

Students' perceptions of science teachers' interpersonal behaviour in secondary schools: Development of a Turkish version of the Questionnaire on Teacher Interaction

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Abstract The purpose of the study was to investigate the reliability and validity of a Turkish adaptation of an existing instrument for measuring teacher interpersonal behaviour. The Questionnaire on Teacher Interaction (QTI) maps teacher behaviour in terms of two dimensions: Influence (Dominance–Submission) and Proximity (Cooperation–Opposition). A sample of 674 students from 24 classes (Grades 9–11) of experienced teachers in two Turkish secondary schools participated in the study. Development of the instrument involved several steps: translation and back translation by teacher educators; piloting of different versions while refining the items; interviews with students and teachers to establish the importance of teacher interpersonal behaviour in the Turkish context; and a final administration of the questionnaire to the sample described. Interview data and statistical analyses supported the reliability and validity of the instrument. Turkish teachers were perceived by their students as very cooperative and moderately dominant.

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Introduction

This study investigated students' perceptions of their science teachers' interpersonal behaviour in the Turkish secondary education context. As such, it describes an attempt to create a cross-culturally valid translation and adaptation of an instrument for this purpose, the Questionnaire on Teacher Interaction (QTI; e.g. Wubbels et al. 1985). Results of the study could help in determining whether the model and instrument used for describing teacher–student interpersonal behaviour transfer to different cultural contexts and to what degree teacher–student interpersonal behaviour is perceived in Turkey in a fashion similar to studies conducted in other countries that have used the QTI. Apart from this, there were other general and more incidental arguments for undertaking a study on teacher–student interpersonal behaviour in the Turkish context.

A *general* argument that can be made is that teacher–student interpersonal behaviour is a crucial element in the teaching–learning process, and hence the learning environment, in any country. Teacher–student interpersonal behaviour is a major component of classroom management (e.g. Doyle 1986) and many experienced and inexperienced teachers experience problems in this domain (Veenman 1984). 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 and Brekelmans 1998) and that healthy teacher–student interpersonal relationships are a prerequisite for engaging students in learning activities (Brekelmans et al. 2000; Wubbels and Levy 1993). 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 and Zoller 2001; Wubbels and Levy 1993).

Some research undertaken in Turkey shows similar importance of the teacher–student interpersonal relationship for the Turkish context. Taskafa (1989), for example, interviewed 43 middle-school students and asked them to identify teachers' desirable and non desirable characteristics. Giving positive reinforcement, being friendly to the students and understanding students' feeling were the most frequently mentioned desirable characteristics. Terzi (2002) described the importance of classroom management for student outcomes for the Turkish context and emphasised the positive and motivating effects of healthy teacher–student interpersonal relationships. Similarly, as part of a larger study of teaching variables, Gorgen and Tahta (2005) found evidence for a strong effect of teacher interpersonal behaviour on students' mathematics outcomes. Although these works underpin the importance of teacher interpersonal behaviour in Turkish classrooms, none of these studies focused uniquely or specifically on the teacher–student interpersonal relationship. Second, these studies 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. The results of this investigation are currently being used in a large-scale study undertaken by the authors with over 200 teachers and 5000 students in Turkish secondary education.

Because the conceptualisation of teacher–student interpersonal behaviour as used in the present study has been described comprehensively by Wubbels and Levy (1993), we only

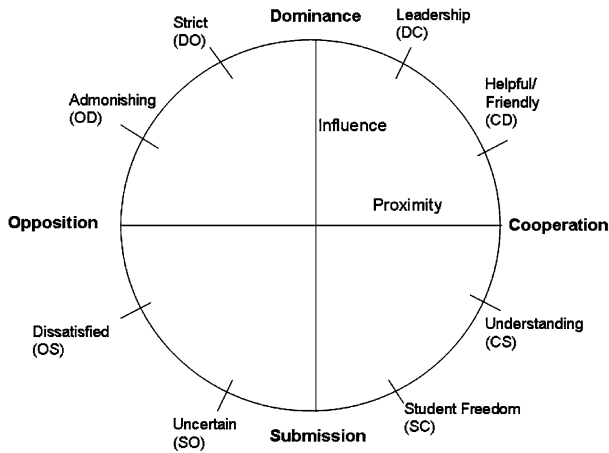


Fig. 1 The model for Interpersonal Teacher Behaviour

summarise it here. The conceptualisation is based on the so-called *systems approach to communication* (Watzlawick et al. 1967). To describe rather stable patterns of interpersonal behaviour, the focus in the systems approach of communication is on the effect of communication on the persons involved (the pragmatic aspect). This pragmatic orientation is characterised in our conceptualisation of the interpersonal perspective by means of a focus on the perceptions of students of the behaviour of their teacher. Students' perceptions are studied using the Model for Interpersonal Teacher Behaviour (MITB; Wubbels et al. 1985), an adaptation of Leary's (1957) Model for Interpersonal Diagnosis of Personality. The Leary model has been investigated extensively and proven to be effective in describing human interaction (Foa 1961; Lonner 1980). While not conclusive, there is evidence that it is also cross-culturally generalisable (Brown 1965; Dunkin and Biddle 1974; Lonner 1980). The MITB describes interpersonal teacher behaviour along two dimensions: *Influence* (DS, or Dominance–Submission) and *Proximity* (CO, Cooperation–Opposition). The Influence dimension represents the degree of dominance or control displayed by the teacher, while Proximity describes the level of cooperation between teacher and students. The two dimensions can be represented in a coordinate system divided into eight equal sectors (see Fig. 1). The sectors are labelled DC, CD and so on according to their position on the graph. For example, the two sectors DC and CD are both characterised by dominance and cooperation. However, the DC sector demonstrates a higher degree of dominance than cooperation. Similarly, the adjacent sector CD includes actions that are more cooperative and less dominant. The sectors of the model describe eight different behaviour types: Leadership, Helpful/Friendly, Understanding, Student Freedom, Uncertain, Dissatisfied, Admonishing and Strict.

The QTI was developed in The Netherlands between 1978 and 1984 to gather student and teacher perception data (Wubbels et al. 1985) based on the MITB. Research with the QTI has resulted in a vast and evolving knowledge base on teacher–student interpersonal behaviour (Fraser 1998; Levy et al. 2003; Wubbels and Brekelmans 1998; Wubbels et al. 2006). The QTI has been reliably and extensively used in a host of countries, such as The Netherlands, Australia, the USA, Israel, Korea, Singapore, Brunei, Indonesia and India, among many others. With respect to this study, previous research on secondary science students' perceptions of teacher behaviour in terms of the two interpersonal

dimensions¹ is of particular interest. These studies show an interesting pattern. First, in all countries, positive dimension scores² are reported, indicating that students perceive more dominance than submissiveness and more cooperation than opposition in their classes. Second, in all countries, students report twice (or more than twice) the amount of Proximity compared to the amount of Influence, meaning that teachers are perceived as more cooperative than they are perceived as dominant. Of course, interesting differences between studies and countries can be noted. Secondary science teachers from The Netherlands (e.g. Brekelmans et al. 2002; den Brok et al. 2004) are perceived lowest of all countries on the Influence (scores range roughly between 0.20 and 0.30) and Proximity dimensions (scores between 0.35 and 0.60). American science teachers (e.g. den Brok et al. 2002; Levy et al. 1997; Wubbels and Levy 1991), on the other hand, are perceived positive on the Influence dimension (0.50–0.60) and similar to Dutch teachers on the Proximity dimension. Australian secondary science teachers (e.g. den Brok et al. 2006b; Evans and Fisher 2000; Fisher and Rickards 1997) are perceived similarly positive on the Influence dimension compared to American science teachers, but are perceived even more positive on the Proximity dimension (scores range between 0.90 and 1.15). Singaporean teachers (e.g. den Brok et al. 2006b) have been perceived as the most cooperative teachers (dimension score of 1.28), but their dominance scores are comparable to American and Australian science teachers. Bruneian teachers (e.g. den Brok et al. 2006b) are among the most dominant teachers, but are perceived to be similarly cooperative to Dutch teachers. Teachers from India, finally, have dimension scores of around 0.5 for both dimensions (den Brok et al. 2005). Of course, differences between countries should be considered with caution and care, as most of the studies differed in terms of sample size, sample makeup and sampling procedure, and because they involved reports from single countries, rather than actual cross-cultural comparisons (an exception is the study of den Brok et al. 2006b).

A more *incidental* reason to conduct the present study—also following from the review of work above—is that most classroom environment research has involved students in Western countries; only a small number has been conducted in non-Western countries (Fraser 2002). In Turkey, no studies have been undertaken on teacher interpersonal behaviour, either in primary or secondary education. Turkey can be regarded as a ‘*high-contact*’ or ‘*high-immediate*’ culture (Hofstede 1991). Hall (1966) defined cultures in which people show considerable interpersonal closeness as ‘*high contact*’ or ‘*highly immediate*’. Students’ (and teachers’) perceptions of the interpersonal relationship can be affected by these cultural differences. Additionally, the study adds to *methodological* issues in learning environments research. Most of the studies creating new language (and cultural) versions of the QTI have started from one (e.g. the American) 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 (at the student level), little is known about their validity and variance

¹ Interpersonal dimension scores (e.g. Influence and Proximity) are to be preferred over the eight interpersonal sector (or scale) scores and the four quadrant scores because they are theoretically (and empirically) independent, because they are more reliable and because they are less subject to (cross-cultural) validity problems (e.g. den Brok et al. 2006b). Most previous studies reported the scale and quadrant scores, rather than the dimension scores. Furthermore, studies either focused on higher or primary education or other subjects than science.

² Dimension scores can range between –3 and +3, with 0 representing equal amounts of dominance and submissiveness, cooperation and opposition, respectively. Scores between 0 and 0.5 are moderately positive, scores between 0.5 and 1 can be regarded as positive, and scores above 1 as very positive.

analyses indicate much lower amounts of variance present for scales at the class level (around 10–15%) than in the American and Dutch versions (25–40%). It seems fair to assume that the (limited) development process in many of these studies might have contributed to these findings, and that more elaborate methods should have been used to create and demonstrate the quality of these cultural adaptations.³ According to Wubbels (1985; see also Hui and 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 concerned about *conceptual or functional equivalence*, which means that concepts or constructs in their instruments have similar connotations and meanings in different cultures. 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). Third, researchers should check for *item equivalence*, meaning that items have similar meaning and structural relations in the different countries.

The aim of this study was to describe and report the development process associated with a Turkish adaptation of the QTI and report Turkish students' (and teachers') perceptions of their teachers' interpersonal behaviour.

Method

Sample

The sample comprised 674 students of 13 teachers in various subjects (Biology, Physics or Chemistry). Teachers' professional experience ranged from 5 to 25 years. A total number of 24 classes (Grades 9–11) from two public, coeducational high schools in Bursa, Turkey participated in the study. Bursa is the fifth largest city in Turkey (population of 2.1 million), has over 60 high schools and is one of the most economically-advanced regions in Turkey. Turkey has a centralised science curriculum and a centralised teacher appointment system. The two selected schools were among the largest in the city and were located near the city centre. The sample chosen from the accessible population was a sample of convenience.

This sample consisted of 322 girls (47.8%) and 352 (52.2%) boys. Class size in these schools varied from 25 to 35 students. Of the students, 144 (21.4%) were in Grade 9, 242 (35.9%) in Grade 10 and 288 (42.7%) in Grade 11. Compared to the city of Bursa and Turkey as a whole, the sample contained a higher percentage of girls (43.7% for Bursa; 43.0% for Turkey), a lower percentage of students in Grade 9 (41.9% for Turkey; 32.1% for Bursa), a higher percentage of students in Grade 11 (41.9% for Turkey; 32.1% for Bursa) and a lower percentage of students in grade 10 compared to Turkey as a whole (39.1%; but higher than Bursa with 33.0%) (e.g. Ministry of National Education 2006). In all cases, these differences were significant ($p < 0.01$).

³ This assumption is supported by other studies in the domain of learning environments research showing weaker and unstable factor structures, lower scale reliability (in terms of Cronbach's α), higher proportions of unanswered items and more incorrect interpretations of items by students (revealed in interviews) with respect to instruments that were only translated (and back-translated) as compared to instruments that were adapted with a more elaborate process (e.g. Coll et al. 2002; Lucas and Taylor 1998; Mahapa 2001; Taylor and Macpherson 1992a, b).

Table 1 Number of items and a typical item for Dutch and USA versions of the QTI

Scale	No. of items		Typical item
	Dutch	USA	
DC Leadership	10	7	S/He is a good leader.
CD Helpful/Friendly	10	8	S/He is someone we can depend on.
CS Understanding	10	8	If we have something to say s/he will listen.
SC Student Freedom	9	8	S/He gives us a lot of free time in class.
SO Uncertain	9	7	S/He seems uncertain.
OS Dissatisfied	11	9	S/He is suspicious.
OD Admonishing	9	8	S/He gets angry.
DO Strict	9	9	S/He is strict.

Construction process of the Turkish QTI

The original (Dutch) version of the QTI consisted of 77 items. Later, a 64-item American version was constructed in 1988 (Wubbels and Levy 1991) and a 48-item Australian version followed in 1993 (Fisher et al. 1993). Items were formulated, based on large numbers of interviews with both teachers and students, and the construction process of the questionnaire included many rounds of careful testing (Wubbels and Levy 1993). The American version (see Table 1) formed the starting point for the development of a Turkish version of the questionnaire in the present study.

The QTI has a five-point response scale, ranging from Never/Not at All to Always/Very. It is scored on the basis of eight sectors or two summarising dimensions of Influence (or DS) and Proximity (or CO).⁴ The QTI has demonstrated acceptable reliability and validity when used in Grades 7–12 (Wubbels and Levy 1993).

The process aimed to create a culturally-adaptive version of the QTI involved more than a simple translation and back-translation of the questionnaire. The present study employed a process of development similar to that of the original Dutch (and American) version, including interviews and several rounds of pretesting, and has used a variety of techniques to establish the quality of the resulting QTI.

Step 1

Firstly, a direct translation and back-translation of the 64-item American version was carried out. This process was conducted by the two Turkish authors of this article, one English-as-a-Foreign language (EFL) teacher educator and two EFL university experts. 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. A total number of 21 teachers and 246 students in eight classes participated in the first round of piloting. Remarks by the experts and statistical results of the piloting round (see Table 2) showed the need to construct a new version of the QTI. Although

⁴ In the ideal interpersonal model (Fig. 1), scales follow a predetermined pattern with respect to the two dimensions, based on their angular location in the circle. Dimension scores are computed as follows (with the numbers before the scale labels representing the factor loadings): Influence = 0.92DC + 0.38CD - 0.38CS - 0.92SC - 0.92SO - 0.38OS + 0.38OD + 0.92DO; Proximity = 0.38DC + 0.92CD + 0.92CS + 0.38SC - 0.38SO - 0.92OS - 0.92OD - 0.38DO. These scores range between about -3 and +3.

Table 2 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:			Number of items remaining	Sample item of Turkish QTI
	Missing data	Low η^2	Low α / validity		
DC Leadership	1	3	1	2	This teacher exactly knows the name of all students.
CD Helpful/Friendly	2	1	2	4	This teacher encourages students.
CS Understanding	–	–	2	6	This teacher gives us extra time for the homework that we cannot complete on time.
SC Student Freedom	2	4	4	3	We are allowed to break some rules in this teacher's class.
SO Uncertain	2	1	1	4	This teacher breaks his/her promises in the classroom.
OS Dissatisfied	–	1	3	6	It is difficult to ask this teacher a personal question.
OD Admonishing	–	–	1	7	This teacher stops the lesson to discuss our behaviour.
DO Strict	1	6	3	3	When a question is asked, students are afraid to give this teacher the wrong answer.

general outcomes were favourable—Cronbach's α coefficient for 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 (see Fig. 1)—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 3% of the cases. Other items were deleted because they could not discriminate between teachers or classes (in an analysis of variance, η^2 (percentage of variance at the teacher–class level) was determined and its limit was set to 0.10 or 10%). A third group of items was deleted because they contributed negatively to scale internal 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. Finally, it was determined whether items correlated highest and positively with 'their own' scale and correlated highest and negatively with their hypothesised opposite scale.

In Turkey, students (and teachers) are used more to power differences between teachers and students (Hofstede 1991; Hofstede and Hofstede 2004) than, for example, students in the USA or The Netherlands, which makes some items of Leadership and Uncertain virtually nonexistent in the Turkish context. Turkish teachers usually have high control and are the natural leaders of the classroom. They expect students in their classes to be attentive and silent. That is the reason why items like "This teacher acts as if s/he does not know what to do" and "S/he is hesitant" did not generate much variation between Turkish students and their teachers.

Step 2

After evaluating this first round, it was decided to conduct interviews to get a clearer picture of the items needed and to search for ideas for further usable items. To this end, semi-

structured interviews were conducted by the first author of this article. A total of 17 students and 5 teachers (selected from the sample of Step 1) were interviewed to obtain additional suggestions for rewriting some of the items and to validate outcomes of the previous study. During the interviews, questions were asked to teachers regarding situations in the classroom (for example, order problems), teachers' interventions in the classroom and the climate in the classroom. In addition, the eight scale names/labels of the QTI were written on eight cards and each teacher was asked to write on the back of each card (or in a word web) associations that they had with that scale: what kind of examples can they provide; what kind of behaviours do they think that students include when concluding that they are 'leading', 'helpful/friendly', etc.; what do they think that 'visitors' to their class see with respect to each of the eight scales; and what is typical for their classroom?

Students were interviewed in small groups of about two or three students. Things that they liked and things they disliked were asked about, as well as reasons for these judgements. 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 whom they had met so far and why he or she was the best; in a similar way, they were asked about their worst teacher.

The outcomes of the interviews—apart from providing a host of new possible items—showed that both teachers and students had difficulties with respect to generating examples for uncertain behaviour. They needed more alternatives/synonyms from the researcher for clear understanding. They indicated that some items of the QTI could not be found in a real Turkish classroom. Teachers defined uncertainty generally as an unplanned lesson or chaos in the classroom, elements that could not be found in the original QTI items.

Step 3

New items were formulated after these interviews with students and teachers. Results were re-evaluated in order to create a new list of items and item alternatives that could be used in a second version of the QTI. Statements that were not interpersonal in nature, 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 by the three authors, two EFL experts, two science teachers and one psychology teacher with respect to the appropriateness of their content and their suitability for the grade level. With the outcomes of this feedback, the number of items was reduced to 80. Then, this adapted Turkish version with 80 possible items was pretested with 96 students from three classes. Through reliability, factor and other statistical analyses, the number of items was reduced to 69. Examples of items that were eliminated during this step are "S/he does not have prejudice toward students", "S/he is unselfish", "S/he shows that s/he knows everything" and "His/her jokes are understandable".

Step 4

As a last step, a third round of piloting was organised using the 69-item version with a sample of 674 students from 13 teachers (24 classes). The final version of Turkish QTI with 62 items was refined after eliminating seven more items that each contributed negatively to their scale's internal consistency. Sample items (typical for the Turkish context) for the eight scales are given in Table 2. The complete set of items of the Turkish QTI can be found in the Appendix.

Analysis

While the QTI has been repeatedly judged to be an acceptable instrument for use in research on teaching, teacher education and professional development, it is nearly 20 years old and has never been used in Turkey. It was therefore important to re-examine whether the instrument still reflected acceptable reliability and validity. The present study conducted reliability and discriminant validity analyses for the eight scales of the QTI. Item quality was checked by performing descriptive and correlational analyses. Also, for all items, the percentage of variance at the class level was determined to test whether items could distinguish between classes. To test scale (sector) quality, percentage of variance at the class level was also determined for each of the scales, as well as reliability analyses (Cronbach's α) and interscale correlations.

Construct validity was investigated in a number of ways. An exploratory factor analysis was conducted on the (aggregated) scale scores in order to see if two dimensions were present in the data (den Brok et al. 2006b). Finally, scale and dimension scores were computed for each class, and were correlated to student report card grades and motivation items for predictive validity. Also, dimension scores were compared with dimension scores found in previous QTI research on students' perceptions of their secondary science teachers (see Introduction section).

Results

Reliability and validity of the Turkish QTI

First, we determined the quality of the items in the 69-item Turkish version. Results from the analyses indicated that, from a total set of 69 items, seven items needed to be deleted because of problems with reliability and discriminant validity. These items were: "This teacher admits if s/he doesn't know something" (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 recognised by students, were interpreted differently, or were not very different between teachers or classes.

Cronbach's α coefficient of the eight scales was high (between 0.74 and 0.97 at the class level) and intra-class correlations of the scales ranged between 0.24 and 0.45, indicating that the instrument was capable of distinguishing between classes (Table 3).

Exploratory factor analyses indicated that two factors structured the eight scales. These two factors (with an eigenvalue larger than 1) explained 86% of the variance and could be interpreted as Influence and Proximity dimensions. Table 4 displays the factor loadings of the two factors found.

Moreover, in accordance with the MITB, the correlation between the two factors (dimensions) was statistically nonsignificant ($r = 0.16$; $p = 0.19$). Analyses also indicated that students' perceptions on the two dimensions had predictive validity: both dimensions were positively related to both cognitive and affective student outcomes (Table 5), similar to prior research (Brekelmans et al. 2002; den Brok et al. 2004).

Table 3 α Reliability, intraclass correlation, and student and mean for each QTI scale

Scale	α Reliability (class)	Intraclass correlation	Mean		
			Student perceptions	Self/teacher perception	Ideal (teacher) perception
DC Leadership	0.90	0.32	0.72	0.84	0.92
CD Helpful/Friendly	0.97	0.45	0.67	0.82	0.90
CS Understanding	0.95	0.32	0.73	0.87	0.92
SC Student Freedom	0.74	0.34	0.50	0.47	0.47
SO Uncertain	0.93	0.25	0.19	0.11	0.09
OS Dissatisfied	0.91	0.25	0.27	0.15	0.15
OD Admonishing	0.87	0.24	0.31	0.29	0.22
DO Strict	0.88	0.33	0.39	0.42	0.38
DS Influence			0.38	0.68	0.69
CO Proximity			1.00	1.45	1.69

Table 4 Factor loadings from exploratory factor analysis for scales of Turkish QTI

Scale	Factor 1	Factor 2
DC Leadership	0.887	0.402
CD Helpful/Friendly	0.935	0.013
CS Understanding	0.959	0.101
SC Student Freedom	0.731	-0.454
SO Uncertain	-0.810	-0.428
OS Dissatisfied	-0.909	-0.236
OD Admonishing	-0.834	0.281
DO Strict	-0.636	0.722

Teacher interpersonal behaviour in Turkey

First, the average profile of teachers in our sample (674 students, 24 classes, 13 teachers) as perceived by students (student perception) was determined. Turkish science teachers, on average, were perceived as moderately dominant and very cooperative. They were perceived 0.38 on average on the Influence dimension, which is comparable to science teachers from The Netherlands and Brunei, but lower than teachers from the USA, Australia, India or Singapore. On the other hand, Turkish teachers on average scored 1.00 on the Proximity dimension, which is similar to Singapore and some American studies, but much higher than the amount of Proximity reported in other countries. 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 individualistic countries such as The Netherlands or the USA. The relatively high ratings for Influence could be a reflection of the high power distance in Turkish society.

Table 5 Correlations between student outcome variables and QTI scales and dimensions

Scale	Correlation					
	Enjoyment	Usefulness	Competence	Interest	Time effort	Report card grade
DC Leadership	0.58*	0.55*	0.31*	0.50*	0.23*	0.05
CD Helpful/Friendly	0.70*	0.60*	0.42*	0.60*	0.26*	0.09*
CS Understanding	0.58*	0.55*	0.37*	0.52*	0.22*	0.05
SC Student Freedom	0.33*	0.23*	0.27*	0.21*	0.09*	0.09*
SO Uncertain	-0.42*	-0.43*	-0.19*	-0.34*	-0.11*	-0.07
OS Dissatisfied	-0.39*	-0.42*	-0.24*	-0.35*	-0.09*	-0.10*
OD Admonishing	-0.35*	-0.31*	-0.25*	-0.25*	-0.02	-0.11*
DO Strict	-0.18*	-0.13*	-0.23*	-0.10*	0.11*	-0.08
DS Influence	0.32*	0.37*	0.06	0.33*	0.20*	-0.00
CO Proximity	0.60*	0.55*	0.38*	0.50*	0.17*	0.10*

* $p < 0.025$ (two-sided)

We also determined teachers' self-perceptions and teachers' ideal perceptions (for these, no validity or reliability was established, because they were mainly gathered for teacher feedback purposes). Teachers' self-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 and Levy 1991, 1993). Average profiles of Turkish teachers are presented in Table 3.

Discussion

The outcomes of this study indicate that a reliable and valid adaptation of the QTI for the Turkish context could be made. The instrument consisted of 62 items and displayed high reliability. Also, the instrument could clearly distinguish between classes, because intra-class correlations were very high. In fact, these correlations were similar to those for the Dutch version and are among the highest for any QTI version (e.g. Wubbels et al. 2006). Scale scores appeared to be structured in terms of two uncorrelated dimensions and were circularly ordered, which is in accordance with the model. The Turkish version of the QTI showed adequate predictive validity, because both dimensions were positively correlated with student outcomes, particularly students' subject-related attitudes. Again, this finding is in line with other research on the QTI (den Brok et al. 2004; Wubbels et al. 2006) and confirms the quality of the constructed version.

In terms of students' average perceptions, teachers were perceived as moderately dominant and highly cooperative. In addition, teachers perceived themselves, on average, higher on both dimensions than their students. These patterns are similar to those for (experienced) teachers in The Netherlands, the USA and Australia (Wubbels and Levy 1993).

The development of a specific Turkish adapted version of the QTI appeared necessary, because only about 40% 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, particularly teacher uncertainty. If only translation and back-translation had been used, scales might have appeared reliable, but would not have been comparable to the Dutch and American versions.

The present study was subject to some common limitations. First, the study covered a relatively small sample (located in one region). Unfortunately, results cannot be generalised to the city of Bursa or the country as a whole—as the sample differed in terms of gender and grade level makeup—and future research with larger samples from different cities will be necessary to see to what degree outcomes change if more representative samples are used. The authors are currently in the process of gathering a larger data set for this purpose. Second, during data gathering, teachers decided which classes would participate. They might have chosen the classes with ‘good climates’ and this could have led to the relatively high dimension scores in this sample. On the other hand (as indicated in the Results section), the high scores also could reflect cultural differences.

Hopefully, collecting information on teachers’ and students’ perceptions of teacher interpersonal behaviour will help in initiating and supporting activities in teacher education and professional development programs in Turkey. The outcomes of the study can help in building more positive teacher–student relationships through reflection. To this end, teachers can be provided with personal feedback on their scale, item and dimension scores for the three different types of perceptions (self, ideal and student). This feedback can be given graphically as well as in terms of item text and numbers. Our current experiences with the Turkish version in this respect are positive, with teachers appearing to recognise themselves and liking the model and the feedback received. Not only were they complimentary receiving such a detailed report and not only did they devote much time to understanding the process and outcomes, they also indicated the importance of this type of feedback for their professional development. They named the teacher report as a ‘mirror of themselves’ in the classroom. Some of the teachers asked us to record their names for participation in further studies. By comparing scores, teachers can uncover if they have a sense of how they come across and where differences are largest. The instrument will also be used for future research on learning environments in Turkey (by the two Turkish authors) and for cross-cultural comparisons (for example, between Turkey and The Netherlands). At this point, the authors are reanalysing data from science teachers and students in The Netherlands and will compare these (statistically) with data that are being collected in Turkey.

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Appendix

Items of the Turkish 62-item version of the QTI

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1. This teacher is a good leader.
 2. This teacher is strict.
 3. This teacher seems uncertain.
 4. We can influence this teacher.
 5. This teacher is friendly.
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Appendix continued

6. This teacher trusts us.
 7. This teacher thinks that we don't know anything.
 8. This teacher looks down on us.
 9. This teacher talks enthusiastically about her/his subject.
 10. We are afraid of this teacher.
 11. This teacher does not know what to do when we break a rule.
 12. This teacher is flexible.
 13. This teacher is someone we can depend on.
 14. If we have something to say, this teacher will listen.
 15. This teacher makes us feel we have asked him/her a stupid question.
 16. This teacher has a bad temper.
 17. This teacher can soften a tense atmosphere in class.
 18. We are afraid to disturb the lesson of this teacher.
 19. This teacher lets us make jokes in the classroom.
 20. This teacher can take a joke.
 21. This teacher is patient.
 22. This teacher seems dissatisfied.
 23. This teacher makes mean remarks to us.
 24. This teacher guides us.
 25. This teacher keeps the class silent.
 26. This teacher is nervous when s/he talks.
 27. This teacher stops the lesson to talk about other things.
 28. This teacher's class is pleasant.
 29. If we want something, this teacher is willing to cooperate.
 30. This teacher believes/thinks we want to break the rules.
 31. This teacher is impatient.
 32. This teacher exactly knows the names of all students.
 33. When a question is asked, students are afraid to give this teacher the wrong answer.
 34. This teacher's behaviour is inconsistent.
 35. We feel welcome in this teacher's class.
 36. This teacher listens to our questions.
 37. It is easy to pick a fight with this teacher.
 38. This teacher has authority in the classroom.
 39. This teacher wants us to do much work.
 40. This teacher is disorganised.
 41. This teacher lets us study other subjects in his/her class.
 42. This teacher encourages us.
 43. This teacher relaxes us.
 44. This teacher tells us our questions are stupid.
 45. This teacher is tense in class.
 46. Students behave respectfully toward this teacher.
 47. We are allowed to break some rules in this teacher's class.
 48. This teacher makes sure everybody has understood his/her explanations.
 49. This teacher explains things willingly to the class.
 50. This teacher is displeased to be in the classroom.
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Appendix continued

51. This teacher forces students to study more.
 52. This teacher's behaviour is consistent in the classroom.
 53. We have to stand up when the teacher enters the classroom.
 54. This teacher keeps changing his/her decisions.
 55. When we ask this teacher for help, we are sure s/he is with us.
 56. This teacher gives us extra time for homework that we cannot complete on time.
 57. It is difficult to ask this teacher a personal question.
 58. This teacher is very tight on things.
 59. This teacher ignores what we say in class.
 60. This teacher stops the lesson to discuss our behaviour.
 61. This teacher breaks his/her promises in the classroom.
 62. This teacher is suspicious about our work (homework, projects or exam results).
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