstediğimiz takdirde yardım etmeye gönüllüdür.	0	1	2	3	4
30.	Derste kuralları bozacağımızı düşünür.	0	1	2	3	4
31.	Sabırsızdır.	0	1	2	3	4
32.	Sınıfta tüm öğrencilerin isimlerini bilir.	0	1	2	3	4
33.	Bir soru sorulduğu zaman, öğrenciler yanlış cevap vermekten korkarlar.	0	1	2	3	4
34.	Davranışları tutarsızdır.	0	1	2	3	4
35.	Dersine zorlanmadan isteyerek geliriz.	0	1	2	3	4
36.	Öğrencilerin sorularını dinler.	0	1	2	3	4
37.	Kolay tartışmaya giren birisidir.	0	1	2	3	4
38.	Sınıfta otoritesi vardır.	0	1	2	3	4
39.	Öğrencilerden çok iş yapmasını bekler.	0	1	2	3	4
40.	Düzensizdir.	0	1	2	3	4
41.	Dersinde başka derslere çalışmamız için izin verir.	0	1	2	3	4
42.	Öğrencileri cesaretlendirir.	0	1	2	3	4
43.	Öğrencileri rahatlatır.	0	1	2	3	4
44.	Öğrencilere sorularının aptalca olduğunu söyler.	0	1	2	3	4
45.	Sınıfta gergindir.	0	1	2	3	4
46.	Öğrenciler arasında saygı görür.	0	1	2	3	4
47.	Sınıfta bazı kuralları bozabiliriz.	0	1	2	3	4
48.	Dersini herkesin anladığından emindir.	0	1	2	3	4
49.	Sınıfta konuları istekli olarak anlatır.	0	1	2	3	4

	ÖĞRETMENİM SINIFTA.....	Hiç Bir Zaman	Çok Az	Bazen	Sıklıkla	Her Zaman
50.	Sınıfta bulunmaktan hoşnutsuzdur.	0	1	2	3	4
51.	Öğrencileri daha fazla çalışmaya zorlar.	0	1	2	3	4
52.	Sınıfta tutarlı davranır.	0	1	2	3	4
53.	Derse girdiğinde ayağa kalkmak zorundayız.	0	1	2	3	4
54.	Sınıfta aldığı kararlarını sürekli değiştirir.	0	1	2	3	4
55.	Yardımını istediğimizde, bizim yanımızda olduğundan eminizdir.	0	1	2	3	4
56.	Yapamadığımız ödevler için bize fazla zaman verir.	0	1	2	3	4
57.	Kendisi hakkında kişisel bir soru sormak zordur.	0	1	2	3	4
58.	Bazı konularda çok katıdır.	0	1	2	3	4
59.	Öğrencilerin sınıfta ne söylediklerini önemsemez.	0	1	2	3	4
60.	Dersi kesip davranışlarımız hakkında konuşur.	0	1	2	3	4
61.	Sınıfta verdiği sözleri tutmaz.	0	1	2	3	4
62.	Yaptığımız ödevler, projeler ve sınav sonuçlarımız hakkında şüphecidir.	0	1	2	3	4

Bölüm A' yı cevaplandırdığınız için teşekkürler. Lütfen Bölüm B' ye geçiniz.

BÖLÜM B

Fen dersleri olarak fizik, kimya ve biyoloji dersleri tanımlanmıştır. Bölüm A' da seçtiğiniz derse göre bölüm B' yi cevaplandırınız.

		Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
1.	Bazı olayların niçin olduğunun bana anlatılmasından ziyade deneylerle bulmayı tercih ederim.	0	1	2	3	4
2.	Fen dersleri eğlencelidir.	0	1	2	3	4
3.	Fen ile ilgili kulübe veya topluluğa katılmak isterim. (Doğa yürüyüşleri, Kuş gözlemciliği vb.).	0	1	2	3	4
4.	Okulu bitirdikten sonra fen ile ilgili bir alanda çalışmak istemem.	0	1	2	3	4
5.	Bilgileri öğretmenden almak, deney yaparak öğrenmekten daha iyidir.	0	1	2	3	4
6.	Fen derslerinden hoşlanmıyorum.	0	1	2	3	4
7.	Evde televizyondaki fen ile ilgili belgesel programları izlerken sıkılıyorum.	0	1	2	3	4
8.	Okuldan mezun olduğumda fen ile ilgili araştırmalar yapan insanlarla çalışmak isterim.	0	1	2	3	4
9.	Deney yaparak öğrenmeyi okuyarak öğrenmeye tercih ederim.	0	1	2	3	4
10.	Okulda haftalık ders programında daha fazla fen dersi olmalıdır.	0	1	2	3	4
11.	Okuldan mezun olduktan sonra fen laboratuarlarında çalışmak istemezdim.	0	1	2	3	4
12.	Bilgileri direk almaktansa deneyler yaparak keşfetmeyi tercih ederim.	0	1	2	3	4
13.	Fen dersleri beni sıkar.	0	1	2	3	4
14.	Tatil süresince fen ile ilgili kitaplar okumaktan hoşlanmam.	0	1	2	3	4
15.	Fen laboratuarında çalışmak geçim sağlamak için ilginç bir yol olabilir.	0	1	2	3	4
16.	Bilgileri öğretmenden almak yerine kendim deneyler yapmayı tercih ederim.	0	1	2	3	4
17.	Fen dersleri okuldaki en ilginç derslerden biridir.	0	1	2	3	4

		Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
18.	Evde fen ile ilgili deneyler yapmaktan hoşlanırım.	0	1	2	3	4
19.	Fen dersleri zaman kaybıdır.	0	1	2	3	4
20.	Okuldan sonra arkadaşlar ile fen ile ilgili konular hakkında konuşmak sıkıcıdır.	0	1	2	3	4
21.	Mezun olduktan sonra fen alanı ile ilgili eğitim almak isterim.	0	1	2	3	4
22.	Cevabın bana söylenmesindense problemi deneyler yaparak çözmeyi tercih ederim.	0	1	2	3	4
23.	Fen derslerine gitmek benim için gerçekten zevklidir.	0	1	2	3	4
24.	Ara tatillerde fen laboratuarında bir iş bulmaktan zevk alırım.	0	1	2	3	4
25.	Deneyler yaparak cevabı bulmaktansa öğretmene sormak daha iyidir.	0	1	2	3	4
26.	Fen derslerinde işlenen konular ilginç değildir.	0	1	2	3	4
27.	Radyodan fen hakkında bir şeyler dinlemek sıkıcı olabilir.	0	1	2	3	4
28.	Bir konu hakkında bilimsel dergiler okumaktansa deney yapmayı tercih ederim.	0	1	2	3	4
29.	Fen derslerini sabırsızlıkla beklerim.	0	1	2	3	4
30.	Bilimsel gerçeklerin anlatılması deneyler yapılarak sonuçların bulunmasından iyidir.	0	1	2	3	4
31.	Eğer fen dersleri olmasaydı, okul daha eğlenceli olurdu.	0	1	2	3	4
32.	Fen ile ilgili gazete makalesi okumaktan hoşlanmam.	0	1	2	3	4

YARDIMLARINIZ İÇİN TEŞEKKÜRLER.

APPENDIX B

62- ITEM TURKISH VERSION OF THE QTI -TEACHER FORM (ACTUAL & IDEAL)

ÖĞRETMEN ETKİLEŞİM ÖLÇEĞİ

Bu tutum ölçeği, sınıftaki davranışlarınızla ilgili görüşlerinizi almak için hazırlanmıştır**.** Ölçek, iki kısımdan oluşmaktadır. İlk bölümü, sizin sınıf içindeki kendi davranışlarınız ile ilgili olarak, ikinci bölümü ise sizce sınıfta olması gereken ideal davranış şeklini düşünerek cevaplandırmanız beklenmektedir. Lütfen bütün sorulara cevap veriniz. **Cevaplarınız sadece araştırma amaçlı kullanılacaktır.**

YARDIMLARINIZ İÇİN TEŞEKKÜR EDERİZ.

Size çalışma sonuçlarını ulaştırmamızı istiyorsanız, lütfen posta ya da e-mail adresinizi yazınız.

_____

_____

_____

_____

1. Okulunuzun adı: **.....**

2. Ad: **.....**

3. Soyadı: **.....**

4. Cinsiyet: ❑ K ❑ E

5. Doğum tarihi (yıl olarak) : _____

6. Doğum yeri: ❑ Türkiye ❑ Diğer*(Lütfen Yazınız)*---------

7. Hizmet yılınız:

❑ Beş yıldan az
❑ 5–10 yıl
❑ 11–15 yıl
❑ 16–20 yıl
❑ 21–25 yıl
❑ 25 yıldan fazla

8. Haftalık kaç ders saatiniz var?

❑ 15 saatten az
❑ 21–25 saat
❑ 15–20 saat
❑ 26–30 saat

9. Sınıflarınız da kaç öğrenci var?

❑ 20 öğrenciden az
❑ 30–40 öğrenci
❑ 45 öğrenciden çok
❑ 20–30 öğrenci
❑ 45 öğrenci

10. Branşınız: ❑ Fizik ❑ Kimya ❑ Biyoloji

1. BÖLÜM

İlk bölümü sizin sınıf içindeki kendi davranışlarınızla ilgili olarak cevaplandırmanız beklenmektedir. Yani, sınıf içinde kendi davranışlarınızı düşünmeniz gerekmektedir.

Lütfen aşağıdaki cümleleri dikkatlice okuyup sizin için en uygun olan seçeneği daire içine alınız.

	BEN SINIFTA.....	Hiç Bir Zaman	Çok Az	Bazen	Sıklıkla	Her Zaman
1.	İyi bir liderim.	0	1	2	3	4
2.	Serttim.	0	1	2	3	4
3.	Kararsız görünürüm.	0	1	2	3	4
4.	Öğrencilerden etkilenebilirim.	0	1	2	3	4
5.	Arkadaş canlısıyımdır.	0	1	2	3	4
6.	Öğrencilerime güvenirim.	0	1	2	3	4
7.	Öğrencilerin hiç bir şey bilmediğini düşünürüm.	0	1	2	3	4
8.	Öğrencilere tepeden bakarım.	0	1	2	3	4
9.	Dersim ile ilgili konularda zevkle konuşurum.	0	1	2	3	4
10.	Öğrenciler benden korkar.	0	1	2	3	4
11.	Öğrenciler kuralların dışında davrandığı zaman, ne yapacağımı bilemem.	0	1	2	3	4
12.	Hoşgörülüyümdür.	0	1	2	3	4
13.	Öğrencilerin güvenebileceği bir kişiyimdir.	0	1	2	3	4
14.	Öğrencilerin söyleyecek bir şeyi varsa, dinlerim.	0	1	2	3	4
15.	Öğrenciler saçma şeyler sorduklarında duymazlıktan gelirim.	0	1	2	3	4
16.	Asabiyimdir.	0	1	2	3	4
17.	Sınıftaki gergin ortamı yumuşatırım.	0	1	2	3	4
18.	Öğrenciler dersimi kesmekten çekinir.	0	1	2	3	4
19.	Öğrencilerin sınıfta şaka yapmalarına izin veririm.	0	1	2	3	4
20.	Şaka kaldırırım.	0	1	2	3	4
21.	Sabırlıyımdır.	0	1	2	3	4
22.	Öğrencilerin çalışmalarının sonuçlarından hoşnutsuz görünürüm.	0	1	2	3	4
23.	İğneleyiciyimdir.	0	1	2	3	4

	BEN SINIFTA.....	Hiç Bir Zaman	Çok Az	Bazen	Sıklıkla	Her Zaman
24.	Öğrencilere rehberlik yaparım.	0	1	2	3	4
25.	Sınıfı sustururum.	0	1	2	3	4
26.	Konuşurken gerginimdir.	0	1	2	3	4
27.	Bazen dersi keserek başka şeyler hakkında konuşurum.	0	1	2	3	4
28	Dersten herkes hoşnuttur.	0	1	2	3	4
29.	Öğrencilere istedikleri takdirde yardım etmeye gönüllüyümdür.	0	1	2	3	4
30.	Öğrencilerin derste kuralları bozacağını düşünürüm.	0	1	2	3	4
31.	Sabırsızımdır.	0	1	2	3	4
32.	Sınıfta tüm öğrencilerin isimlerini bilirim.	0	1	2	3	4
33.	Bir soru sorulduğu zaman öğrenciler bana yanlış cevap vermekten korkarlar.	0	1	2	3	4
34.	Davranışlarımda tutarsızımdır.	0	1	2	3	4
35.	Öğrenciler dersime zorlanmadan isteyerek gelir.	0	1	2	3	4
36.	Öğrencilerin sorularını dinlerim.	0	1	2	3	4
37.	Kolay tartışmaya giren birisiyimdir.	0	1	2	3	4
38.	Sınıfta otoritem vardır.	0	1	2	3	4
39.	Öğrencilerden çok iş yapmasını beklerim.	0	1	2	3	4
40.	Düzensizimdir.	0	1	2	3	4
41.	Dersimde öğrencilerin başka derslere çalışması için izin veririm.	0	1	2	3	4
42.	Öğrencileri cesaretlendiririm.	0	1	2	3	4
43.	Öğrencileri rahatlatırım.	0	1	2	3	4
44.	Öğrencilere sorularının aptalca olduğunu söylerim.	0	1	2	3	4
45.	Sınıfta gerginimdir.	0	1	2	3	4
46.	Öğrenciler arasında saygı görürüm.	0	1	2	3	4
47.	Öğrenciler sınıfta bazı kuralları bozabilir.	0	1	2	3	4
48.	Dersimi herkesin anladığından eminimdir.	0	1	2	3	4

	BEN SINIFTA.....	Hiç Bir Zaman	Çok Az	Bazen	Sıklıkla	Her Zaman
49.	Sınıfta konuları istekli olarak anlatırım.	0	1	2	3	4
50.	Sınıfta bulunmaktan hoşnutsuzumdur.	0	1	2	3	4
51.	Öğrencileri daha fazla çalışmaya zorlarım.	0	1	2	3	4
52.	Sınıfta tutarlı davranırım.	0	1	2	3	4
53.	Derse girdiğimde öğrenciler ayağa kalkmak zorundadır.	0	1	2	3	4
54.	Sınıfta aldığım kararları sürekli değiştiririm.	0	1	2	3	4
55.	Öğrenciler yardımımı istediğinde, yanlarında olduğumdan emindirler.	0	1	2	3	4
56.	Öğrencilere yapamadıkları ödevler için fazla zaman veririm.	0	1	2	3	4
57.	Bana öğrencilerin kişisel bir soru sorması zordur.	0	1	2	3	4
58.	Bazı konularda çok katıyımdır.	0	1	2	3	4
59.	Öğrencilerin sınıfta ne söylediklerini önemsemem.	0	1	2	3	4
60.	Dersi kesip davranışları hakkında konuşurum.	0	1	2	3	4
61.	Sınıfta verdiğim sözleri tutmam.	0	1	2	3	4
62.	Öğrencilerin yaptığı ödevler, projeler ve sınav sonuçları hakkında şüpheciyimdir.	0	1	2	3	4

Bölüm 1'de ki soruları cevaplandırdığınız için teşekkür ederiz.

2.BÖLÜM

İkinci kısımdaki cümlelerde ise, sizce sınıfta olması gereken ideal davranış şeklini düşünerek cevaplandırmanız beklenmektedir.Lütfen aşağıdaki cümleleri dikkatlice okuyup sizin için en uygun olan seçeneği daire içine alınız.

	İYİ BİR ÖĞRETMEN SINIFTA.....	Hiç Bir Zaman	Çok Az	Bazen	Sıklıkla	Her Zaman
1.	İyi bir lider olmalı.	0	1	2	3	4
2.	Sert olmalı.	0	1	2	3	4
3.	Kararsız görünmeli.	0	1	2	3	4
4.	Öğrencilerden etkilenebilmeli.	0	1	2	3	4
5.	Arkadaş canlısı olmalı.	0	1	2	3	4
6.	Öğrencilerine güvenmeli.	0	1	2	3	4
7.	Öğrencilerin hiç bir şey bilmediğini düşünmeli.	0	1	2	3	4
8.	Öğrencilere tepeden bakmalı.	0	1	2	3	4
9.	Dersle ilgili konularda konuşmaktan zevk almalı.	0	1	2	3	4
10.	Öğrenciler ondan korkmalı.	0	1	2	3	4
11.	Öğrenciler sınıfta kuralların dışında davrandığında zaman ne yapacağını bilememeli.	0	1	2	3	4
12.	Hoşgörülü olmalı.	0	1	2	3	4
13.	Öğrencilerin güvenebileceği bir kişi olmalı.	0	1	2	3	4
14.	Öğrencilerin söyleyecek bir şeyi varsa, onları dinlemeli.	0	1	2	3	4
15.	Öğrenciler ona saçma bir şey sorduğunda onları duymazlıktan gelmeli.	0	1	2	3	4
16.	Asabi olmalı.	0	1	2	3	4
17.	Sınıftaki gergin ortamı yumuşatmalı.	0	1	2	3	4
18.	Öğrenciler dersini kesmekten çekinmeli.	0	1	2	3	4
19.	Öğrencilerin sınıfta şaka yapmalarına izin vermeli.	0	1	2	3	4
20.	Şaka kaldırmalı.	0	1	2	3	4
21.	Sabırlı olmalı.	0	1	2	3	4
22.	Öğrencilerin çalışmalarının sonuçlarından, hoşnutsuz görünmeli.	0	1	2	3	4

	İYİ BİR ÖĞRETMEN SINIFTA.....	Hiçbir Zaman	Çok Az	Bazen	Sıklıkla	Her Zaman
23.	İğneleyici olmalı.	0	1	2	3	4
24.	Öğrencilere rehberlik yapmalı.	0	1	2	3	4
25.	Sınıfı susturmalı.	0	1	2	3	4
26.	Konuşurken gergin olmalı.	0	1	2	3	4
27.	Bazen dersi keserek başka şeyler hakkında konuşmalı.	0	1	2	3	4
28.	Dersinden herkes hoşnut olmalı.	0	1	2	3	4
29.	Öğrenciler istediği takdirde yardım etmeye gönüllü olmalı.	0	1	2	3	4
30.	Öğrencilerin derste kuralları bozacağını düşünmeli.	0	1	2	3	4
31.	Sabırsız olmalı.	0	1	2	3	4
32.	Sınıfta tüm öğrencilerin isimlerini bilmeli.	0	1	2	3	4
33.	Bir soru sorulduğu zaman, öğrenciler yanlış cevap vermekten korkmalılar.	0	1	2	3	4
34.	Davranışları tutarsız olmalı.	0	1	2	3	4
35.	Öğrenciler dersine zorlanmadan isteyerek gelmeli.	0	1	2	3	4
36.	Öğrencilerin sorularını dinlemeli.	0	1	2	3	4
37.	Kolay tartışmaya giren birisi olmalı.	0	1	2	3	4
38.	Sınıfta otoritesi olmalı.	0	1	2	3	4
39.	Öğrencilerden çok iş yapmasını beklemeli.	0	1	2	3	4
40.	Düzensiz olmalı.	0	1	2	3	4
41.	Dersinde öğrencilerin başka derslere çalışması için izin vermeli.	0	1	2	3	4
42.	Öğrencileri cesaretlendirmeli.	0	1	2	3	4
43.	Öğrencileri rahatlatmalı.	0	1	2	3	4
44.	Öğrencilere sorularının aptalca olduğunu söylemeli.	0	1	2	3	4
45.	Sınıfta gergin olmalı.	0	1	2	3	4
46.	Öğrenciler arasında saygı görmeli.	0	1	2	3	4
47.	Sınıfta bazı kuralları bozabilmeli.	0	1	2	3	4
48.	Dersini herkesin anladığından emin olmalı.	0	1	2	3	4

	İYİ BİR ÖĞRETMEN SINIFTA.....	Hiçbir Zaman	Çok Az	Bazen	Sıklıkla	Her Zaman
49.	Sınıfta konuları istekli olarak anlatmalı.	0	1	2	3	4
50.	Sınıfta bulunmaktan hoşnutsuz olmalı.	0	1	2	3	4
51.	Öğrencileri daha fazla çalışmaya zorlamalı.	0	1	2	3	4
52.	Sınıfta tutarlı davranmalı.	0	1	2	3	4
53.	Öğrenciler, öğretmen derse girdiğinde ayağa kalkmalı.	0	1	2	3	4
54.	Sınıfta aldığı kararlarını sürekli değiştirmeli.	0	1	2	3	4
55.	Öğrenciler yardımını istediğinde, onun yanlarında olduğundan emin olmalı.	0	1	2	3	4
56.	Öğrencilere yapamadığı ödevler için fazla zaman vermeli.	0	1	2	3	4
57.	Kendisi hakkında kişisel bir soru sormak zor olmalı.	0	1	2	3	4
58.	Bazı konularda çok katı olmalı.	0	1	2	3	4
59.	Öğrencilerin sınıfta ne söylediklerini önemsememeli.	0	1	2	3	4
60.	Dersi kesip öğrencilerin davranışları hakkında konuşmalı.	0	1	2	3	4
61.	Sınıfta verdiği sözleri tutmamalı.	0	1	2	3	4
62.	Öğrencilerin yaptığı ödevler, projeler ve sınav sonuçları hakkında şüpheci olmalı.	0	1	2	3	4

YARDIMLARINIZ İÇİN TEŞEKKÜRLER.

APPENDIX C

A SAMPLE REPORT GIVEN TO TEACHERS FOR EACH OF THEIR PARTICIPATING CLASSES

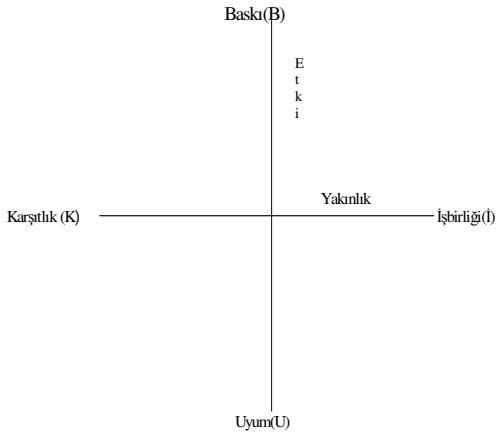
ÖĞRETMEN ETKİLEŞİM ÖLÇEĞİ RAPORU

Hatırlayacağınız üzere siz ve öğrencileriniz 69 sorudan[19] oluşan sınıf etkileşimi hakkında bir anket cevaplandırmıştınız. Bu rapor, sizin her bir sınıfınızın ve sizin cevaplarınızın sonuçlarını içermektedir.

Siz ve öğrenciler 69 soruyu 0 ve 4 aralığında puan vererek değerlendirdiniz. Sonuçlarda puanlar 0- 4 aralığında artıkça, daha belirgin şekilde veya daha sık olarak öğrencileriniz bu sorudaki davranışı yaptığınıza inandığını göstermektedir.

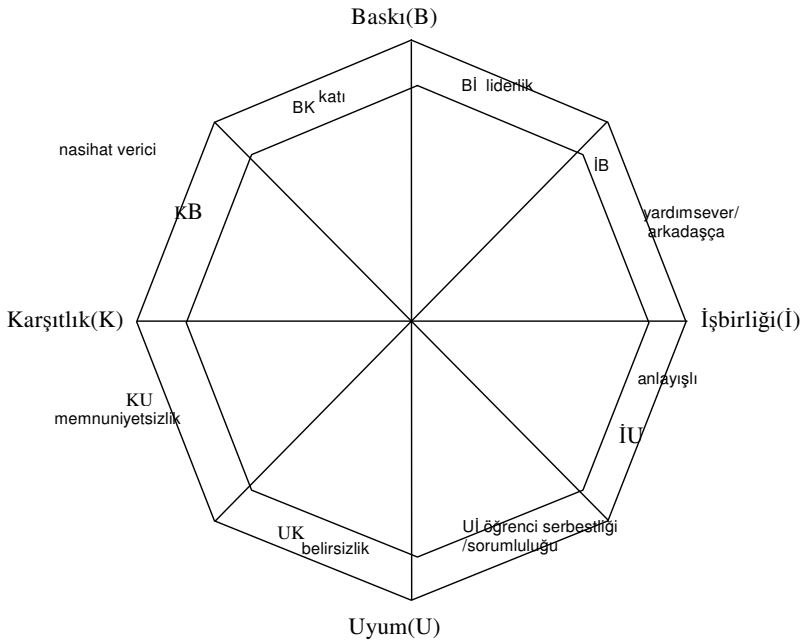
Aşağıdaki şemada öğretmen ve öğrencilerin davranışlarının birbirini nasıl etkilediği gösterilmektedir. Aynı zamanda bu şekil 69 sorununda kısa bir özeti durumundadır.

Öğretmen davranışlarını şema ile gösterebilmek için iki boyut kullanılmıştır. Baskı-Uyum (Etki) ve İşbirliği-Karşıtlık (Yakınlık). İki boyut aşağıdaki şekildedir.



[19] This report was given at the end of the 69-item QTI pilot study and the name of the teacher was kept anonymous here. Later, 7 items were deleted and the report consisted of 62 items after that moment.

Bu iki boyut, sekiz parçaya bölünerek aşağıdaki grafik şeklinde tekrar düzenlenmiştir.



Şekilden de görüldüğü üzere, her bir bölüme Bİ, İB vb. şeklinde grafikteki yerlerine göre isimler verilmiştir. Örneğin, Bİ Liderlik bölümünde, Baskı (B) ve İşbirliği (İ) özelliklerinin her ikisinin de liderlikte bulunmasına rağmen, Baskı (B) yönü İşbirliği (İ) yönünden daha öncelikli gelmektedir. İB, ya da Yardımcı – Arkadaşça bölümünde; işbirliği yönü baskı yönünden daha öncelikli gelen davranışı içermektedir.

Her bölümdeki davranışların bazı genel özelikleri aşağıda verilmiştir.

LİDERLİK (Bİ)	Organizasyon yapar, yön verir, ödevlere karar verir, yöntemi belirler, sınıfta neler olduğundan haberdardır, sınıf ortamını kurar, hedefleri net açıklar, öğrencilerin dikkatini toplar.
YARDIMCI-ARKADAŞÇA (İB)	Yardım eder, ilgilidir, merak eder, şaka yapabilir, öğrenciye güven ve sorumluluk verir.
ANLAYIŞLI (İU)	İlgili ile dinler, güven verir, önemi vurgular, onaylayıcıdır, sabırlıdır, açıktır, farklılıkları bulmak için yollar araştırır.

ÖĞRENCİ SORUMLULUĞU-SERBESTLİK (Uİ)	Bağımsız çalışmalar için izin verir, şefkatlidir, öğrencilerin kendi kavrama güçlerinde dersi takip etmesine izin verir, öğrenciler sınıfta yerlerine oturuncaya kadar bekler, öğrenci aktivitelerini kabul eder.
BELİRSİZLİK(UK)	Kararsız davranır, özür diler, "bekle ve gör" tutumundadır, çekingendir.
HOŞNUTSUZ(KU)	Beğenmez, tenkit eder, soruları ciddidir, mutsuz gözükür, ya da morali bozuktur, kritik eder.
NASİHAT VERİCİ(KB)	Sinirlenir, alaycı ve iğneleyici ifadeleri vardır, sinirli olduğunu belli eder, yasak koyar, ceza verir, azarlar, nasihat verir
KATI(BK)	Katı bir yönetim ve yol takip eder, kontrol eder, yargılar, sessizlik ister, kuralları koyar, zor testler verir.

Şekilde verilen ve yukarıda tanımlanan sekiz bölüm arasında **sınırlar kesin değildir** ve komşu bölümler birbirlerinin alanlarını aynı zamanda kısmen kaplamaktadır yani çakışmaktadırlar. Örneğin, "Arkadaş canlısıdır. " şeklindeki bir davranış hem anlayış hem de Yardımcı- Arkadaşça bölümlerinin özelliklerini içermektedir. Öte yandan birbirlerine karşıt bölümler karşıt davranışları tanımlamaktadır. Örneğin öğrenci Sorumluluğu – Serbestlik ile Katı bölümü karşı karşıyadır.

Öğretmenlerin her boyutla ilgili kabul edilebilir davranışları vardır. Yani öğretmen için Hoşnutsuz, Belirsiz ya da Nasihat Verici veya herhangi bir bölümde gruplandırılabilecek davranışı bulunmaktadır. Görülen o dur ki, her öğretmen her bölümde davranışlar gösterebilmektedir ve her bölüm ile ilgili puanları bulunmaktadır.

Bu rapor aşağıdaki sıraya göre düzenlenmiştir.

1.	Madde Puanları (Sınıf/lar)
	a. Öğrenci Cevapları
	b. Sizin Cevaplarınız
	c. Sizin İdealiniz
2.	Bölüm Puanları (Her sınıf için)
	a. Sizin İdealinizin davranışları
	b. Sizin Cevaplarınız
	c. Öğrenci Cevapları
3.	Karşılaştırma profilleriniz

Sizin ve öğrencilerinizin puanları her bir bölüm ve bu bölüme ait maddeler şeklinde verilmiştir. Her bölüm 7, 8 ya da 9 madde içermektedir ve her maddenin yanında üç puan vardır. Bunlar sırası ile sizin öğrencileriniz, siz ve sizin idealinizdir. Örnek olarak aşağıda Liderlik bölümünden sorular ve değerlendirmeleri verilmiştir:

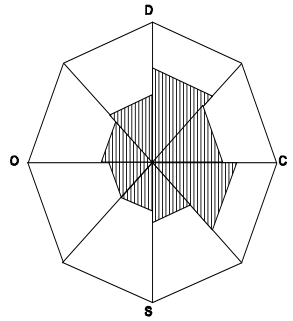
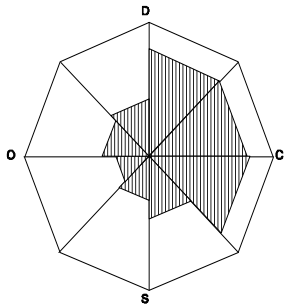
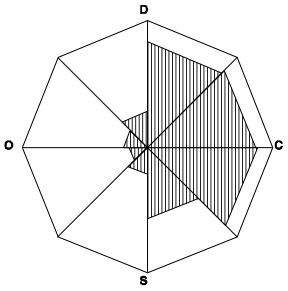
		Sizin Sınıfınız	**Siz**	**Sizin İdealiniz**
Bölüm: **(Bİ) LİDERLİK** (8 Madde)		3.1	3.5	3.4
1.	İyi bir liderdir.	3.4	3.2	3.0
9.	Dersle ilgili konularda konuşmaktan zevk alır.	3.1	3.8	3.0
17.	Sınıftaki gergin ortamı yumuşatır.	2.8	3.5	4.0

Puanlama 0'den 4'e doğrudur. Bu, ölçekte hiçbir zaman (0)- Her zaman (4) ve ara değerler şeklinde düzenlenmiştir. Öğrencilerin ve sizin puanlarınızda daha yüksek puan daha çok bu davranışın gösterildiği anlamına gelmektedir. Hemen sizin puanlarınız ve öğrencilerin puanları arasındaki fark dikkatinizi çekecektir. Yukarıdaki örnekte Madde 1 için; sınıf puanı 3.4 ve sizin puanınız 3.2 şeklinde gösterilmiştir. Madde 17' de, fark daha fazla ve dikkat çekicidir. Sınıf puanı 2.8, sizin puanınız 3.5 ve ideal 4.0'tür. Genel olarak puanlar arasındaki **fark 0.5 ve daha fazla** ise bu noktaya dikkat etmeniz gerekmektedir. Ancak bu kısımlar herhangi bir doğru veya yanlış değerlendirmesini göstermemektedir, sadece algılardaki farklılıklara dikkat çekmektedir.

Tüm puanlar aynı zamanda grafik şeklinde de verilmiştir. Grafikler sınıf, sizin ve ideal için ayrı ayrı gösterilmiştir.

Yardımlarınız için teşekkürler.

Sekiz kişilerarası davranış tipinin grafik ile gösterimi ve özelikleri[20] , [21]

Kişilerarası davranış tipi	Sınıf ortamı
 **1. Emir verici**	Emir verici profilli bir öğretmenin sınıfında, sınıf ortamı çok düzenli ve ödev merkezlidir. Bu öğretmen verimli organizasyonlar yapar ve tüm dersleri normal olarak zamanında tamamlar. Sınıf tartışmalarını yönlendirir ve kontrol eder. Buna ek olarak çoğunlukla öğrencinin ilgisini de toplar. Ara sıra öğrencilerine yakın ve anlayışlı olmasına rağmen, çoğunlukla gerçek anlamda bir yakınlık yoktur. Yüksek standartları vardır ve talep edici görünür. Genel olarak olaylar öğretmenin çalışmak zorunda olduğu bir iş ortamında gerçekleşiyor şeklindedir. Zaman zaman öğrencileri burada bulundukları ve çalışmak zorunda oldukları konusunda uyarır ve kızar. Öğrencilerin yanlışları ve dikkatsizlikleri konusunda hemen ikaz eder. Bundan sonra normal olarak öğrenciler hemen toparlanır.
 **2.Otoriter**	Otoriter sınıf atmosferi çok düzenli, hoş ve ödev merkezlidir. Kurallar ve yapılacak işler nettir ve öğrencileri bu konuda uyarmak gerekmez. Emsal olarak alınabilecek Emir Verici öğretmene göre, sınıfta daha dikkatlidir ve genel olarak daha verimli ve üreticidir. Otoriter öğretmen öğrenci ihtiyaçlarına ve taleplerine daha açık ve duyarlıdır. Öğrenciler ile bireysel olarak ilgilenir ve bunu derste de hissettirir. Ders anlatım metodu olarak, düz anlatım şekli en çok kullandığı metot olmasına rağmen sık sık diğer teknikleri de kullanır. Dersleri iyi ve mantık örgüsüne göre planlanmıştır.
 **3.Toleranslı/ Otoriter**	Toleranslı- Otoriter öğretmen, sınıfta öğrenci serbestliğini ve sorumluluğunu destekleyen bir yapı oluşturur. Öğrencinin olumlu cevap verdiği farklı pek çok metodu sınıfta kullanır. Genellikle derslerini küçük çalışma grupları şeklinde organize eder. Sınıf ortamı ikinci sırada verilen Otoriter öğretmenin sınıf ortamına benzemesine rağmen, Toleranslı- Otoriter öğretmen öğrencileri ile daha yakın ilişkiler geliştirir. Sınıf dersten hoşnuttur ve büyük oranda derse katılır. Öğretmen ve öğrenciler ara sıra gülerken görülebilir ve kuralları uygulamak için bir zorlama yoktur. Öğretmen dersin akışını bozan ufak çaplı hareketleri önemsemez ve ağırlıklı olarak derse dikkat toplamaya çalışır. Öğrenciler kendileri hedeflerine ulaşmak için çalışırlar ve öğretmen öğretim hedeflerine çok az veya hiç şikâyetsiz ulaşır.

[20] Model'de ki sekiz boyut ve sekiz öğretmen tipinde ki sayı benzerliği arasında bağlantı yoktur.

[21] Brekelmans, M., Levy, J., and Rodriguez, R. (1993), A typology of teacher communication style. In T. Wubbels & J. Levy (Eds.), *Do you know what you look like?* (pp.46-55).

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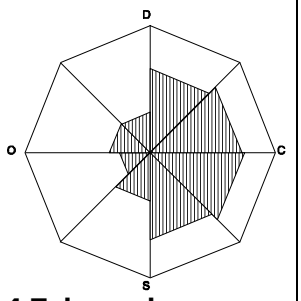
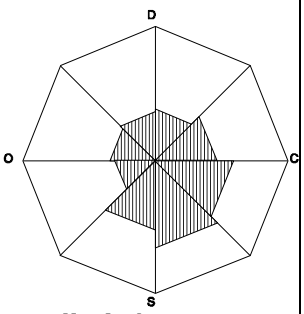
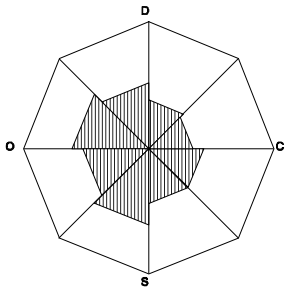
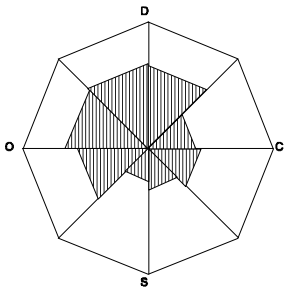
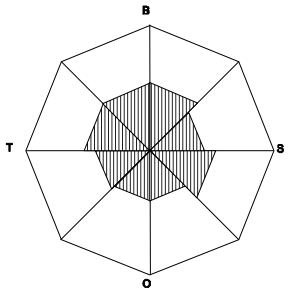
 **4.Toleranslı**	Amerika' da ve Hollanda da yapılan çalışmalarda varılan sonuçlara göre; her iki ülkenin toleranslı öğretmen tanımlamasında fark vardır. *Hollanda da varılan sonuçlara göre*: Bu öğretmen tipinin sınıf ortamı hoş, öğrenciyi destekleyici ve öğrencilerin derse katılmaktan hoşnut kaldığı bir atmosferi vardır. Öğrenciler, Toleranslı- Otoriter öğretmenin sınıfına oranla daha fazla serbestliğe sahiptir ve ders anlatım şeklini ve içeriğini etkileyebilme güçleri vardır. Öğrenciler, öğretmenin kişisel yeteneklerini, konu ve öğretim metotları ile birleştirebilmesine; aynı zamanda öğretmenin derse kişisel katılımını farkındadır ve takdir etmektedir. Genellikle sınıfta herkes kendi halindedir ve sınıf atmosferini bozacak çok az şey olur. *Bundan farklı olarak Amerika'da varılan sonuçlara göre:* Toleranslı öğretmen iyi organize olamayan kişi olarak algılanmaktadır. Dersleri iyi hazırlanmamıştır ve öğrenciler ile çatışma durumuna sık gelir, onlara meydan okur. Genelde dersine bir açıklama ile başlar ve daha sonra öğrencileri ödevlerini yapmaları için serbest bırakır. Öğretmen, öğrencilerin özel hayatları ile ilgili olmasına rağmen, akademik beklentileri net değildir.
 **5.Belirsiz/ Toleranslı**	Belirsiz- Toleranslı öğretmen üst seviyede paylaşımcı ve işbirlikçidir. Ancak sınıfta fazla liderlik karakteri gösteremez. Dersleri yapı ve içerik olarak zayıftır, konuyu tam olarak açıklamaz ve çoğunlukla tamamlamaz. Sınıftaki düzensizliği genelde tolere eder ve pek ödev vermez. Belirsiz- Toleranslı öğretmen derse odaklanmıştır ve konuyu dinlemeyen öğrencilere tekrar tekrar anlatma meylindedir. Sınıf ortamı düzensizdir genelde öndeki öğrenciler dersi takip etmelerine rağmen, diğerleri ödevlerini tamamlamakta ya da başka işlerle uğraşmaktadır. Bu öğrenciler sınıfta pek ses yapmamakta, öğretmen onları görmezlikten gelmekte ve bu esnada konuyu yüksek sesle ve hızlı bir şekilde geçmektedir. Öğretmenin sınıfında kurallar keyfi uygulanır ve öğrenciler kuralları bozduklarında karşılaşacakları davranışları kestiremezler. Öğretmenin yanlış davranışları durdurmak için çabası ve sınıf üzerinde etkisi de azdır. Derse katılmamaya bazen birden tepki vermesine rağmen bazen tamamıyla görmezlikten gelir. Sınıf performansı beklentileri uzun vade yerine kısa vadeli ve en alt düzeydedir. Genel olarak öğretmen ve öğrencilerin kendi yollarını izledikleri verimsiz bir denge görüntüsü vardır.

Continued

 **6. Belirsiz/ Gergin**	Bu sınıf ortamının en belirgin özelliği gergin bir düzensizliktir. Öğretmen ve öğrenci birbirlerini karşıt olarak görürler ve karşılıklı olarak fikir ayrılığı olan konularda birbirleriyle atışarak geçirirler. Öğrenci ortamda düzensizlik oluşturacak her fırsatı değerlendirme çabasındadır. Sürekli konuyu keserek, gülerek veya yüksek sesle konuşarak öğretmeni kışkırtmak meylindedir. Bu davranış genelde öğretmenin panik atak şeklinde cevap vermesiyle devam eder ki bu da öğrencinin davranış bozukluğunu daha fazla arttırır. Sınıftaki bir gözlemci, öğretmenin ve öğrencinin, öğrencinin okuduğu bir kitap üstünde atıştıklarını gözlemleyebilir. Öğretmen öğrencinin dikkatini toplamaya zorlamak için kitabı alır. Öğrenci de, öğretmenin kendi eşyasını bu şekilde alamayacağını düşündüğü için karşı koyar. İki tarafta geri adım atmadığı için sonuçta olay kontrolden çıkar. Tartışmanın ortalarına doğru öğretmen birden bir kaç öğrenci üzerinde disiplini sağlar ama asıl sorumluları kaçırmıştır. Öğretmenin belirsiz ve dengesiz davranışlarından dolayı, öğrenciler öğretmenin olaydan sorumlu olduğunu düşünür. Davranış kuralları işlememiştir ya da tam olarak açıklanmamıştır. Öğretmen zamanını çoğunu sınıfı kontrol etme çabası içinde harcar ve bu arada sınıfta yeni metotları denemekte veya dersi anlatmakta isteksiz görünür. Öncelikli olarak sınıfta davranışlar üzerinde düşünmeyi yeğler. Öğrenme maalesef daha az önemlidir.
 **7.Bastırıcı/ Engelleyici**	Bu öğretmenin sınıfında öğrenci katılımcı değildir ve aşırı derecede öğretmenin kontrolü altındadır. Öğrenciler kuralları takip ederler ve öğretmenin ani ve öfkeli çıkışlarından çekinirler. Öğretmen, öğrencinin ufak tefek düzensizliklerine veya sorumsuzluklarına aşırı tepki veriyor gözükmektedir ve sık sık iğneleyici uyarılar yapay ya da düşük notlar verir. Baskılayıcı- Engelleyici öğretmen tam bir katılık örneğidir. Dersler planlı ama organize değildir. Yönlendirmeler verilirken ve geriye dönük açıklamalar yapılırken çok az soru sorulmasına izin verilir veya öğrenci çok az cesaretlendirilir. Bireysel ödevleri üzerinde çalışan öğrenciler öğretmenden genellikle çok az derecede samimi yardım alırlar. Sınıftaki aşırı kontrol edilen, hoş olmayan bir atmosfer vardır. Öğrenciler ürkek ve endişelidir. Öğretmenin açıklamaları yarışma odaklı olduğundan ve bu konu sürekli konuşulduğu için, öğrencilerin sınav endişeleri fazladır. Öğrenciler sessizce otururken; öğretmen, öğrencilerin ders ile beklentilerini bastırır gözükmektedir. Öğrenciler, öğretmeni mutsuz ve sabırsız olarak algılamaktadırlar ve sessizlikleri de fırtınadan önceki sessizliğe benzetilebilir.

Continued

 **8.Ağır can sıkıcı**	Bu öğretmenin sınıfındaki atmosferde, Belirsiz- Toleranslı (5) ve Belirsiz- Gergin (6) maddelerde verilen öğretmenlerin sınıfındaki atmosfere benzeyen bir düzensizlik içermektedir. *Farklı olan nokta*: Öğretmenin sürekli olarak sınıfı kontrol etmek için mücadele etmesidir. Çok fazla çaba sarf ederek ve Belirsiz- Toleranslı (5) ve Belirsiz- Gergin (6) maddelerde tanımlanan öğretmen profillerinden farklı olarak, bunu yapmayı başarır. Öğrenciler, öğretmen kendilerini motive etmeye çabaladığı sürece dikkatlerini toplarlar. Öğrenciler derse yoğunlaştıkları zaman, sınıf konuya odaklanmıştır. Öğretmen de sıcak yaklaşım yoktur. Öğretmen genelde dersi aynı şekilde işler; deneylere ve farklı anlatım yöntemlerine pek yer vermez. Bu öğretmenin sınıfında bir şeyler yokuş aşağı gidiyor gibidir, sınıf atmosferi ne gayretli ne yarışmacı ne de destekleyici bir hava içindedir. Öğretmen maalesef sürekli olarak sınıf yönetimini kontrol etmesine rağmen, zaman zaman patlamanın eşiğine gelmektedir, ani çıkışlar göstermektedir.

Öğretmen İçin Etkileşim Ölçeği Raporu
Boyutlara Göre

Öğretmen (Teacher) : X **Sınıf (Class) : X**

		Öğr. (St.)	Siz (Self)	Sizin idealiniz (Your Ideal)
LİDERLİK- Bölüm ortalama değeri (LEADERSHIP)- (Scale average)		.73	.78	.94
1.	İyi bir liderdir.	3.72	4.00	5.00
9.	Dersle ilgili konularda konuşmaktan zevk alır.	4.10	4.00	5.00
17.	Sınıftaki gergin ortamı yumuşatır.	3.48	4.00	4.00
25.	Bize rehberlik yapar.	3.41	4.00	5.00
33.	Sınıfta tüm öğrencilerin isimlerini bilir.	3.10	4.00	4.00
41.	Sınıfta otoritesi vardır.	4.38	5.00	5.00
49.	Öğrenciler arasında saygı görür.	4.21	4.00	5.00
57.	Sınıfta tutarlı davranır.	4.48	4.00	5.00

		Öğr. (St.)	Siz (Self)	Sizin idealiniz (Your Ideal)
YARDIMCI-ARKADAŞÇA – Bölüm ortalama değeri (HELPFUL- FRIENDLY)- (Scale average)		.57	.72	.84
5.	Arkadaş canlısıdır.	3.69	4.00	4.00
13.	Güvenebileceğimiz bir kişidir.	3.76	4.00	5.00
21.	Şaka kaldırır.	2.90	4.00	4.00
29.	Dersten herkes hoşnuttur.	2.69	4.00	5.00
37.	Dersine zorlanmadan isteyerek geliriz.	2.90	4.00	5.00
45.	Öğrencileri cesaretlendirir.	3.38	4.00	5.00
53.	Dersini herkesin anladığından emindir.	3.17	3.00	2.00
61.	Yardımı istediğimizde, bizim yanımızda olduğundan eminiz.	3.48	4.00	5.00

Continued

		Öğr. (St.)	Siz (Self)	Sizin idealiniz (Your Ideal)
ANLAYIŞLI - Bölüm ortalama değeri (UNDERSTANDING)- (Scale average)		.70	.75	.84
6.	Bize güvenir.	3.69	4.00	4.00
14.	Söyleyecek bir şeyimiz varsa, bizi dinler.	4.14	5.00	5.00
22.	Sabırlıdır.	3.90	4.00	5.00
30.	İstediğimiz takdirde yardım etmeye gönüllüdür.	4.10	4.00	5.00
38.	Öğrencilerin sorularını dinler.	4.14	5.00	5.00
46.	Öğrencileri rahatlatır.	3.21	4.00	4.00
54.	Sınıfta konuları istekli olarak anlatır.	4.41	4.00	5.00
62.	Yapamadıgımız ödevler icin bize fazla zaman verir.	2.59	2.00	2.00

		Öğr. (St.)	Siz (Self)	Sizin idealiniz (Your Ideal)
ÖĞRENCİ SORUMLULUĞU VE SERBESTLİK- Bölüm ortalama değeri (STUDENT RESPONSIBILITY- FREEDOM)- (Scale average)		.41	.46	.38
4.	Bizden etkilenebilir.	2.07	3.00	3.00
12.	Hoşgörülüdür.	3.93	4.00	5.00
20.	Sınıfta şaka yapmamıza izin verir	3.03	3.00	3.00
28.	Bazen dersi keserek başka şeyler hakkında konuşur.	3.00	3.00	2.00
44.	Dersinde başka derslere çalışmamız için izin verir.	1.90	2.00	1.00
52.	Sınıfta bazı kuralları bozabiliriz.	1.76	2.00	1.00

Continued

		Öğr. (St.)	Siz (Self)	Sizin idealiniz (Your Ideal)
BELİRSİZLİK - Bölüm ortalama değeri UNCERTAIN)- (Scale average)		.11	.07	.29
3.	Kararsız görünür.	1.59	2.00	1.00
11.	Sınıfta kuralların dışında davrandığımız zaman ne yapacağını bilemez.	1.62	1.00	5.00
27.	Konuşurken gergindir.	1.45	1.00	1.00
35.	Davranışları tutarsızdır.	1.28	1.00	1.00
43.	Düzensizdir.	1.28	1.00	1.00
59.	Sınıfta aldığı kararlarını sürekli değiştirir.	1.41	2.00	1.00
68.	Sınıfta verdiği sözleri tutmaz.	1.41	1.00	5.00

		Öğr. (St.)	Siz (Self)	Sizin idealiniz (Your Ideal)
HOŞNUTSUZ-Bölüm ortalama değeri (DISSATISFIED)- (Scale average)		.21	.28	.17
7.	Bizim hiç bir şey bilmediğimizi düşünür.	1.31	2.00	1.00
15.	Ona saçma bir şey sorduğumuzda bizi duymazlıktan gelir.	2.21	3.00	2.00
23.	Bizim çalışmalarımızın sonuçlarından hoşnutsuz görünür.	2.21	2.00	1.00
31.	Derste kuralları bozacağımızı düşünür.	1.86	2.00	3.00
47.	Öğrencilere sorularının aptalca olduğunu söyler.	1.14	1.00	1.00
55.	Sınıfta bulunmaktan hoşnutsuzdur.	1.45	2.00	1.00
63.	Kendisi hakkında; kişisel bir soru sormak zordur.	2.79	3.00	3.00
66.	Öğrencilerin sınıfta ne söylediklerini önemsemez.	1.59	2.00	1.00
69.	Yaptığımız ödevler,projeler ve sınav sonuçlarımız hakkında şüphecidir.	1.83	2.00	2.00

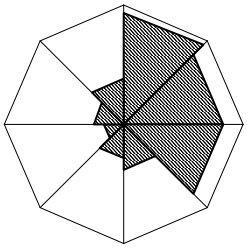
Continued

		Öğr. (St.)	Siz (Self)	Sizin idealiniz (Your Ideal)
NASİHAT VERİCİ –Bölüm ortalama değeri (ADMONISHING)- (Scale average)		.28	.31	.25
8.	Bize tepeden bakar.	1.38	1.00	1.00
16.	Asabidir.	1.93	2.00	1.00
24.	İğneleyicidir.	2.79	3.00	3.00
32.	Sabırsızdır.	1.62	2.00	1.00
40.	Kolay tartışmaya giren birisidir.	2.31	3.00	3.00
48.	Sınıfta gergindir.	1.72	1.00	1.00
56.	Öğrencileri daha fazla çalışmaya zorlar.	2.38	3.00	3.00
67.	Dersi kesip davranışlarımız hakkında konuşur.	2.66	3.00	3.00

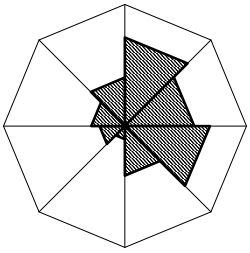
		Öğr. (St.)	Siz (Self)	Sizin idealiniz (Your Ideal)
KATI –Bölüm ortalama değeri (STRICT)- (Scale average)		.40	.56	.38
2.	Serttir.	2.55	3.00	3.00
10.	Ondan korkarız.	1.97	3.00	2.00
18.	Dersini kesmekten çekiniriz.	2.69	4.00	2.00
26.	Sınıfı susturur.	4.21	5.00	5.00
34.	Bir soru sorulduğu zaman,öğrenciler yanlış cevap vermekten korkarlar.	2.03	1.00	1.00
42.	Öğrencilerden çok iş yapmasını bekler.	2.59	4.00	3.00
50.	Sınıfta bağırır.	1.86	3.00	1.00
65.	Bazı konularda çok katıdır.	2.62	3.00	3.00

Note= Öğr: Öğrenciler, St.= Students

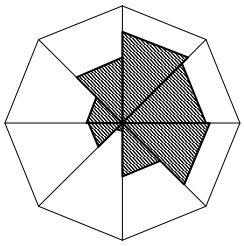
Continued



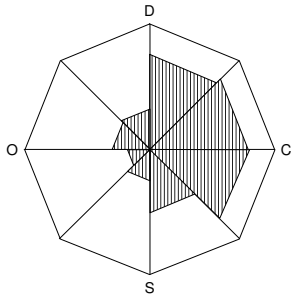
Sizin İdealiniz



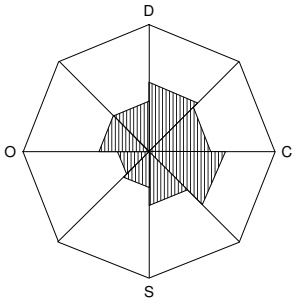
Öğrencilerinizin algıları
(öğrenci algıları)



Sizin kişisel algınız



İdeal öğretmen profili
(öğrencilere göre)



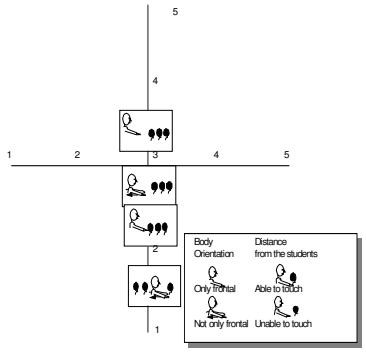
Ortalama öğretmen
(öğrencilere göre)

APPENDIX D

Table D

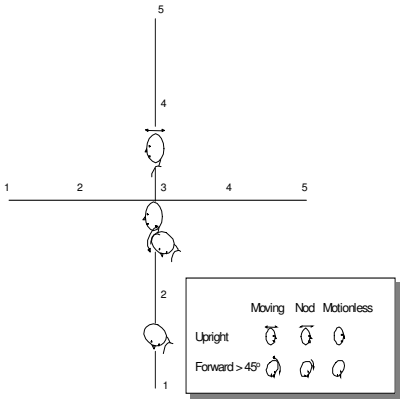
Five Channels of Nonverbal Behaviour and the Dimensions of the Model for Interpersonal Teacher Behaviour (MITB) (From van Tartwijk, 1993)

1-Space: Interpersonal Perspective on the Use of Space



A body-orientation that is frontal to the majority of the students during the entire fragment turned out to be strongly related to a perception of teacher behaviour as dominant. The other major aspect of spatial behaviour for the rating of teacher behaviour on the Influence (DS) scale was the distance to the nearest student. Being able to touch one or more students was related to a perception of teacher behaviour as relatively submissive.

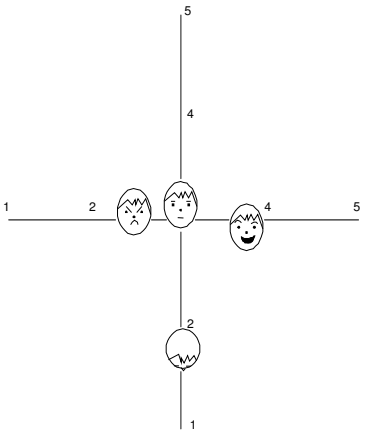
2 – Body*:* Interpersonal Perspective on Body Position and Movement



Differences in head position and movement proved to be the major aspects of body movement and position for the rating of teacher behaviour on the Influence (DS) rating scale.
We found that fragments in which the teacher has an upright head position and moves his or her head around, for instance when scanning the class, were rated as relatively dominant. This behaviour is depicted in drawing A. A head position that indicates the teacher is not looking at the students, as in drawing D, was scored often in fragments showing teacher behaviour that was rated as relatively submissive.

Table D Continued

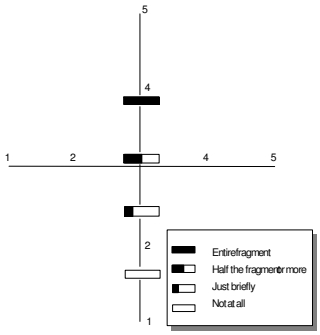
3 – Face: Interpersonal Perspective on Facial Expression



For the Influence (DS) ratings, the visibility of the face for the students was the most important factor. Not surprising if compared with the importance of an upright head position for a rating as relatively dominant.
The most important facial expression for the Proximity (CO) ratings was laughing, neutral or angry facial expressions.

4- Visual Behaviour: Interpersonal

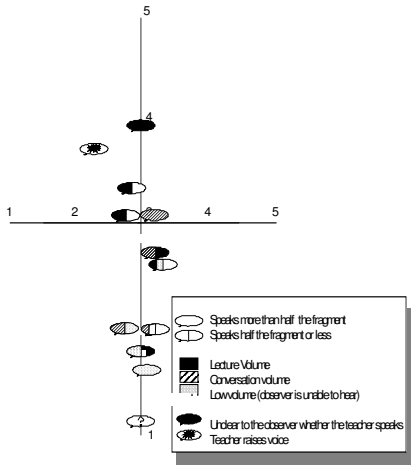
Perspective on Visual Behaviour



The graph shows that the more the teacher looks at the students, the more he or she is perceived as dominant.

Table D Continued

5 – Voice: Interpersonal Perspective on the Use of Voice



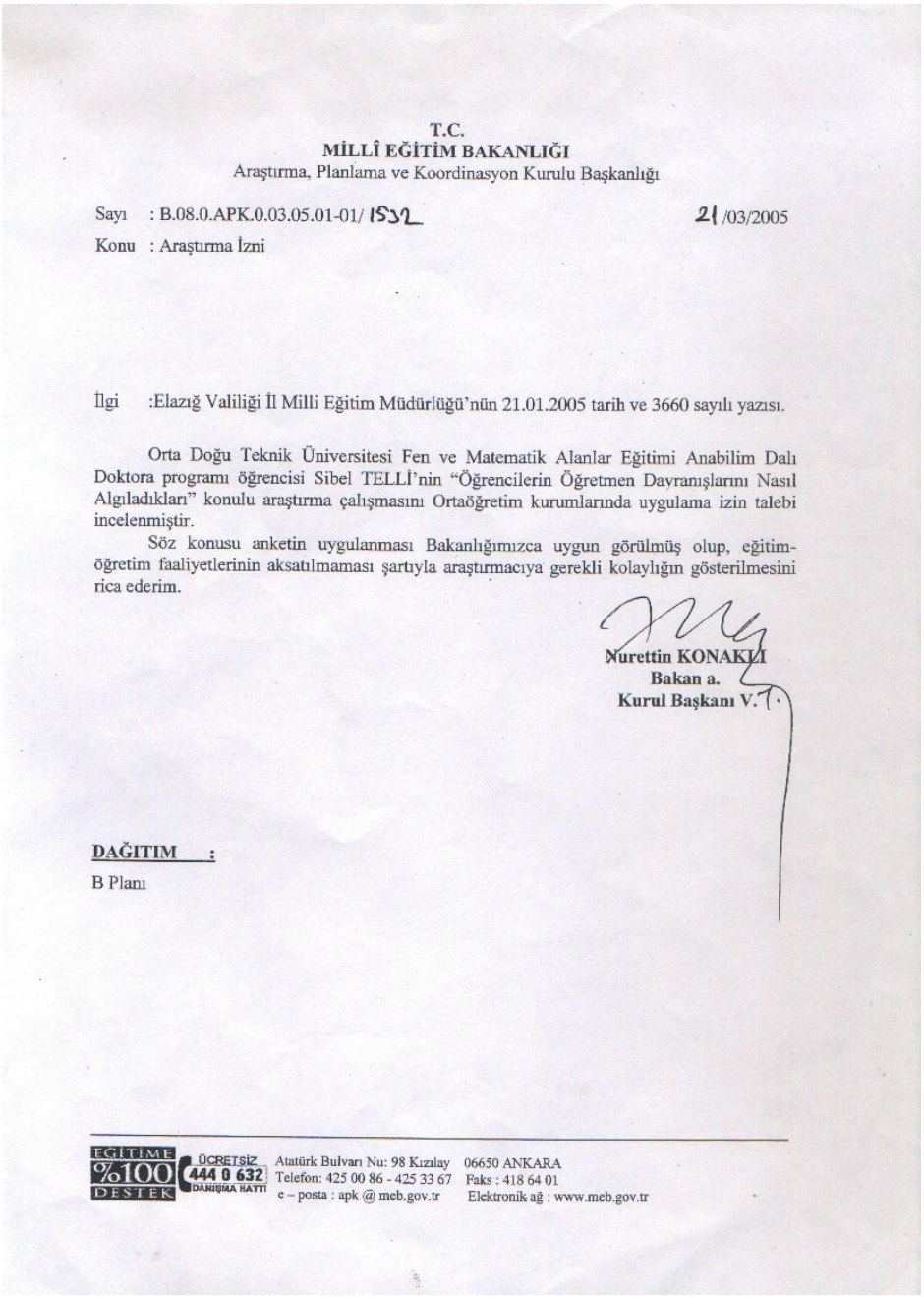
The relation between the Voice channel and the Influence (DS) ratings seems to be that the longer the teacher speaks using a lecturing volume, the more he or she is perceived as dominant and the longer the teacher speaks in such a way that he or she can not be heard by the observer, the more the teacher's behaviour is perceived as submissive.

For the Proximity (CO) ratings, whether the teacher raises his or her Voice (drawing B versus the other drawings) is the most important distinctive feature.

APPENDIX E

OFFICIAL PERMISSION

LETTER



T.C.
MİLLÎ EĞİTİM BAKANLIĞI
Araştırma, Planlama ve Koordinasyon Kurulu Başkanlığı

Sayı : B.08.0.APK.0.03.05.01-01/ 1532 21 /03/2005
Konu : Araştırma İzni

İlgi :Elazığ Valiliği İl Milli Eğitim Müdürlüğü'nün 21.01.2005 tarih ve 3660 sayılı yazısı.

Orta Doğu Teknik Üniversitesi Fen ve Matematik Alanlar Eğitimi Anabilim Dalı Doktora programı öğrencisi Sibel TELLİ'nin "Öğrencilerin Öğretmen Davranışlarını Nasıl Algıladıkları" konulu araştırma çalışmasını Ortaöğretim kurumlarında uygulama izin talebi incelenmiştir.

Söz konusu anketin uygulanması Bakanlığımızca uygun görülmüş olup, eğitim-öğretim faaliyetlerinin aksatılmaması şartıyla araştırmacıya gerekli kolaylığın gösterilmesini rica ederim.

Nurettin KONAKLI
Bakan a.
Kurul Başkanı V.

DAĞITIM :
B Planı

EĞİTİME %100 DESTEK ÜCRETSİZ 444 0 632 DANIŞMA HATTI
Atatürk Bulvarı Nu: 98 Kızılay 06650 ANKARA
Telefon: 425 00 86 - 425 33 67 Faks : 418 64 01
e – posta : apk @ meb.gov.tr Elektronik ağ : www.meb.gov.tr

APPENDIX F

INSTRUCTION GUIDE OF THE STUDY FOR THE SCHOOL MANAGEMENT

UYGULAMA YÖNERGESİ-I

Değerli İdarecim,

Bu çalışmaya yaptığınız özverili katkılardan dolayı teşekkür ederiz.

Çalışma ile ilgili önerileriniz ve sorularınız için yönerge sonunda verilen adres ve telefondan çalışma grubuna ulaşabilirsiniz.

GENEL AÇIKLAMALAR:

1. Size gönderilen zarftaki anketler bir okul içindir.

2. He okulda **bir fizik, bir kimya ve bir biyoloji öğretmeninin** çalışmaya katılması düşünülmüştür. Yani bir okuldan **3 (üç) öğretmen** ve **bu öğretmenlerin derse girdiği 6 (altı) sınıf** ile çalışmanın yapılması hedeflenmiştir.

<table>
<tr><th>Sınıf sayısı</th><th>Ders</th><th>ÖNEMLİ AÇIKLAMA</th></tr>
<tr><td>1. nolu sınıf</td><td>Fizik</td><td rowspan="2">1. nolu sınıf ve 2. nolu sınıfın öğrencileri AYRI, Fizik öğretmenleri AYNI olması gerekli.</td></tr>
<tr><td>2. nolu sınıf</td><td>Fizik</td></tr>
<tr><td>3. nolu sınıf</td><td>Kimya</td><td rowspan="2">3. nolu sınıf ve 4. nolu sınıfın öğrencileri AYRI, kimya öğretmenleri AYNI olması gerekli.</td></tr>
<tr><td>4. nolu sınıf</td><td>Kimya</td></tr>
<tr><td>5. nolu sınıf</td><td>Biyoloji</td><td rowspan="2">5. nolu sınıf ve 6. nolu sınıfın öğrencileri AYRI, biyoloji öğretmenleri AYNI olması gerekli.</td></tr>
<tr><td>6. nolu sınıf</td><td>Biyoloji</td></tr>
<tr><td colspan="3">Bu dersleri alan 9- 10., ve 11. sınıflarda uygulama yapılabilir.</td></tr>
</table>

3. Okulda bu dersleri alan 9.- 10. ve 11 sınıflarda **toplam 6 (altı) farklı sınıf yoksa,** bir sınıf, iki farklı ders ve iki farklı öğretmen için soruları cevaplandırabilir.

UYGULAMAYA BAŞLAMA:

1. Üzerinde branşlar (fizik, kimya, biyoloji) yazılı kargo zarflarını uygulamaya katılmak isteyen öğretmenlere veriniz.

2. Öğretmenler uygulamayı kendi belirledikleri iki sınıf da başlatabilirler.

UYGULAMAYI SONLANDIRMA:

1. Lütfen ölçeklerin **30 Mayıs. 2005** tarihine kadar araştırmacıya ulaşacak şekilde geri dönmesine yardımcı olunuz.

YARDIMLARINIZ İÇİN TEŞEKKÜRLER.

İletişim bilgileri :

Sibel TELLİ

ADRES:

Tel:

e-posta:

Faks:

APPENDIX G

INSTRUCTION GUIDE OF THE STUDY FOR TEACHER

UYGULAMA YÖNERGESİ-II

Değerli meslektaşım;

Bu çalışmaya yaptığınız özverili katkılardan dolayı teşekkür ederiz.

Çalışma ile ilgili önerileriniz ve sorularınız için yönerge sonunda verilen adres ve telefondan çalışma grubuna ulaşabilirisiniz.

GENEL AÇIKLAMALAR:

1. Size gönderilen zarftaki anketler iki kısımdan oluşmaktadır.

Öğrencilerin dolduracakları anketler:

a. Her sınıf için 30 adet ölçek ve cevap anahtarı olarak düzenlenmiştir. Çalışmanın değerlendirmesi açısından, uygulamaya katılan her öğretmenin **en az iki sınıfında** uygulamanın yapılması gerekmektedir. Bu neden ile size iki sınıfınız için toplam 60 adet ölçek ve cevap anahtarı gönderilmiştir.

b. Öğrenci anketlerinde ilk kısımda, öğrencilerin fen öğretmenlerinden (fizik, kimya, biyoloji) seçilen ve derslerine giren **bir öğretmenin** sınıftaki davranışlarını tanımlamaları istenen 62 cümle bulunmaktadır. İkinci kısımda, **ilk kısımda seçilen derse göre** cevaplandırılması gereken 32 cümle bulunmaktadır. Lütfen bu konuyu öğrencilerinize hatırlatmayı unutmayınız.

- Öğrenci sayısı 30'dan fazla olduğu durumlarda yedek olarak gönderilen ölçekleri ve cevap anahtarlarını kullanınız.
- Bu çalışma 9.- 10. ve 11. sınıflarda uygulanabilir. Seçilen iki sınıfında aynı seviyede olması şart değildir. Örneğin çalışmayı iki 9. veya iki 10. sınıfınızda uygulayabileceğiniz gibi; bir sınıfınızı 9. diğer sınıfınızı 11. sınıftan seçebilirisiniz.

Öğretmenin dolduracağı anketler:

1. Öğretmenin dolduracağı anket iki bölümden oluşmaktadır. Birinci bölümdeki cümleleri sizin sınıf içindeki davranışlarınız ile ilgili olarak cevaplandırmanız beklenmektedir. Yani sınıf içinde kendi davranışlarınızı düşünmeniz gerekmektedir. İkinci bölümdeki cümlelerde ise, sizce sınıfta olması gereken ideal davranış şeklini düşünerek cevaplandırmanız gerekmektedir.

2. **Sınıftaki öğrencilerin tamamının uygulamaya katılması, sonuçların doğru değerlendirilmesi açısından gereklidir.** Bu sebepten çeşitli nedenlerle uygulamaya katılamayan öğrencilerin anketi doldurmasını sağlamanız; çalışmanın değerlendirilmesi açısından önemlidir.
3. Lütfen **hiç bir soruyu boş bırakmayınız** ve öğrencileri de bu konuda uyarınız.
4. Bunun bir sınav veya test olmadığını öğrencilerinize hatırlatınız.
5. Çalışmanın değerlendirilmesi açısından öğrencilerin birbirinden etkilenmeden cevaplandırmalarının önemli olduğunu sınıfta belirtiniz.
6. Uygulama süresi en fazla bir ders saati (45 dakika) olarak hesaplanmıştır.
7. Öğrencileriniz ve siz soruları cevaplandırırken, her cümle için cevabınıza karşılık gelen sayıyı yuvarlak içine alınız. Örneğin:

	Hiçbir zaman				Her zaman
Serttir.	0	1	2	3	4

Eğer öğretmeninizin her zaman sert olduğunu düşünüyorsanız yada siz kendinizin her zaman sert olduğunuzu düşünüyorsanız 4' ü yuvarlak içine alınız. Eğer öğretmeninizin hiç bir zaman sert olduğunu düşünmüyorsanız(veya kendinizin) 0'ı yuvarlak içine alınız. Aralarda kalan görüşleriniz için 1, 2, 3'ü seçebilir.. Eğer fikrinizi değiştirmek istiyorsanız üzerine çarpı işareti koyunuz ve yeni bir numara seçiniz.

Cevaplar net olacak şekilde herhangi bir kalem ile size uygun maddeyi işaretleyebilirisiniz**.**

UYGULAMAYA BAŞLAMA:

1. **Lütfen Unutmayınız!**

"GENEL AÇIKLAMALAR" kısmını lütfen dikkatlice okuyunuz.

2. Uygulamaya başlamadan önce öğrencilere gerekli uyarıları mutlaka yapınız.

3. Öğrencilere soruları cevaplandırırken **ders öğretmeni, ders ve SINIF ORTAMINA göre soruları cevaplandıracaklarını MUTLAKA hatırlatınız.**

UYGULAMAYI SONLANDIRMA:

1. Tüm öğrencilerden eksiksiz olarak ölçekleri geri alınız.

2. Size gönderilen sayı ile karşılaştırarak eksik olup olmadığını kontrol ediniz.

3. Eksik yoksa lütfen **30 Mayıs 2005** tarihine kadar alıcıya ulaşacak şekilde size gönderilen kargonun içinde, üzerinde adres bilgileri olan ikinci kargo poşetini kullanarak gönderiniz.

4. Gönderirken, **alıcı ödemeli** (**ödemeyi karşı taraf yapacak) şekilde kargo** ile gönderiniz.

YARDIMLARINIZ İÇİN TEŞEKKÜRLER.

İletişim bilgileri:

Sibel TELLİ

ADRES:

Tel:

e-posta:

Faks:

APPENDIX H

Table H

64-Item American Version of the QTI and Deleted Items in the Turkish Version

		Items removed for			Remaining items
		1	2	3	
1.	This teacher is strict.				X
2.	We have to be silent in this teacher' s class.		X	X	
3.	This teacher talks enthusiastically about his/her subject.				X
4.	This teacher trusts us.				X
5.	This teacher is concerned when we have not understood him/her.	X	X		
6.	If we do not agree with him we can talk about it.			X	
7.	This threatens to punish us.				X
8.	We can decide some things in this teacher's class.	X	X	X	
9.	This teacher is demanding.		X		
10.	This teacher thinks we cheat.			X	
11.	This teacher is willing to explain things again.				X
12.	This teacher thinks we do not know anything.				X
13.	If we want something this teacher is willing to cooperate.				X
14.	This teacher's tests are hard.	X	X		
15.	This teacher helps us with our work.			X	
16.	This teacher gets angry unexpectedly.			X	
17.	If we have something to say this teacher will listen.				X
18.	This teacher sympathizes with us.				X

Table H Continued

19.	This teacher tries to make us look foolish.				X
20.	This teacher's standards are very high.		X	X	
21.	We can influence this teacher.				X
22.	We need this teacher's permission before we speak.		X	X	
23.	This teacher seems uncertain.				X
24.	This teacher looks down on us.				X
25.	We have the opportunity to choose assignments which most interesting to us.	X	X	X	
26.	This teacher is unhappy.			X	
27.	This teacher lets us fool around in class.		X	X	
28.	This teacher puts us down.				X
29.	This teacher takes personal interest in us.	X			
30.	This teacher thinks we can not do things well.		X	X	
31.	This teacher explains things clearly.		X		
32.	This teacher realizes when we do not understand.			X	
33.	This teacher lets us get away with a lot in class.				
34.	This teacher is hesitant.	X			
35.	This teacher is friendly.				X
36.	We learn a lot from this teacher.		X		
37.	This teacher is someone we can depend on.				X
38.	This teacher gets angry quickly.				X
39.	This teacher acts as if s/he does not know what to do.				X
40.	This teacher holds our attention.		X		
41.	This teacher is too quick to correct us when we break a rule.				X

Table H Continued

42.	This teacher lets us boss her/him around.	X		X	
43.	This teacher is inpatient.				X
44.	This teacher is not sure what to do when we fool her/him around.				X
45.	This teacher knows everything that goes on in the classroom.	X			
46.	It is easy to make a fool out of her/him.		X		
47.	This teacher has a sense of humour.			X	
48.	This teacher allows us a lot of choice in what we study.				X
49.	This teacher gives us a lot of free time in class.		X	X	
50.	This teacher can take a joke.				X
51.	This teacher has a bad temper.				X
52.	This teacher is a good leader.				X
53.	If we do not finish our homework we are scared to go to this teacher's class.		X		
54.	This teacher seems dissatisfied.				X
55.	This teacher is timid.				X
56.	This teacher is patient.				X
57.	This teacher is severe when marking papers.				X
58.	This teacher is suspicious.				X
59.	It is easy to pick a fight with this teacher.				X
60.	This teacher's class is pleasant.				X
61.	We are afraid of her/him.				X
62.	This teacher acts confidently.			X	
63.	This teacher is sarcastic.				X
64.	This teacher is lenient.				X

Note: 1= Missing data, 2= Low eta squared, 3= Low reliability or validity

APPENDIX I

Table I 62-Item Turkish Version of the QTI (Bilingual Form)

Item No	Item No[22]	Item
1.	QTI 52	İyi bir liderdir. *This teacher is a good leader.*
2.	QTI 1	Serttir. *This teacher is strict.*
3.	QTI 23	Kararsız görünür. *This teacher seems uncertain.*
4.	QTI 21	Bizden etkilenebilir. *We can influence this teacher.*
5.	QTI 35	Arkadaş canlısıdır. *This teacher is friendly.*
6.	QTI 4	Bize güvenir. *This teacher trusst us.*
7.	QTI 12	Bizim hiç bir şey bilmediğimizi düşünür. *This teacher thinks we do not know anything.*
8.	QTI 24	Bize tepeden bakar. *This teacher looks down on us.*
9.	QTI 3	Dersle ilgili konularda konuşmaktan zevk alır. *This teacher talks enthusiastically about her/his subject.*
10.	QTI 61	Ondan korkarız. *We are afraid of this teacher.*
11.	QTI 39	Sınıfta kuralların dışında davrandığımız zaman ne yapacağını bilemez. *This teacher does not know what to do when we break a rule.*
12.	QTI 64	Hoşgörülüdür. *This teacher is flexible.*
13.	QTI 37	Güvenebileceğimiz bir kişidir. *This teacher is someone we can depend on*

[22]These are the item numbers from the 64-item American version that remained at the end of the statistical analysis. The rest was added or changed.

Table I Continued

14.	QTI 17	Söyleyecek bir şeyimiz varsa, bizi dinler. *If we have something to say, this teacher will listen.*
15.	QTI 28	Ona saçma bir şey sorduğumuzda bizi duymazlıktan gelir. *This teacher makes us feel we have asked him/her a stupid question.*
16.	QTI 51	Asabidir. *This teacher has a bad temper.*
17.		Sınıftaki gergin ortamı yumuşatır. *This teacher softens tense atmosphere in class.*
18.		Dersini kesmekten cekiniriz. *We are afraid to disturb the lesson of this teacher.*
19.		Sınıfta şaka yapmamıza izin verir. *This teacher lets us make jokes in the classroom.*
20.	QTI 50	Şaka kaldırır. *This teacher can take a joke.*
21.	QTI 56	Sabırlıdır. *This teacher is patient.*
22.	QTI 54	Bizim çalışmalarımızın sonuçlarından hoşnutsuz görünür. *This teacher seems dissatisfied.*
23.	QTI 63	İğneleyicidir. *This teacher makes mean remarks to us.*
24.		Bize rehberlik yapar. *This teacher guides us.*
25.		Sınıfı susturur. *This teacher keeps the class silent.*
26.		Konuşurken gergindir. *This teacher is nervous when s/he talks.* *(This teacher is nervous).*
27.		Bazen dersi keserek başka şeyler hakkında konuşur. *This teacher stops the lesson to talk about other things.*
28.	QTI 60	Dersten herkes hoşnuttur. *This teacher's class is pleasant.*
29.	QTI 13	İstediğimiz takdirde yardım etmeye gönüllüdür. *If we want something he is willing to cooperate.*

Table I Continued

30.	QTI 58	Derste kuralları bozacağımızı düşünür. *This teacher believes/thinks we want to break the rules.*
31.	QTI 43	Sabırsızdır. *This teacher is impatient.*
32.		Sınıfta tüm öğrencilerin isimlerini bilir. *This teacher exactly knows the names of all students.*
33.		Bir soru sorulduğu zaman öğrenciler yanlış cevap vermekten korkar. *When a question is asked, students are afraid to give him/her the wrong answer.*
34.		Davranışları tutarsızdır. *This teacher behaviour is inconsistent.*
35.		Dersine zorlanmadan isteyerek geliriz. *We feel welcome in this class.*
36.		Öğrencilerin sorunlarını dinler. *This teacher listens to our question.*
37.	QTI 59	Kolay tartışmaya giren birisidir. *It is easy to pick up a fight with this teacher.*
38.		Sınıfta otoritesi vardır. *This teacher has authority in the classroom.*
39.		Öğrencilerden çok iş yapmasını bekler. *This teacher wants students to do much work.*
40.		Düzensizdir. *This teacher is disorganised.*
41.		Dersinde başka derslere çalışmamız için izin verir. *This teacher lets us study other subjects in his/her class time.*
42.		Öğrencileri cesaretlendirir. *This teacher encourages students.*
43.		Öğrencileri rahatlatır. *This teacher relaxes us.*
44		Öğrencilere sorularının aptalca olduğunu söyler. *This teacher tells us our questions are stupid.*

Table I Continued

45.		Sınıfta gergindir. *This teacher is tense in class.*
46.		Öğrenciler arasında saygı görür. *Students behave respectfully toward this teacher.*
47.		Sınıfta bazı kuralları bozabiliriz. *We are allowed to break some rules in this teacher's class.*
48.		Dersini herkesin anladığından emindir. *This teacher explains things willing to the class.*
49.		Sınıfta konuları istekli olarak anlatır. *This teacher explains things willingly to the class.*
50.		Sınıfta bulunmaktan hoşnutsuzdur. *This teacher is displeased to be in the classroom.*
51.		Öğrencileri daha fazla çalışmaya zorlar. *This teacher forces students to study more.*
52.		Sınıfta tutarlı davranır. *This teacher behaviour is consistent in the classroom.*
53.		Derse girdiğinde ayağa kalmak zorundayız**.** *We have to stand up when the teachers enters the classroom.*
54.		Sınıfta aldığı kararlarını sürekli değiştirir. *This teacher keeps changing his/her decisions.*
55.		Yardımı istediğimizde, bizim yanımızda olduğundan eminiz. *When we ask for his/ her help; we are sure s/he is with us.*
56.		Yapamadığımız ödevler için bize fazla zaman verir. *This teacher gives us extra time for the homework that we can not complete on time.*
57.		Kendisi hakkında kişisel bir soru sormak zordur. *It is difficult to ask this teacher a personal question.*
58.		Bazı konularda çok katıdır. *This teacher is very tight on things.*
59.		Öğrencilerin sınıfta ne söylediklerini önemsemez. *This teacher ignores what we say in class.*

Table I Continued

60.		Dersi kesip davranışlarımız hakkında konuşur. *This teacher stops the lesson to discuss our behaviour.*
61.		Sınıfta verdiği sözleri tutmaz. *This teacher breaks his/her promises in the classroom.*
62.		Yaptığımız ödevler, projeler ve sınav sonuçlarımız hakkında şüphecidir. *S/he is suspicious about our work (like homework, projects or exam results).*

APPENDIX J

Table J
Item Distribution for the 62- item Turkish Version of the Questionnaire on Teacher Interaction (QTI)

	SCALE	TOTAL ITEM	ITEMS
DC-	Leadership	8	1,9, 17, 24, 32, 38, 46, 52
CD-	Helpful / Friendly	8	5, 13, 20, 28, 35, 42, 48, 55
CS-	Understanding	8	6, 14, 21, 29, 36, 43, 49, 56
SC-	Student Responsibility/ Freedom	6	4, 12, 19, 27, 41, 47
SO-	Uncertain	7	3, 11, 26, 34, 40, 54, 61
OS-	Dissatisfied	9	7, 15, 22, 30, 44, 50, 57, 59, 62
OD-	Admonishing	8	8, 16, 23, 31, 37, 45, 51, 60
DO-	Strict	8	2, 10, 18, 25, 33, 39, 53, 58

Items are scored from never (0), very few (1), sometimes (2), often (3) and always (4). To make a profile item scores are added.

APPENDIX K

TEACHER INTERVIEW FORM – (QTI-DEVELOPMENT STEP 2)

Öğretmen Görüşme Formu Uyarlama Çalışmaları İçin

Ad Soyadı *(Name Surname)*		Branş *(Subject Matter Area)*	
Hizmet Yılı *(Years in Profession)*		Görüşme Tarihi *(Interview Date)*	

A) Aşağıdaki sözcüklerle ilgili bulduğunuz örnekleri, davranışları yazınız.

(Please give examples of teacher behaviour that relate to the following words).

- LİDERLİK *(LEADERSHIP)*:
- YARDIMCI- ARKADAŞÇA *(HELPFUL/FRIENDLY):*
- ANLAYIŞLI OLMAK *(UNDERSTANDING)*:
- ÖĞRENCİ SORUMLULUĞU/SELBESTLİK *(STUDENT FREEDOM):*
- BELİRSİZLİK *(UNCERTAIN)*:
- MEMNUNİYETSİZLİK *(DISSATISFIED):*
- NASİHAT VERİCİ *(ADMONISHING)*:
- KATI *(STRICT):*

B) Lütfen öğrencilerinizin aşağıdaki sözcüklerle tanımlayabileceği davranışlara, örnek veriniz.

(Please give examples of teacher behaviour that your students can relate to for the following words.)

- LİDERLİK *(LEADERSHIP)*:
- YARDIMCI- ARKADAŞÇA *(HELPFUL/FRIENDLY):*
- ANLAYIŞLI OLMAK *(UNDERSTANDING)*:
- ÖĞRENCİ SORUMLULUĞU /SELBESTLİK (*STUDENT FREEDOM):*
- BELİRSİZLİK *(UNCERTAIN)*:

- MEMNUNİYETSİZLİK *(DISSATISFIED):*
- NASİHAT VERİCİ *(ADMONISHING)*:
- KATI *(STRICT):*

C) Sınıfa gelen bir ziyaretçinin aşağıdaki sözcüklerle tanımlayabileceği davranışlara örnek veriniz.

(Please give examples that a visitor in your classroom can relate to for the following words).

- LİDERLİK *(LEADERSHIP)*:
- YARDIMCI- ARKADAŞÇA *(HELPFUL/FRIENDLY):*
- ANLAYIŞLI OLMAK *(UNDERSTANDING)*:
- ÖĞRENCİ SORUMLULUĞU /SELBESTLİK *(STUDENT FREEDOM):*
- BELİRSİZLİK *(UNCERTAIN)*:
- MEMNUNİYETSİZLİK *(DISSATISFIED):*
- NASİHAT VERİCİ *(ADMONISHING)*:
- KATI *(STRICT):*

D) Öğretmen olarak eğer öğrenciniz dersinizi keserse veya konu ile ilgilenmezse ne yaparsınız?
(What do you do (as teacher) when students interrupt the lesson or do not pay attention?)

E) Eğer öğrencileriniz sınıfta evlerinde gibiymiş gibi davranmaya başlarlarsa öğretmen olarak ne yaparsınız?
(What do you do (as teacher) to make students feel at home in your class?)

F) Öğretmen olarak öğrencilerin hakkında, onların geçmişleri ile ilgili olarak ya da problemleri hakkında bilgi edinmek için ne /neler yapıyorsunuz?
(What do you do (as teacher) to learn about the students, their backgrounds, their problems, etc?)

G) Öğretmen olarak sınıf üzerinde kontrolünüzü ve sınıf faaliyetlerinde hâkimiyetinizi kontrol etmek için öğretmen olarak ne yapıyorsunuz?
(What do you do (as teacher) to make sure you have control over classroom activities?)

APPENDIX L

TEACHER INTERVIEW FORM – (QTI-DEVELOPMENT STEP 5)
(Teachers' Interview Form when the Teacher Reports were given them).

Ad Soyadı *(Name Surname)*		Branş *(Subject Matter Area)*	
Hizmet Yılı *(Years in Profession)*		Görüşme Tarihi *(Interview Date)*	

1. Öğrencileriniz sizin ile ilgili bir anket doldururken öğretmen olarak kendinizi nasıl hissettiniz?
   (How did you feel as a teacher while your students were answering a questionnaire about you?)

2. Kişisel beklentileriniz ile sonuçlar arasında benzerlik var mı?
   (Do you think your personal expectations have consistency with the results of study?

3. Siz ve öğrencileriniz arasında hangi boyutlarda farklı algılara sahipsiniz?
   (In which scales are your perceptions and your students' different?)

4. Sizce bu farklılıklar hangi sebeplerden kaynaklanıyor olabilir?
   (What might be the cause of these differences from your point of view?)

5. İki sınıfınızın sonuçlarını karşılatırdığınızda sizce farklılıklar var mı? Bu fark/farklılıklar nerede ve neden kaynaklanıyor olabilir?
(Are there differences in the results of your two classes? If yes, in which scales? What might be the cause of these differences?)

6. Sizce öğrenciler böyle bir çalışmaya katılırken öğretmenleri ile aynı hassasiyeti ve dikkati gösteriyorlar mı?
(Do you think students have empathy for their teachers towards such a study?)

7. Bu şekilde rapor verilmesini öğretmenin mesleki gelişimi açışından nasıl değerlendiriyorsunuz?
(How would you evaluate this report for the professional development of a teacher?)

8. Öğretmen bu şekilde bir çalışma sonucunda edindiği izlenimleri sınıf ortamına yansıtabilir mi?
(Do you think a teacher can relate his/her results to the classroom atmosphere after this study?)

9. Bu rapor ve çalışma ile ilgili görüşleriniz nelerdir?
(What is your personal idea about the report and the study?)

10. Sizin çalışmada veya ölçekte dikkatinizi çeken noktalar nelerdir?
(Is there any point that drewn your attention particularly in the report or in the study?)

APPENDIX M

STUDENT INTERVIW FORM (QTI DEVELOPMENT STEP 2)

(

Ad Soyadı *(Name, Surname)*		Sınıfı *(Grade)*	
Görüşme Tarihi *(Interview Date)*			

A) Öğretmeninizin aşağıdaki sözcüklerle tanımlayabileceği davranışlara, örnek veriniz.

(Please give examples that can be defined by following words from your teachers.)

- LİDERLİK *(LEADERSHIP)*:
- YARDIMCI- ARKADAŞÇA *(HELPFUL/FRIENDLY):*
- ANLAYIŞLI OLMAK *(UNDERSTANDING)*:
- ÖĞRENCİ SORUMLULUĞU /SELBESTLİK *(STUDENT FREEDOM):*
- BELİRSİZLİK *(UNCERTAIN)*:
- MEMNUNİYETSİZLİK *(DISSATISFIED):*
- NASİHAT VERİCİ *(ADMONISHING)*:
- KATI *(STRICT):*

B) Aşağıdaki sorulara cevap veriniz. (Please answer the following questions.)

1. Öğretmenler sınıfta ne/neler yapıyor?

(What do teachers do in the classroom? Give examples.)

2. Sınıfta öğretmenlerin davranışlarına örnek veriniz.

(Please give examples for your teacher's behaviour in the classroom.)

3. Öğretmenler size kişisel olarak nasıl davranıyorlar?
(How do your teachers behave to you personally?)

4. Beğendiğiniz davranışlar nelerdir? Neden?
(What are the things of a teacher that you like? Why ?)

5. Beğenmediğiniz davranışlar nelerdir? Neden?
(What are the things of a teacher that you dislike? Why ?)

6. Şu ana kadar karşılaştığınız en iyi öğretmeniniz hakkında böyle düşünmenize sağlayan neden/nedenler nedir?
(Who is your best teacher you have had so far? Please support your answer with examples).

7. Şu ana kadar karşılaştığınız en kötü öğretmeniniz hakkında böyle düşünmenize sağlayan neden/nedenler nedir?
(Who is your worst teacher you have had so far? Please support your answer with examples.)

8. Öğretmenler hakkında duyduğunuz ve size ilginç gelen olaylar var mı? Örnek veriniz.
(What are the interesting stories about teachers you have heard? Please give examples.)

APPENDIX N

OUTCOMES OF THE ITEM ANALYSES FOR THE 3rd PILOT STUDY

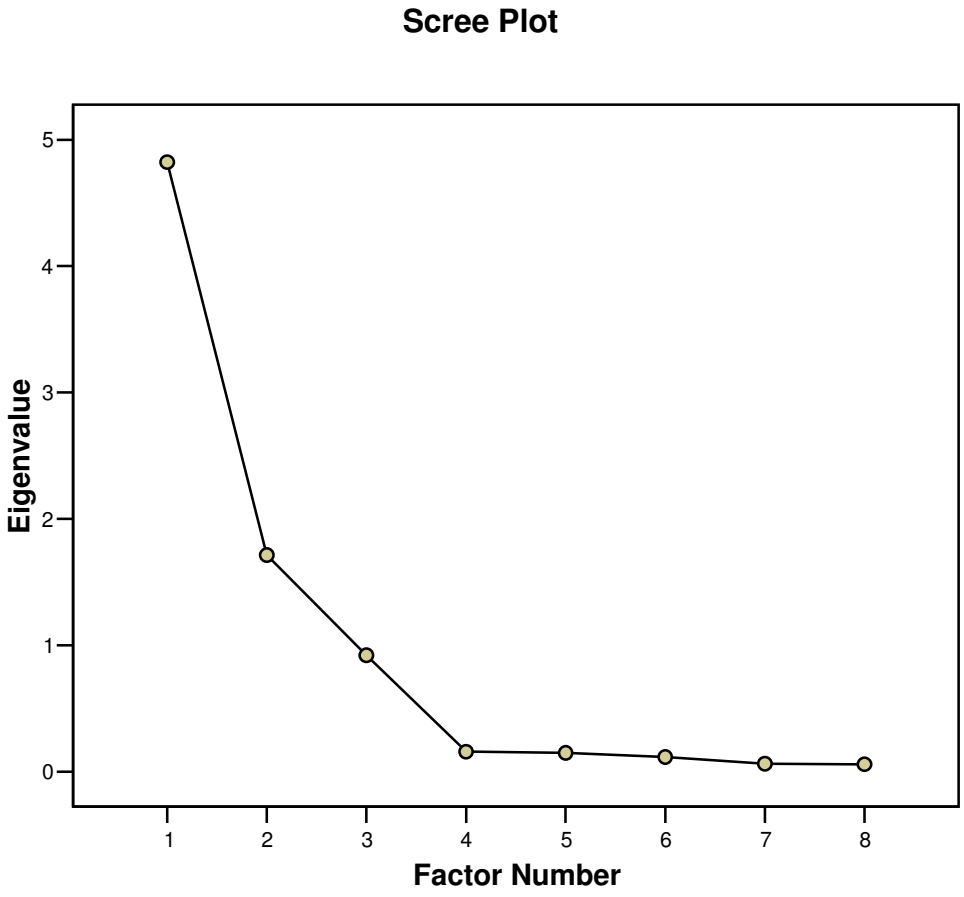
Questions	Intra-class correlation	Standard deviation
v1	.19	.50
v2	.29	.54
v3	.25	.51
v4	.11	.35
v5	.31	.70
v6	.23	.61
v7	.13	.38
v8	.07	.28
v9	.12	.35
v10	.11	.34
v11	.13	.38
v12	.26	.54
v13	.22	.57
v14	.20	.50
v15	.20	.59
v16	.16	.42
v17	.27	.64
v18	.19	.57
v19 *	.18	.62
v20	.28	.66
v21	.30	.70
v22	.12	.39
v23	.18	.55
v24	.20	.59
v25	.27	.67
v26	.18	.48
v27	.11	.35
v28	.14	.43
v29	.39	.86
v30	.16	.44
v31	.17	.51
v32	.08	.32
v33	.37	.81
v34	.14	.50
v35	.18	.47
v36	.24	.65
v37	.28	.73
v38	.16	.45
v39	.11	.31
v40	.16	.50
v41	.19	.52
v42	.18	.53
v43	.100	.33
v44	.40	.82
v45	.27	.68
v46	.26	.71

v47	.12	.38
v48	.12	.37
v49	.25	.59
v50	.17	.41
v51 *	.12	.38
v52	.12	.39
v53	.20	.50
v54	.11	.37
v55	.097	.33
v56	.21	.58
v57	.12	.39
v58 *	.14	.45
v59	.13	.41
v60 *	.25	.70
v61	.21	.63
v62	.19	.59
v63	.10	.46
v64 *	.11	.45
v65	.12	.46
v66	.15	.43
v67	.12	.41
v68	.18	.49
v69	.18	.57

(*=deleted in reliability analyses)

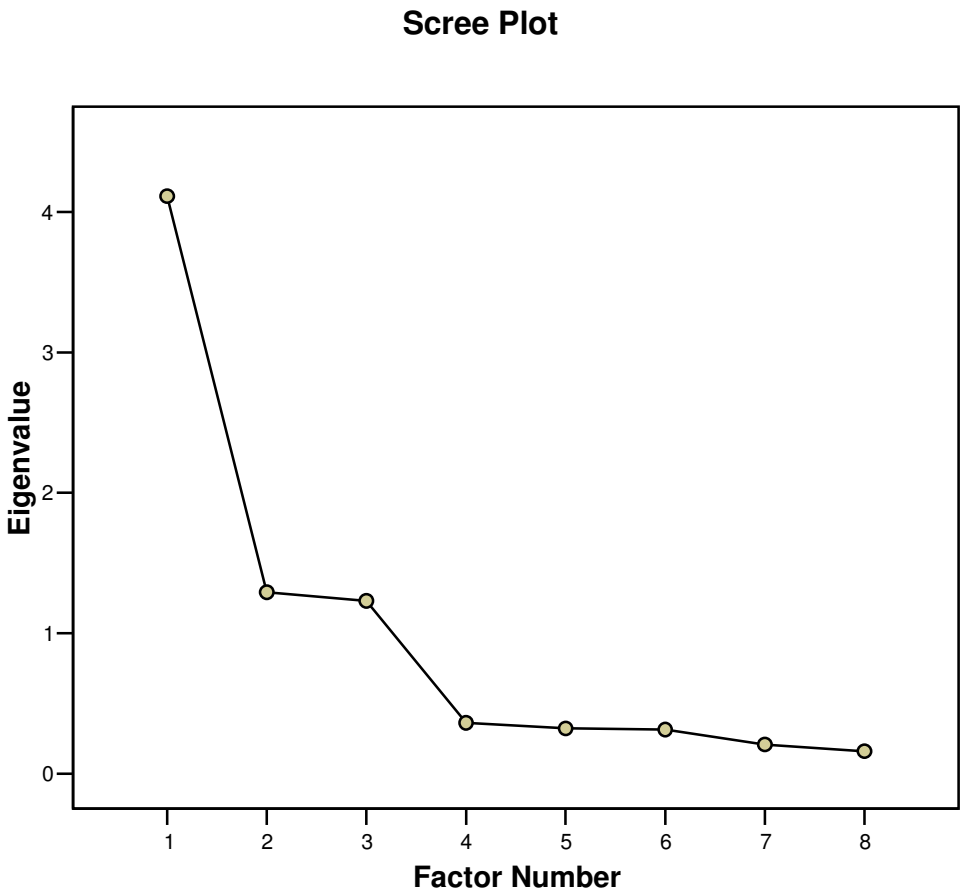
APPENDIX O

SCREE PLOT (EXPLORATORY) FACTOR ANALYSIS AT THE CLASS LEVEL



APPENDIX P

SCREE PLOT (EXPLORATORY) FACTOR ANALYSIS AT THE STUDENT LEVEL



APPENDIX Q

Table Q

32- item Turkish Version of the TOSRA (Bilingual Form)

Turkish TOSRA	**TOSRA**	**Item**
1.	**3.**	I would prefer to find out why something happens by doing an experiment than by being told. *Bazı olayların niçin olduğunun bana anlatılmasından ziyade deneylerle bulmayı tercih ederim.*
2.	**5.**	Science lessons are fun. *Fen dersleri eğlencelidir.*
3.	**6.**	I would like to belong to a science club. *Fen ile ilgili kulübe veya topluluğa katılmak isterim. (Doğa yürüyüşleri, Kuş gözlemciliği vb.)*
4.	**7.**	I would like dislike being a scientist after I leave school. *Okulu bitirdikten sonra fen ile ilgili bir alanda çalışmak istemem.*
5.	**10.**	Doing experiments is not as good as finding out information from teachers. *Bilgileri öğretmenden almak, deney yaparak öğrenmekten daha iyidir.*
6.	**12.**	I dislike science lessons. *Fen derslerinden hoşlanmıyorum.*
7.	**13.**	I get bored when watching science programs on TV at home. *Evde televizyondaki fen ile ilgili belgesel programları izlerken sıkılıyorum.*
8.	**14.**	When I leave school, I would like to work with people who make discoveries in science. *Okuldan mezun olduğumda fen ile ilgili araştırmalar yapan insanlarla çalışmak isterim.*

Table Q Continued

9.	**17.**	I would prefer to do experiments than to read about them. *Deney yaparak öğrenmeyi, okuyarak öğrenmeye tercih ederim.*
10.	**19.**	School should have more science lessons each week. *Okulda haftalık ders programında daha fazla fen dersi olmalıdır.*
11.	**21.**	I would dislike a job in a science laboratory after I leave school. *Okuldan mezun olduktan sonra fen laboratuarlarında çalışmak istemezdim.*
12.	**24.**	I would rather agree with other people than do an experiment to find out for my self. *Bilgileri direk almaktansa, deneyler yaparak keşfetmeyi tercih ederim.*
13.	**26.**	Science lessons bore me. *Fen dersleri beni sıkar.*
14.	**27.**	I dislike reading books about science during my holidays. *Tatil süresince fen ile ilgili kitaplar okumaktan hoşlanmam.*
15.	**28.**	Working in a science laboratory would be an interesting way to earn a living. *Fen laboratuarında çalışmak; geçim sağlamak için ilginç bir yol olabilir.*
16.	**31.**	I would prefer to do my own experiments than to find out information from a teacher. *Bilgileri öğretmenden almak yerine, kendim deneyler yapmayı tercih ederim.*
17.	**33.**	Science is one of the most interesting school subjects. *Fen okuldaki en ilginç derslerden biridir.*
18.	**34.**	I would like to do science experiments at home. *Evde fen ile ilgili deneyler yapmaktan hoşlanırım.*
19.	**40.**	Science lessons are a waste of time. *Fen dersleri zaman kaybıdır.*

Table Q Continued

20.	**41.**	Talking to friends about science after school would be boring. *Okuldan sonra arkadaşlarla fen ile ilgili konular hakkında konuşmak sıkıcıdır*.
21.	**42.**	I would like to teach science when I leave school. *Mezun olduktan sonra, fen alanıyla ilgili eğitim almak isterim.*
22.	**45.**	I would rather solve a problem by doing an experiment than be told the answer. *Cevabın bana söylenmesindense, problemi deneyler yaparak çözmeyi tercih ederim.*
23.	**47.**	I really enjoy to science lessons. *Fen derslerine gitmek benim için gerçekten zevklidir.*
24.	**48.**	I would enjoy having a job in a science laboratory during my school holidays. *Ara tatillerde fen laboratuarında iş bulmaktan zevk alırım.*
25.	**52.**	It is better to ask the teacher the answer than to find it out by doing experiments. *Deneyler yaparak cevabı bulmaktansa, öğretmene sormak daha iyidir.*
26.	**54.**	The material covered in science lessons is uninteresting. *Fen derslerinde işlenen konular ilginç değildir.*
27.	**55.**	Listening to talk about science on the radio would be boring. *Radyodan fen hakkında bir şeyler dinlemek sıkıcı olabilir.*
28.	**59.**	I would prefer to do an experiment on a topic than to read about it in science magazines. *Bir konu hakkında bilimsel dergiler okumaktansa, deney yapmayı tercih ederim.*
29.	**61.**	I look forward to science lessons. *Fen derslerini sabırsızlıkla beklerim.*

Table Q Continued

30.	**66.**	It is better to be told scientific facts than to find them out experiments. *Bilimsel gerçeklerin anlatılması, deneyler yapılarak sonuçların bulunmasından iyidir.*
31.	**68.**	I would enjoy school more if there were no science lessons. *Eğer fen dersleri olmasaydı, okul daha eğlenceli olurdu.*
32.	**69.**	I dislike reading newspaper articles about science. *Fen ile ilgili gazete makalesi okumaktan hoşlanmam.*

APPENDIX R

Table R

Item Distribution for the 32- Item Turkish Version of the TOSRA

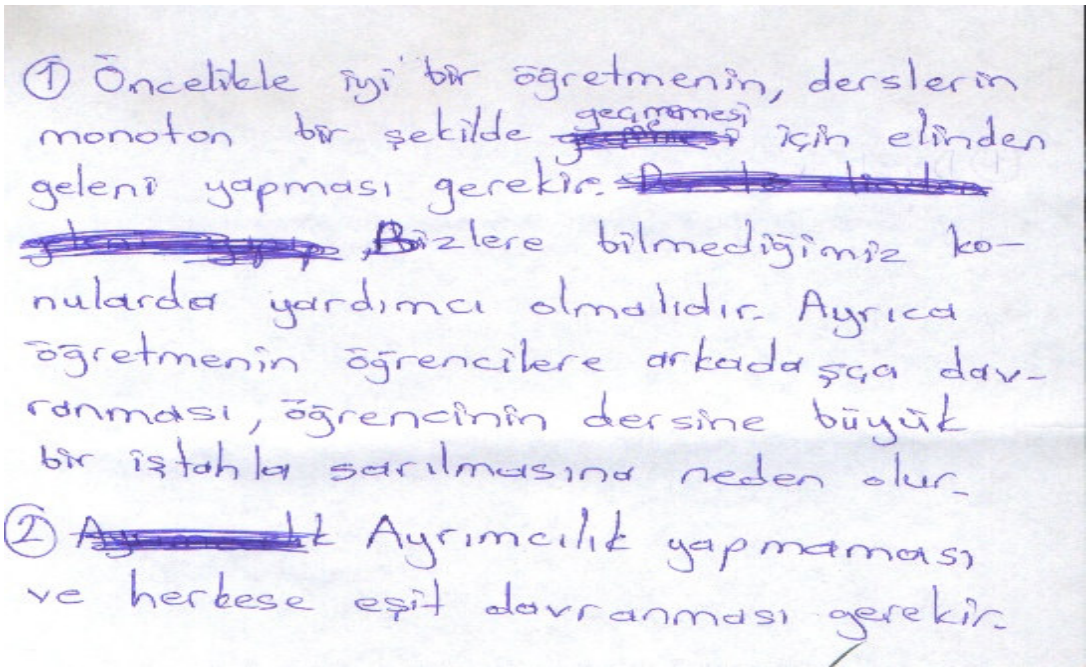
SCALE	ITEMS	TOTAL ITEM
Attitude to scientific inquiry	1, 5, 9, 12, 16, 22, 25, 28, 30	8
Enjoyment of science lessons	2, 6, 10, 13, 17, 19, 23, 26, 29, 31	10
Leisure interest in science	3, 7, 14, 18, 20, 24, 27, 32	8
Career interest in science	4, 8, 11, 15, 21	5

For positive items, responses SA, A, N, D, SD are scored 5, 4, 3, 2, 1, respectively. For negative items, responses SA, A, N, D, SD, are scored 1, 2, 3, 4, 5, respectively.

APPENDIX S

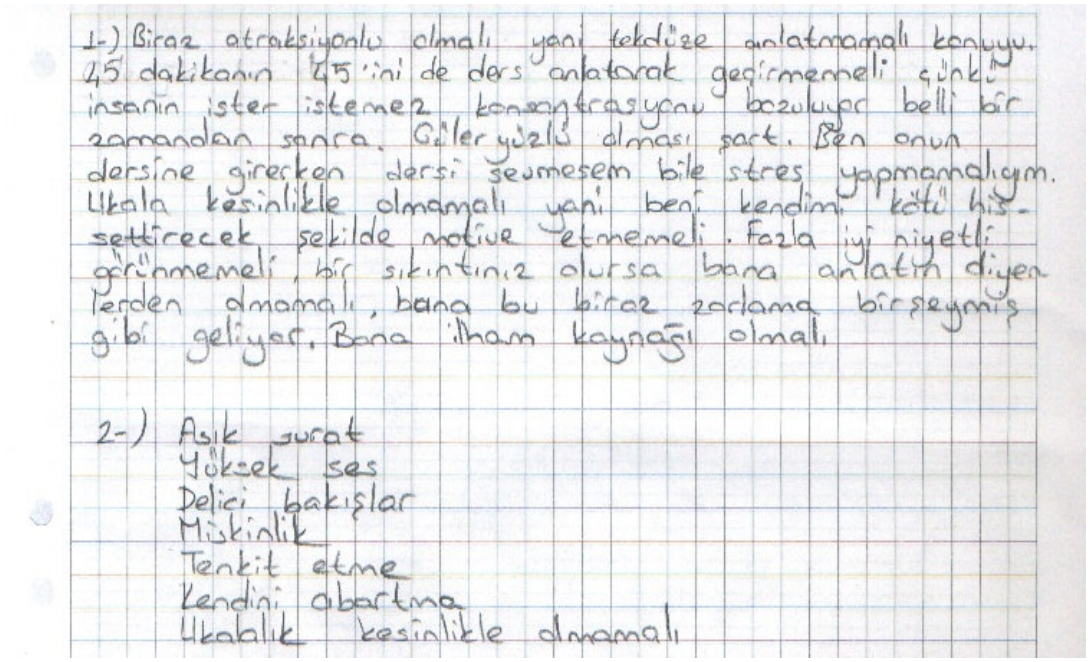
EXAMPLES FROM STUDENT AND TEACHER ANSWERS TO OPEN-ENDED QUESTION

Student A-


① Öncelikle iyi bir öğretmenin, derslerin monoton bir şekilde geçmemesi için elinden geleni yapması gerekir. Bizlere bilmediğimiz konularda yardımcı olmalıdır. Ayrıca öğretmenin öğrencilere arkadaşça davranması, öğrencinin dersine büyük bir iştahla sarılmasına neden olur.

② Ayrımcılık yapmaması ve herkese eşit davranması gerekir.

Student B-


1-) Biraz atraksiyonlu olmalı yani tekdüze anlatmamalı konuyu. 45 dakikanın 45'ini de ders anlatarak geçirmemeli çünkü insanın ister istemez konsantrasyonu bozuluyor belli bir zamandan sonra. Güler yüzlü olması şart. Ben onun dersine girecken dersi sevmesem bile stres yapmamalıyım. Ukala kesinlikle olmamalı yani beni kendimi kötü hissettirecek şekilde motive etmemeli. Fazla iyi niyetli görünmemeli, bir sıkıntınız olursa bana anlatın diyen lerden olmamalı, bana bu biraz zorlama bir şeymiş gibi geliyor. Bana ilham kaynağı olmalı

2-) Asık surat
Yüksek ses
Delici bakışlar
Müskinlik
Tenkit etme
Kendini abartma
Ukalalık kesinlikle olmamalı

Student C-

İyi bir öğretmen → İnsanlarla kolay iletişim kurabilmeli
→ Konusuna hakim olmalı
→ Akıcı konuşmalı (ne dediği anlaşılsın yeter)
→ Öğrencinin dikkatini derse yönlendirebilmeli
→ Öğrencilere örnek olduğu için dikkatli olmalı
→ Hoş görü ve sabra sahip olmalı.

Kötü bir öğretmen → Sıkıcıdır.
→ Öğrenciye ikinci sınıf insan muamelesi yapar.
→ Hiç bağırmadan sınıfı hizaya sokan öğretmenlerin içten fetetme metodlarından haberi bile yoktur.
→ Derse hakim değildir.
→ Kendisi bile geçen ders ne işlediğini bilmez.

Student D-

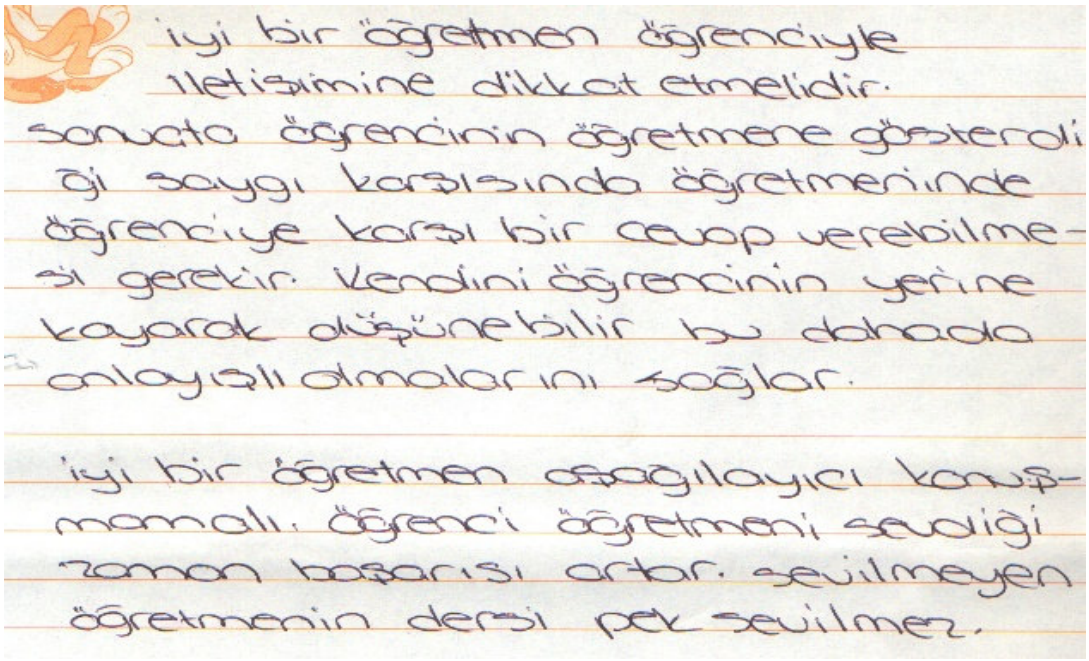
1) İyi bir öğretmen nasıl olmalı?

2) İyi bir öğretmende olmaması gereken özellikler?

1) İlk önce enerjik olmalı. Çünkü öğretmenin enerjisi öğrencilere yansıyor gözlemlediğim kadarıyla. Problemlerini öğrenciye yansıtmamalı, mümkün olduğu kadar, ruh halinde çalkantılar olmamalı. Öğrenciler depresif öğretmenlerden hoşlanmıyor. Daha sonra aklıma sabır geliyor. Eğer bir insan sabırlıysa öğretmen olsun bence. Defalarca aynı yeri, aynı şeyi anlatmak, problemli öğrencilerle uğraşmak için sabır konusunda bir hayli iyi olmak gerekiyor. Sevecen olmalı, öğrenciye gönüllü insanın içi açılmalı. Bir de belli sınırda öğrenciyle arkadaş olmalı. ?

2) Kötü diksiyon, otoritesizlik, dalgınlık, uyuşukluk, ben bilirim havası

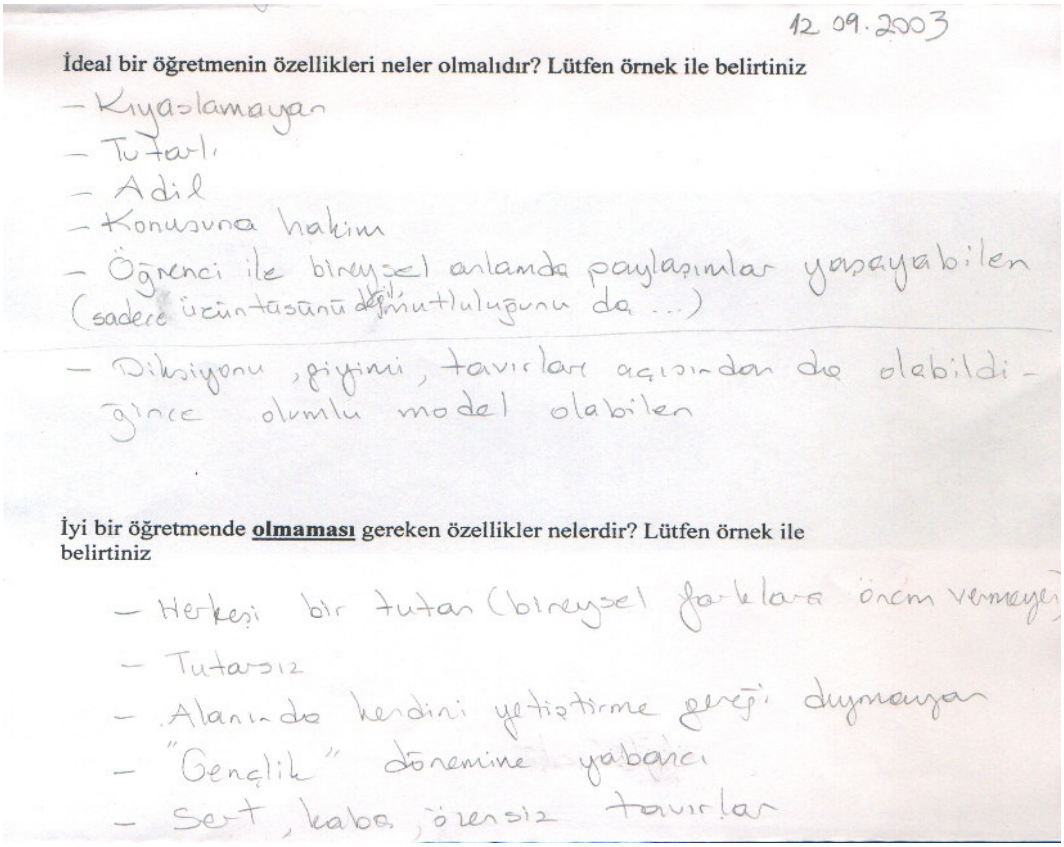
Student E-



iyi bir öğretmen öğrenciyle iletişimine dikkat etmelidir. sonuçta öğrencinin öğretmene gösterdiği saygı karşısında öğretmeninde öğrenciye karşı bir cevap verebilmesi gerekir. Kendini öğrencinin yerine koyarak düşünebilir bu dahada anlayışlı olmalarını sağlar.

iyi bir öğretmen açıklayıcı konuşmamalı. Öğrenci öğretmeni sevdiği zaman başarısı artar. sevilmeyen öğretmenin dersi pek sevilmez.

Teacher A-



12.09.2003

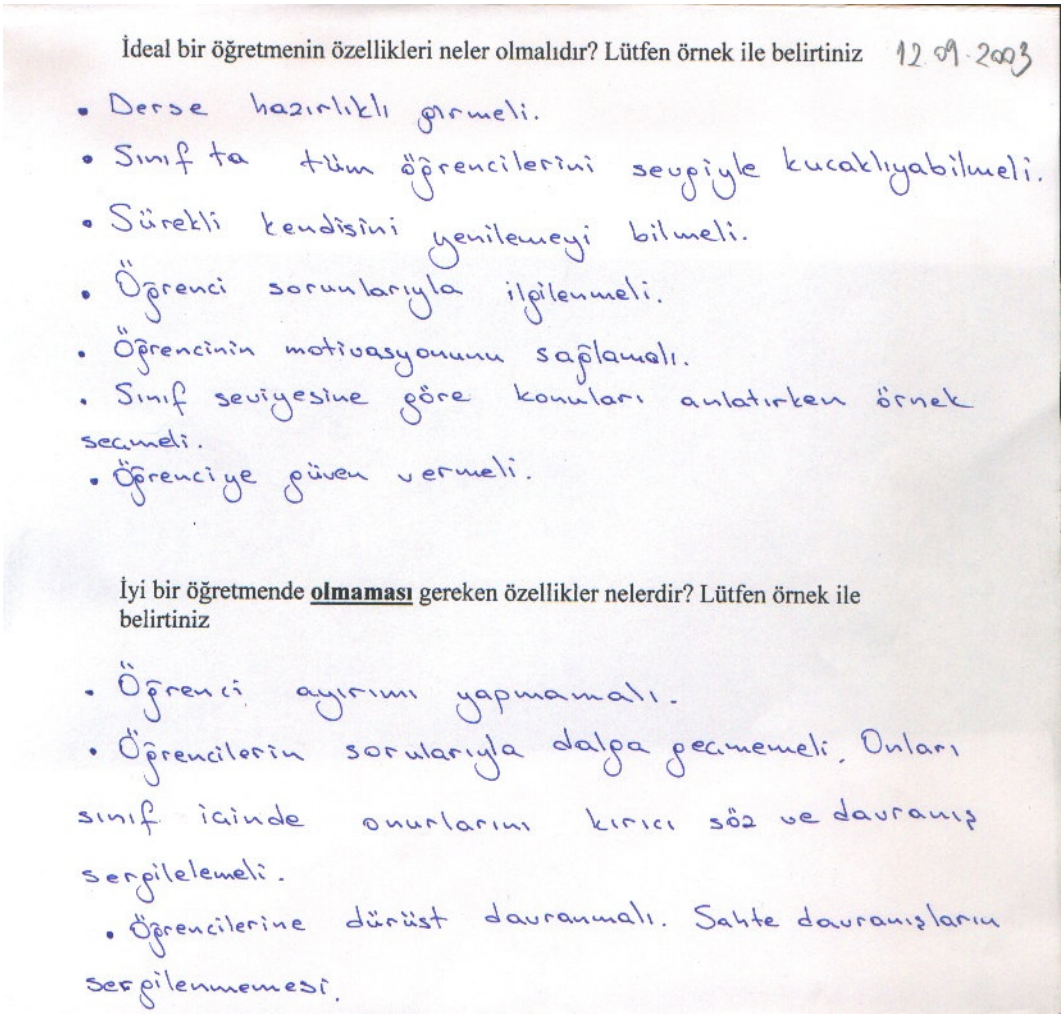
İdeal bir öğretmenin özellikleri neler olmalıdır? Lütfen örnek ile belirtiniz

- Kıyaslamayan
- Tutarlı
- Adil
- Konusuna hakim
- Öğrenci ile bireysel anlamda paylaşımlar yaşayabilen (sadece üçüncü şahıs değil, mutluluğunu da ...)
- Diksiyonu, giyimi, tavırlar açısından da olabildiğince olumlu model olabilen

İyi bir öğretmende <u>olmaması</u> gereken özellikler nelerdir? Lütfen örnek ile belirtiniz

- Herkesi bir tutan (bireysel farklara önem vermeyen)
- Tutarsız
- Alanında kendini yetiştirme gereği duymayan
- "Gençlik" dönemine yabancı
- Sert, kaba, özensiz tavırlar

Teacher B-



İdeal bir öğretmenin özellikleri neler olmalıdır? Lütfen örnek ile belirtiniz 12.09.2003

- Derse hazırlıklı girmeli.
- Sınıfta tüm öğrencilerini sevgiyle kucaklıyabilmeli.
- Sürekli kendisini yenilemeyi bilmeli.
- Öğrenci sorunlarıyla ilgilenmeli.
- Öğrencinin motivasyonunu sağlamalı.
- Sınıf seviyesine göre konuları anlatırken örnek seçmeli.
- Öğrenciye güven vermeli.

İyi bir öğretmende **olmaması** gereken özellikler nelerdir? Lütfen örnek ile belirtiniz

- Öğrenci ayrımı yapmamalı.
- Öğrencilerin sorularıyla dalga geçmemeli. Onları sınıf içinde onurlarını kırıcı söz ve davranış sergilememeli.
- Öğrencilerine dürüst davranmalı. Sahte davranışlarını sergilenmemesi.

APPENDIX T

Table T

Means, Standard Deviations and Percentages of Student Responses to the Items of the 62- Item Turkish Version of the QTI

			Degrees of rating (%)							
Item No	Item Mean	Item SD.	0	1	2	3	4	Missing	Skewness	Kurtosis
1.	2.86	1.14	4.5	8.5	20.0	29.6	36.6	.8	-.80	-.171
2.	1.53	1.07	18.8	29.8	35.7	10.0	5.1	.5	.35	-.318
3.	.76	.99	52.3	26.8	13.9	3.6	2.4	.9	1.33	1.326
4.	1.51	1.09	19.8	29.1	33.7	10.1	5.3	2.0	.37	-.382
5.	2.64	1.27	8.0	12.2	18.9	27.5	31.9	1.5	-.62	-.695
6.	2.70	1.19	6.5	10.1	19.5	32.7	30.1	1.1	-.72	-.359
7.	.84	1.11	53.2	21.1	15.8	4.8	4.0	1.1	1.25	.740
8.	.56	1.07	71.3	12.0	7.8	3.7	4.3	.9	1.97	2.917
9.	3.19	1.08	4.3	4.9	9.8	29.1	50.7	1.2	-1.44	1.426
10.	1.00	1.17	45.3	24.5	18.0	5.5	5.5	1.3	1.05	.241
11.	.79	1.12	56.6	19.4	13.3	4.4	4.5	1.8	1.40	1.089
12.	3.08	1.09	3.8	6.3	13.9	29.5	45.7	.8	-1.15	.610
13.	3.17	1.15	4.8	5.9	12.1	20.9	55.5	.7	-1.34	.839
14.	3.25	1.09	3.9	5.4	10.0	22.3	57.5	.9	-1.49	1.393
15.	1.34	1.33	36.8	20.3	21.9	9.6	9.8	1.5	.62	-.769
16.	1.20	1.22	37.1	26.6	20.3	8.0	6.9	1.2	.80	-.298
17.	2.46	1.22	8.2	13.8	24.2	29.4	23.3	1.0	-.44	-.748
18.	2.00	1.38	18.5	19.6	23.4	17.7	19.3	1.3	.02	-1.22
19.	2.27	1.23	10.3	14.8	30.2	24.3	19.2	1.2	-.25	-.828
20.	2.52	1.22	7.7	12.9	24.2	28.7	25.5	1.0	-.48	-.709
21.	2.89	1.16	5.1	8.3	16.4	31.5	37.7	1.0	-.92	.013
22.	1.33	1.28	34.4	23.2	22.1	10.4	8.2	1.7	.62	-.688
23.	1.21	1.31	41.3	21.6	18.1	8.9	8.8	1.3	.79	-.539
24.	2.55	1.32	10.1	12.3	21.1	23.6	31.8	1.0	-.52	-.881
25.	2.99	1.11	3.8	7.5	15.4	31.0	41.2	1.1	-1.01	.263
26.	1.01	1.12	42.4	27.2	19.1	6.0	4.2	1.1	.97	.192
27.	1.42	1.12	23.7	30.3	29.8	9.3	5.7	1.2	.50	-.375
28.	2.46	1.26	8.6	16.2	19.2	31.1	23.8	1.2	-.45	-.867
29.	3.20	1.09	3.5	5.9	11.6	24.2	53.3	1.5	-1.34	1.012
30.	1.25	1.19	32.8	28.7	21.9	8.3	6.2	2.1	. .73	-.309
31.	.92	1.17	49.9	23.0	14.6	5.7	5.4	1.4	1.19	.493
32.	2.60	1.36	8.3	19.2	12.4	23.6	36.0	.5	-.51	-1.10

Table T Continued

33.	1.19	1.30	41.4	22.3	17.4	9.0	8.3	1.6	.82	-.487
34.	.56	1.02	68.5	14.2	8.6	3.2	3.4	2.0	1.94	3.047
35.	2.71	1.29	8.8	10.8	16.3	27.6	35.3	1.1	-.73	-.590
36.	2.93	1.22	5.7	9.0	15.8	24.0	44.3	1.2	-.94	-.177
37.	1.37	1.26	30.6	28.1	20.6	10.5	8.4	1.9	.64	-.605
38.	2.93	1.17	5.0	8.8	15.0	28.9	41.0	1.3	-.95	-.017
39.	2.15	1.29	13.0	17.8	26.6	22.7	17.9	2.0	-.14	-1.02
40.	.48	.99	73.8	12.0	6.2	3.0	3.5	1.5	2.24	4.29
41.	1.34	1.23	32.8	23.3	26.2	9.4	7.1	1.2	.57	-.604
42.	2.57	1.26	8.1	12.5	22.1	27.1	29.0	1.2	-.53	-.747
43.	2.48	1.28	9.1	14.0	23.7	24.4	27.6	1.3	-.42	-.896
44.	.56	1.03	68.9	14.5	8.2	3.4	3.5	1.5	1.95	3.06
45.	.86	1.09	49.2	26.1	14.7	4.5	4.0	1.6	1.25	.904
46.	3.14	1.07	3.4	6.3	11.6	29.2	48.3	1.2	-1.26	.878
47.	1.14	1.12	34.5	31.5	20.9	6.4	4.8	2.0	.85	.075
48.	2.36	1.14	7.5	14.6	26.7	34.0	15.5	1.7	-.41	-.590
49.	3.24	1.10	4.3	5.1	9.0	24.0	56.2	1.3	-1.52	1.533
50.	.71	1.12	62.0	17.0	10.2	4.6	4.7	1.6	1.59	1.585
51.	2.37	1.25	9.9	14.4	25.1	28.0	21.1	1.5	-.37	-.838
52.	3.02	1.12	4.2	6.7	15.1	29.3	43.2	1.6	-1.07	.385
53.	3.24	1.22	6.6	5.7	8.3	15.0	63.1	1.4	-1.53	1.123
54.	.86	1.12	49.6	27.0	12.3	4.4	4.9	1.7	1.34	1.082
55.	2.97	1.24	6.2	8.6	13.9	22.8	47.2	1.3	-1.02	-.063
56.	2.17	1.31	13.8	16.8	25.7	22.5	19.4	1.7	-.17	-1.06
57.	1.79	1.34	20.5	23.0	24.7	14.1	14.8	2.8	.24	-1.07
58.	1.81	1.27	17.2	25.1	26.8	15.6	12.8	2.6	.22	-.946
59.	.80	1.11	54.2	20.8	13.5	4.2	4.3	2.9	1.37	1.08
60.	1.67	1.14	16.9	26.9	33.0	13.3	7.4	2.5	.29	-.577
61.	.52	1.01	70.6	13.0	7.0	2.8	3.7	2.9	2.12	3.77
62.	1.05	1.21	43.7	24.1	16.8	6.6	6.1	2.7	.20	.034
Average								1.46		

APPENDIX U

Table U

Means, Standard Deviations and Percentages of Student Responses to the Items of the 32- item Turkish version of the TOSRA

			Degrees of rating (%)							
Item No	Item Mean	Item SD.	0	1	2	3	4	Missing	Skewness	Kurtosis
1.	1.11	1.16	38.3	29.2	17.9	7.6	5.3	1.7	.90	-.022
2.	1.31	1.18	27.6	36.1	19.8	8.0	7.5	.9	.79	-.15
3.	1.33	1.29	34.1	26.6	18.7	10.2	9.0	1.4	.69	-.62
4.	2.47	1.33	11.5	11.7	23.7	22.8	29.0	1.3	-.45	-.93
5.	2.17	1.29	13.5	16.7	25.0	26.2	17.2	1.4	-.22	-1.01
6.	2.71	1.27	8.5	10.5	15.6	30.9	33.4	1.1	-.77	-.48
7.	2.59	1.27	8.8	12.4	17.4	31.6	28.2	1.5	-.62	-.67
8.	1.56	1.26	23.9	27.6	24.4	12.7	9.8	1.7	.44	-.80
9.	1.33	1.32	35.0	26.1	16.7	10.9	9.6	1.7	.69	-.69
10.	2.07	1.30	15.0	18.6	26.4	21.7	16.6	1.7	-.08	-1.06
11.	2.30	1.29	11.3	16.3	23.1	26.8	20.8	1.7	-.30	-.98
12.	1.18	1.23	36.3	31.0	14.8	9.3	7.0	1.6	.88	-.22
13.	2.56	1.25	8.9	11.8	18.8	32.9	25.8	1.7	-.62	-.62
14.	2.10	1.27	12.7	21.6	21.8	27.4	14.9	1.6	-.13	-1.07
15.	1.82	1.12	11.7	28.4	32.1	16.8	8.6	2.4	.29	-.63
16.	1.74	1.30	21.2	24.0	23.6	18.5	11.1	1.6	.21	-1.06
17.	1.35	1.22	27.6	35.8	16.2	11.7	7.5	1.2	.72	-.44
18.	1.65	1.22	17.7	34.0	20.7	16.2	9.3	2.0	.42	-.81
19.	3.00	1.21	7.0	5.9	11.4	28.9	44.7	2.0	-1.19	.48
20.	2.20	1.28	12.0	18.9	21.7	27.9	17.1	2.4	-.22	-1.04
21.	1.53	1.28	25.9	25.9	24.6	11.6	10.0	1.9	.46	-.80
22.	1.28	1.17	28.9	34.4	18.5	9.7	6.2	2.2	.75	-.26
23.	1.39	1.19	24.8	34.9	20.5	10.2	7.5	2.1	.67	-.39
24.	1.87	1.23	15.6	23.2	28.6	18.9	11.4	2.3	.11	-.92
25.	2.44	1.22	8.6	14.0	22.1	32.2	21.0	2.2	-.47	-.72
26.	2.58	1.24	8.6	12.0	16.8	34.6	25.8	2.3	-.66	-.58
27.	1.99	1.21	11.9	24.4	26.2	23.2	12.2	2.1	.02	-.95
28.	1.85	1.19	15.3	22.0	30.8	20.8	8.8	2.3	.04	-.85
29.	1.87	1.16	11.3	28.4	29.9	17.6	10.5	2.3	.22	-.75
30.	2.18	1.20	10.6	17.1	27.4	28.5	13.8	2.6	-.24	-.83
31.	2.61	1.26	9.7	9.1	18.8	32.3	28.2	2.0	-.71	-.50
32.	2.35	1.31	11.9	15.1	19.2	30.2	21.6	2.0	-.41	-.97
Average								1.84		

APPENDIX V
CURRICULUM VITAE

PERSONAL INFORMATION

Surname	Telli
Name	Sibel
Nationality	Turkish (T.C.)
Date and Place of Birth	19 September 1970, Afyon/Turkey
Marital Status	Single
e-mail	tellisibel@yahoo.com

EDUCATION

Degree	**Institution**	**Year of Graduation**
State Certification in German	State Language Education Centre, Ankara/Turkey	2000 – 2001
MS	Faculty of Science, Department of Biology, Gebze Yüksek Teknoloji Enstitüsü, Gebze-Kocaeli/ Turkey	2000
BS	METU Education Faculty, Department of Biology, Ankara-Turkey	1994
High School	Atatürk High School, Sinop-Turkey	1987

WORK EXPERIENCE

Year	**Place**	**Enrolment**
1998 -present	Milli Piyango Anatolian High School, Nilüfer-Bursa/ Turkey	Biology Teacher
1994 -1998	Ertuğrulgazi Anatolian High School, Yenişehir-Bursa/ Turkey	Biology Teacher

FOREIGN LANGUAGES :

German, English

PUBLICATION:

1. Cakiroglu, J., Telli S., & Cakiroglu, E., (2003). *Turkish High School Students' Perceptions of their Learning Environment in Biology Classrooms and their Attitudes toward Biology*. Eric Document Reproduction Service No. ED477696.
2. Telli, S., Cakiroglu, J., & den Brok, P. (2006). Turkish secondary education students' perceptions of their classroom learning environment and their attitude towards Biology. In D. L. Fisher & M. S. Khine (Eds.), *Contemporary approaches to research on learning environments: world views* (pp.517-542). Singapore: World Scientific.
3. Telli, S., den Brok, P., & Cakiroglu, J. (in press). Students' Perceptions of Science Teachers' Interpersonal Behaviour in Secondary Schools: Development of the Turkish version of the Questionnaire on Teacher Interaction. Manuscript conditionally accepted for publication in *Learning Environment Research.*

CONFERENCES INTERNATIONAL:

1. Telli S., Rakici N., & Cakiroglu, J. (2003). *Learning environment and student's attitudes towards biology*. Paper presented at the biannual meeting of the European Science Education Research Association (ESERA), Noordwijkerhout, the Netherlands.
2. Telli S., den Brok, P., & Cakiroglu, J. (2005). *Perceptions of teacher interpersonal behaviour in Turkish secondary schools*. Paper presented at the biannual meeting of European Association for Research on Learning and Instruction (EARLI), Nicosia, Cyprus.
3. Telli S., den Brok P., & Cakiroglu, J. (2006). *Teacher–Student Interpersonal Behaviour in Science Classes in Turkey*. Paper presented at the annual meeting of the National Association for Research in Science Teaching (NARST), San Francisco, USA.
4. Telli S., Cakiroglu J., & den Brok, P. (2006). *Teacher-Student Interpersonal Relationships in General and Vocational Schools Science Classes in Turkey*. Poster presented at the annual meeting of American Educational Research Association, San Francisco, USA.

CONFERENCES NATIONAL:

1. Telli S. & Cakiroglu J. (2002). Biyoloji sınıfındaki öğrenme ortamı ve öğrencilerin biyolojiye yönelik tutumları (*Students' Perceptions of their Learning Environment in Biology Classrooms and their Attitudes towards Biology).* Presented at the biannual meeting of the National Science and Mathematics Education Congress, METU, Ankara, Turkey.
2. Telli, S., Cakiroglu, J., den Brok P. (2006). Genel ve Meslek Liselerinde Öğrenci Algılarına Göre Belirlenen Kişilerarası Öğretmen Profillerinin Karşılaştırılması. *(Comparing teacher interpersonal profiles between general and vocational schools based on the students' perceptions*). Paper presented at the biannual meeting of National Science and Mathematics Education Congress, Gazi University, Ankara, Turkey.
3. Telli S., den Brok, P., Cakiroglu, J. (2006). Liselerde Fen Sınıflarında Öğretmen Profilleri. *(Teacher profiles in science classes).* Presented at the biannual meeting of National Science and Mathematics Education Congress, Gazi University, Ankara, Turkey.

PROJECTS:

1. METU-Scientific Research Project (BAP-2002-05-01-03): Öğrencilerin Biyoloji Sınıfları Öğrenme Ortamı Algıları ve Biyoloji'ye Karşı Tutumlarına Etkisi (*Student's Perceptions of their Learning Environment in the Biology Classroom and their Attitudes toward Biology),* METU-AFP, Ankara/ Turkey.
2. METU-Scientific Research Project (BAP-2005-05-06-01): Ortaöğretimde Öğrencilerin Fen dersleri Öğretmenlerinin Kişilerarası Davranışlarını Algıları (*Secondary School Students' Perceptions of their Science Teachers' Interpersonal Behaviour),* METU-AFP, Ankara/ Turkey.
3. METU-Scientific Research Project (BAP-2006-05-06-03) *Öğrenci algılarına dayanarak biyoloji dersi sınıf öğrenme ortamının geliştirilmesi (Developing Biology Classroom Learning Environments based on Students' Perceptions)* METU-AFP, Ankara/ Turkey.

HOBBIES:

Judo (3rd Dan, National Referee of the Turkish Republic)
Travel
Communicating with people from different cultures
Skiing
Dance