VALIDATION AND USE OF TEACHER COMMUNICATION BEHAVIOR QUESTIONNAIRE IN ELEMENTARY SCHOOLS

ÖĞRETMENİN İLETİŞİM DAVRANIŞLARI ÖLÇEĞİNİN İLKÖĞRETİM OKULLARINDA UYGULANMASI VE GEÇERLİLİK ANALİZLERİ

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ABSTRACT: This study investigated the validation of Turkish version of the Teacher Communication Behavior Questionnaire (TCBQ) in a cross-study of elementary school science classrooms. The effects of gender and grade level on students' perceptions of their teachers' behaviors were also examined. Questionnaire includes five scales namely challenging, encouragement and praise, non-verbal support, understanding and friendly, and controlling. The TCBQ was administered to 751 students from 29 classes in 6 elementary schools. Data analysis revealed that Turkish version of the TCBQ was valid and reliable. Further analysis revealed no gender difference for the challenging, encouragement and praise, non-verbal support scales. Significant differences were found for understanding and controlling scales. Grade level analysis indicated that when the grade level increases challenging, encouragement and praise, non-verbal support, and understanding and friendly behaviors occurred less . 6th and 7th grade students also indicated that their teachers are more controlling than other grade level teachers.

Keywords: teacher behaviors, learning environment, grade level, gender

ÖZET: Bu çalışmada ilköğretim okullarında farklı yaş gruplarındaki öğrencilere uygulanan Öğretmenin İletişim Davranışları Ölçeğinin Türkçe çevirisinin uyarlaması yapılmıştır. Ayrıca, cinsiyetin ve farklı sınıf süzeylerindeki öğrencilerin öğretmenlerinin davranışlarını nasıl algıladıklarıda incelenmiştir. Ölçek beş alt kısımdan oluşmaktadır, bunlar sorgulamak, teşvik etmek ve övmek, sözlü olmayan destekler vermek, anlayışlı ve arkadaşça davranmak ve kontrol etmektir. Ölçek 6 ilköğretim okulunun 29 sınıfında bulunan 751 öğrenciye uygulanmıştır. Verilerin analizi sonucunda ölçeğin Türkçe çevirisinin geçerli ve güvenilir olduğu bulunmuştur. Cinsiyet analizi sonuçları sorgulamak, teşvik etmek ve övmek, sözlü olmayan destekler vermek kısımlarında kız ve erkek öğrenciler arasında fark göstermezken diğer boyutlardaki algılamaların farklı olduğunu göstermiştir. Farklı sınıf düzeylerindeki analizler, sınıf düzeyi arttıkça öğretmenlerin gösterdiği sorgulayıcı, teşvik edici ve övücü, anlayışlı ve arkadaşça davranışlarında ve sözlü olmayan desteklerinde azalma olduğunu göstermiştir. 6. ve 7. sınıflardaki öğrenciler ise davranışlarının öğretmenler tarafından çok sıkı kontrol edildiğini belirtmişlerdir.

Anahtar Sözcükler: öğretmen davranışları, öğrenme ortamı, sınıf düzeyi, cinsiyet

1. INTRODUCTION

Over the past several decades considerable knowledge has been constructed on determining primary and secondary students' perceptions of their learning environment (Fraser 1994, 1998; Fraser & Walberg, 1991; Wubbles & Levy, 1993). Classroom learning environment were investigated by both qualitative (Tobin, Kahle, & Fraser, 1990) and quantitative (Fisher & Fraser, 1983) research approaches. Researchers who conduct quantitative research developed several instruments to measure classroom environment from different perspectives such as My Class Inventory and The Learning Environment Inventory (Fraser, Anderson, Walberg, 1982) were developed to investigate primary and secondary classrooms learning environments respectively, the Science Laboratory Environment Inventory (Fraser, Giddings, & McRobbie, 1995) was developed to measure laboratory environment in science classes. More recently classroom environment research focuses assessment and improvement of learning and teaching within the context of constructivist learning environment (Taylor, Fraser, & Fisher, 1997; Taylor & Fraser, 1991).

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Learning environment studies revealed interesting associations between dimensions of learning environment and student learning practices. For example, it was found that there was a strong correlation between characteristics of learning environment and students' cognitive and effective learning outcomes. Since teachers are organizing the classroom environment, their contributions to students' learning play an important role in the correlations stated above (Fraser, 1998). Studies carried out in Holland, United States, and Australia revealed that teachers' positive communication with students, such as being helpful, behave friendly, being understanding, significantly developed students' higher level thinking skills and positive attitudes and prevented discipline problems (Fisher & Rickards, 1997; Rosenholts, Bassler, & Hoover-Dempsey, 1986; Wubbels & Levy, 1993).

One can easily see that structure of learning environments and teachers' behaviors can play an important role in students' understanding of the subject matter being taught. In order to study above issues researchers mostly collected qualitative data with observations to get direct information about classroom environment and teachers' behaviors. However in recent studies to investigate different aspects of learning environment researchers started to use perceptual data obtained from large students' samples. She (2000, p. 708) summarized the advantages of using students' perceptual information in 7 aspects. These are:

1. Students are directly involved in classroom activities and observe more of the teacher's typical behavior than does an outside observer. A teacher's behavior is context-based and one teacher can exhibit different behaviors in different subject areas.

2. Students are more familiar with their teacher's idiosyncrasies that can be interpreted differently by an observer.

3. Students are in a better position to judge certain aspects of a teacher's behavior (e.g., clarity of expression).

4. Students could observe aspects of the teacher's behavior that the observer does not.

5. Students' perceptions of the classroom have been shown to account for a greater proportion of the variance in student outcomes than have directly-observed lowinference variables.

6. The use of trained observers over a period of time is more expensive and time consuming than is the duplication, administration, and scoring of questionnaires.

7. The presence of observers could alter what generally occurs in the classroom.

Like other courses in science classes teacher-student interactions play an important role in students' learning because their interaction shaped their behaviors mutually (Fisher & Rickards, 1997; Wubbels & Levy, 1993). It is necessary to help teachers determine their behaviors in classrooms and put effort to create effective science classroom environments. For this purpose She and Fisher (2000) developed an instrument called Teacher Communication Behavior Questionnaire (TCBQ) to measure students' perceptions about their science teachers' behaviors. Based on their search She and Fisher (2000) argued that teacher communication patterns in a classroom can be measured by several constructs such as challenging, encouragement and praise, understanding and friendly. For example their literature review revealed that teacher's strict or controlling behavior in classroom environment strongly associated with student cognitive development but not attitudes. van Tartwijk (1993) found that non-verbal teacher behaviors (facial expression) also regulated the most of the events happened in the classrooms. Teachers' behaviors also had an effect on student achievement (Walberg, 1984). Teachers' questioning methods and their responses to students' answers were also seen as the important dimension in teacher-student communication in classroom environment (Carlsen, 1991; Smith, Blakeslee, & Anderson, 1993).

Above literature clearly pointed out the importance of teachers' communication patterns in students' learning. Unfortunately there is not much information available on teachers' communication behaviors in

Turkey. This study focuses on the validation and use of Turkish version of the (TCBQ) in a cross-study of elementary school science classrooms. The study also investigated the effect of gender and grade level on students' perceptions of their teachers' behaviors.

2. METHOD

2.1. Sample

TCBQ was administered to 751 students from 29 classes in 6 elementary schools. Students were enrolled in 4-8 grades. All of the schools were located in Ankara. Among schools 3 were located in the suburban, 2 were in urban areas and one was in a county. Selection of schools and classrooms were done by random selection. Table 1 summarizes the distribution of students as a function of gender, grade, and school location.

Table 1. Number of students in each demographic variable

Demographic variable	Number of students
Gender	
Female	397
Male	354
Grades	
4	163
5	167
6	165
7	127
8	129
School Location	
Urban	227
Suburban	384
County	140

2.2. Instrument

The TCBQ was developed to measure students' perceptions of their teacher's interpersonal communication behavior in the learning environments by She and Fraser (2000). Questionnaire includes five scales namely challenging, encouragement and praise, non-verbal support, understanding and friendly, and controlling. Below are the descriptions of each scale and some example items from Turkish Version – the full questionnaire in Turkish can be provided to researchers upon request- (Table 2) (She & Fraser, 2000, p.710):

Challenging: Extend to which the teacher uses higher-order questions to challenge students in their learning

Encouragement and praise: Extend to which the teacher praises and encourages students

Non-verbal support: Extend to which the teacher uses non-verbal communication to interact positively with students

Understanding and friendly: Extend to which the teacher is understanding and friendly towards the students

Controlling: Extend to which the teacher controls and manages student behavior in the classroom

Table 2. Example Items from Translated Version of the Questionnaire

TCBQ Scales	Example Items
Sorgulayıcı	Öğretmenim, bilgileri dikkatli analiz ederek cevaplayabileceğim sorular sorar.
	Öğretmenim, kendi cümlelerimi kullanarak açıklama yapmamı gerektiren sorular sorar.
Anlayışlı ve Arkadaşça	Öğretmenim bana güvenir.
	Öğretmenim bana karşı sabırlıdır.

For each item students could select one of the 5 options (almost never, seldom, sometimes, often, and very often). The TCBQ included 40 items and each scale consists of 8 items. TCBQ was developed for science classes for students who enrolled in 7 to 9 grades. On the development stage the items in the questionnaire were written in both Chinese and English. Chinese version applied to Taiwan students and English version was applied to Australian students. The Cronbach alpha reliability of each scale for Chinese version ranged between 0.86 and 0.93 in Taiwan and between 0.86 and 0.93 in Australia (She & Fraser, 2000).

In order to establish the content and construct validity of the TCBQ, She and Fraser (2000) did detailed literature search on the dimensions of the TCBQ. Moreover, they also relied on She's (1997, 1998, 1999, 2000) studies conducted over years with Questionnaire on Teacher Interaction (QTI-Wubbels & Levy, 1993 was developed)

The TCBQ was translated into Turkish by two bilingual university professors. Translated version was then back-translated into English by another bilingual instructor. Modification in wording was carried out until an acceptable compromise was reached. Translation process took a month.

3. RESULT

3.1. Validation of TCBQ

Principal components analysis: In the first step of validation of TCBQ a principal components analysis with varimax rotation was used to generate factors. The variance associated with each factor and their eigenvalues were presented at Table 3. Results of factor analysis revealed that besides two items all of the items loaded in their hypothesized scales of the Chinese and English versions of the TCBQ. In addition to their factor, item 11 and 12 also loaded to factor 1. After analysis of these items in order to increase the validity the wordings of these two items were changed as below:

Item Number	Original Item	Translated Item	Revised Item
11	This teacher encourages me to discuss my ideas with other students.	Öğretmenim fikirlerimi diğer öğrenciler ile tartışmam için beni cesaretlendirir.	Öğretmenim fikirlerimi diğer öğrenciler ile tartışmam için beni teşvik eder.
12	This teacher encourages me to express my opinions about a topic.	Öğretmenim bir konu hakkındaki görüşlerimi açıklamam konusunda beni cesaretlendirir.	Öğretmenim bir konu hakkındaki görüşlerimi açıklamam konusunda beni teşvik eder.

Table 3. Factor Loadings from Principal Component Analysis

Items	CH	EP	NVS	UF	CO
			Factor Loadings		
1	.54				
2	.62				
3	.62				
4	.61				
5	.60				
6	.52				
7	.42				
8	.48				
9		.32			
10		.55			
11		.40			
12		.36			
13		.64			
14		.60			
15		.73			
16		.56			
17			.56		
18			.50		
19			.71		
20			.70		
21			.72		
22			.69		
23			.69		
24			.75		
25				.38	
26				.81	
27				.43	
28				.86	
29				.43	
30				.78	
31				.61	
32				.56	
33					.39
34					.31
35					.68
36					.80
37					.57
38					.36
39					.77
40					.77
Variance	23.55	4.70	8.26	6.03	4.17
Eigenvalue	9.42	1.88	3.30	2.41	1.67

Reliability Analysis: Analysis of alpha coefficients of the five dimensions of the TCBQ instrument revealed that all the coefficients were accepted as high enough for the reliability of the items. The Cronbach alpha reliabilities for challenging, encouragement and praise, non-verbal support, understanding and friendly, and controlling were .69, .77, .86, .86, and .77 respectively. Overall scale reliability was found as .90. These findings indicated that Turkish version of the questionnaire had the similar reliability indices as the other two versions. Table 4 shows the reliabilities and discriminant validity scores of Chinese, English and Turkish versions of the TCBQ. Mean correlation of a scale with other scales were analyzed for

dicriminant validity of the instrument. The mean correlation of each scales of the TCBQ were ranged between .19- .62. These values can be accepted as small enough to verify the discriminant validity of TCBQ. These findings indicated that even though each scales measures different aspects of teacher's communication behavior there were some overlapping aspects among the scales. When three versions of the TCBQ compared, mean correlation of one scale with other scale of the Turkish version showed the similar indices with Chinese and English versions. The slight difference was observed for challenging scale. It was thought that the items 11 and 12 might create this difference because of the wording used in translations of these items.

Table 4. Internal Consistency (Cronbach Alpha Coefficient) Indexes of Chinese, English, and Turkish Versions

	Alpha Reliability			Mean Correlation with Other scales		
Scale	Chinese	English	Turkish	Chinese	English	Turkish
Challenging	0.88	0.86	.70	0.40	0.37	0.62
Encouragement and Praise	0.90	0.87	.77	0.50	0.45	0.61
Non-Verbal Support	0.93	0.91	.86	0.50	0.44	0.51
Understanding and Friendly	0.91	0.93	.86	0.46	0.40	0.54
Controlling	0.86	0.86	.76	0.16	0.06	0.19

3.2. Effects of Gender on Students' Perceptions

After validation of the TCBQ, effects of gender on students' perceptions were examined for the same participants. In order to investigate effect of gender on students' perceptions of their teachers' behavior t-test analysis was carried out. The results revealed no gender difference for the challenging, encouragement and praise, non-verbal support scales of the TCBQ. However significant differences were found for understanding and controlling scales. Female students' mean scores for understanding and friendly scale were higher than those of male students' scores. On the contrary to controlling scale male students' mean scores were higher than those of female students' mean scores. Table 5 summarizes the t-test results.

Table 5. Differences between Female and Male Students' Scores for each Scale

Scale	Female Mean Scores	Male Mean Score	*t-test*	*p<.05*
Challenging	3.96	3.92	0.64	.52
Encouragement and Praise	3.35	3.47	-1.78	.07
Non-Verbal Support	3.24	3.11	1.81	.07
Understanding and Friendly	4.26	4.00	4.27	.00
Controlling	2.90	3.15	-4.06	.00

3.3. Effects of Grade Level on Students' Perceptions

After validation of the TCBQ, effects of grade level on students' perceptions were examined for the same participants. To control for errors resulting from multiple comparisons, a multivariate analysis of variance (MANOVA) was performed. A 1 x 5 MANOVA was run to determine possible differences between students' responses in different grades based on different scales of TCBQ. The multivariate test was significant for the main effect of grade level, Wilks Lambda = .70, $F_{(20, 3755)} = 13.80$, $p < .001$. Univariate follow-up revealed significant differences on challenging ($F_{(5, 751)} = 15.03$, $p < .0001$, MSE = 8.97), encouragement and praise ($F_{(5, 751)} = 52.27$, $p < .0001$, MSE = 35.82), non-verbal support ($F_{(5, 751)} = 4.31$, $p < .001$, MSE = 4.21), understanding and friendly ($F_{(5, 751)} = 29.87$, $p < .001$, MSE = 18.66), and controlling ($F_{(5, 751)} = 5.46$, $p < .001$, MSE = 3.80). Duncan post-hoc analysis revealed very interesting trend among students' perceptions. For challenging, encouragement and praise, non-verbal

support, and understanding and friendly scales when the grade level increases students indicated fewer occurrences of these behaviors in their classrooms. For controlling scale, 6th and 7th grade students indicated that their teachers are more controlling than 4, 5 and 8th grade level teachers. Table 6 summarizes mean scores obtained as a result MANOVA analysis.

Table 6. Mean Subscale Scores for Students

	Mean Scores				
Grade	Challenging	Encouragement and Praise	Non-Verbal Support	Understanding and Friendly	Controlling
4	4.17 a*	3.92 a*	3.38 a*	4.53 a*	3.17 a*
5	4.14 a*	3.79 a*	3,14 a*	4.43 a*	3.13 c*
6	3.82 b*	3.29 b*	3,13 a*	3.99 b* c*	3.09 b*
7	3.92 a* b*	3.15 b*	3,30 a*	3.88 b*	2.86 b*
8	3.56 c*	2.71 c*	2,93 b*	3.73 c*	2.83 a* c*

*   p < .001. Means with similar letters (a, b,c,d) are not significantly different from each other; means with different letters (a, b,c,d) are significantly different from each other.

4. DISCUSSION

As in China and Australia TCBQ showed satisfactory results in Turkey. Validation of the Turkish version of the TCBQ has added a new instrument to Turkish researcher. Beside researchers, science teachers can also use this instrument to measure their classroom environments. The questionnaire validated in this study allows researcher to investigate science teachers' characteristics from a different perspectives. These perspectives were individualization, teacher interpersonal behavior, and constructivism. These areas were not being investigated previously (She and Fisher, 2000). Thus the major contribution of this study was to make this unique questionnaire available for use in Turkish science classrooms.

She and Fisher (2000) carried out their study for 7 to 9 grade level students. This study suggested that this instrument also gives valid and reliable results when it is used for 4 to 6 grade level students.

Analysis gender and grade level effects revealed interesting results. It was found that teachers' behaviors toward female students were more understanding and friendly than those male students. As it is stated in introduction part researchers found that positive teachers' behaviors influence students' attitudes and motivation (Fisher & Rickards, 1997; Rosenholts, Bassler, & Hoover-Dempsey, 1986). Based on this result it is argued that girl students may develop more positive attitudes and high motivation toward science courses than male students. Altınok's (2004) study provided empirical support to our suggestions. She carried out a research with 1042 fifth grade students. She found that girls have high motivation than males toward science courses. Based on gender analysis of this study it is also argued that more controlling behaviors toward male students may increase male students' achievement in science courses. If male students feel that teachers control their behavior they might try to do their best. For example, they may give more attention to do their homework on time and listen to their teachers. Not enough research is available on this issue in Turkey yet.

According to MANOVA analysis results, students in 6th and 7th grade indicated that their teachers are more controlling than 4, 5 and 8th grade level teachers. This finding shows that teachers might be more flexible with 4 and 5th grade students because they just started to learn science. Teachers could believe that more controlling environment may decrease students' motivation, attitudes, and achievement toward their courses. Actually in the literature there are many research findings support this behavior pattern of teachers (Ryan, Connell, & Deci, 1985; Zimmerman, 1999). It was found that enhancing students' control over their learning resulted in higher intrinsic motivation and better academic performance (Bandura & Wood, 1989;

Connell, 1985). What is more Eccles et al. (1993) argued that low student control over their learning might have a damaging effect on students' intrinsic motivation and to academic performance. Even though this suggestion might be true for 8 grade students, one needs to give special attention effects of High School Entrance Exam. Teachers in 8 grades might give flexibility to students in order to allow students to get better prepared for the exam.

Grade level analysis pointed out that when the grade level increases, teachers exhibit lower levels of challenging, encouragement and praise, non-verbal support, and understanding and friendly communication behaviors. This finding clearly revealed that teacher in 4 and 5 th grades give more importance to promote an environment for positive interactions with their students in their science classrooms.

5. CONCLUSION

This study investigated the validation of Turkish version of the TCBQ in a cross-study of elementary school science classrooms. Also the effects of gender and grade level on students' perceptions of their teachers' behaviors were also examined.

This study enabled researchers to utilize TCBQ in their research to find out students' perceptions of their teachers' classroom behaviors

According to this study, teachers were found friendly by females more than males. This finding revealed that teachers in elementary schools need to give more attention to their male students in order to increase their motivation. Since student motivation is strongly related to student success, teachers' understanding and friendly behaviors need to be increased towards male students. Moreover, male student success is also related to teachers' approach in the classroom. Teachers need to coach male students' learning process rather than controlling as an authoritative figure.

This study revealed a very interesting trend among teachers' behaviors toward students in different grade levels. In early grades, teachers behave flexibly towards their students in order to increase students' motivation and success in science lessons. When the grade level increases, they become more authoritative in order to maintain students' attention towards their courses. Teachers could increase student success in science with a similar trend.

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EXTENDED ABSTRACT (Uzun İngilizce Özet)

This study investigated the validation of Turkish version of the Teacher Communication Behavior Questionnaire (TCBQ) in a cross-study of elementary school science classrooms. The effects of gender and grade level on students' perceptions of their teachers' behaviors were also examined. Over the past several decades considerable knowledge has been constructed on determining primary and secondary students' perceptions of their learning environment (Fraser 1994, 1998; Fraser & Walberg, 1991; Wubbles & Levy, 1993). Learning environment studies revealed interesting associations between dimensions of learning environment and student learning practices. Studies carried out in Holland, United States, and Australia revealed that teachers' positive communication with students, such as being helpful, behave friendly, being understanding, significantly developed students' higher level thinking skills and positive attitudes and prevented discipline problems (Fisher & Rickards, 1997; Rosenholts, Bassler, & Hoover-Dempsey, 1986; Wubbels & Levy, 1993). One can easily see that structure of learning environments and teachers' behaviors can play an important role in students' understanding of the subject matter being taught. In order to study above issues researchers mostly collected qualitative data with observations to get direct information about classroom environment and teachers' behaviors. However in recent studies to investigate different aspects of learning environment researchers started to use perceptual data obtained from large students' samples. She and Fisher (2000) developed the TCBQ to investigate students' perceptions about their teachers' classroom behaviors.

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The TCBQ was administered to 751 students from 29 classes in 6 elementary schools. Data analysis revealed that Turkish version of the TCBQ was valid and reliable. Results of factor analysis revealed that besides two items all of the items loaded in their hypothesized scales of the Chinese and English versions of the TCBQ. In addition to their factor, item 11 and 12 also loaded to factor 1. After analysis of these items in order to increase the validity the wordings of these two items were changed. Analysis of alpha coefficients of the five dimensions of the TCBQ instrument revealed that all the coefficients were accepted as high enough for the reliability of the items. The Cronbach alpha reliabilities for challenging, encouragement and praise, non-verbal support, understanding and friendly, and controlling were .69, .77, .86, .86, and .77 respectively. Overall scale reliability was found as .90.

After validation of the TCBQ, effects of gender on students perceptions were examined for the same participants. In order to investigate effect of gender on students' perceptions of their teachers' behavior t-test analysis was carried out. The results revealed no gender difference for the challenging, encouragement and praise, non-verbal support scales of the TCBQ. However significant differences were found for understanding and controlling scales. Female students' mean scores for understanding and friendly scale were higher than those of male students' scores. On the contrary to controlling scale male students' mean scores were higher than those of female students' mean scores.

Effects of grade level on students perceptions were examined for the same participants. To control for errors resulting from multiple comparisons, a multivariate analysis of variance (MANOVA) was performed. A 1 x 5 MANOVA was run to determine possible differences between students' responses in different grades based on different scales of TCBQ. A 1 x 5 MANOVA was run to determine possible differences between students' responses in different grades based on different scales of TCBQ. The multivariate test was significant for the main effect of grade level, Wilks Lambda = .70, $F_{(20, 3755)}$ = 13.80, p < .001. Univariate follow-up revealed significant differences on challenging ($F_{(5, 751)}$ = 15.03, p < .0001, MSE = 8.97), encouragement and praise ($F_{(5, 751)}$ = 52.27, p < .0001, MSE = 35.82), non-verbal support ($F_{(5, 751)}$ = 4.31, p< .001, MSE = 4.21), understanding and friendly ($F_{(5, 751)}$ = 29.87, p< .001, MSE = 18.66), and controlling ($F_{(5, 751)}$ = 5.46, p< .001, MSE = 3.80). Duncan post-hoc analysis revealed very interesting trend among students' perceptions. For challenging, encouragement and praise, non-verbal support, and understanding and friendly scales when the grade level increases students indicated fewer occurrences of these behaviors in their classrooms. For controlling scale, 6th and 7th grade students indicated that their teachers are more controlling than 4, 5 and 8th grade level teachers. Grade level analysis pointed out that when the grade level increases, teachers exhibit lower levels of challenging, encouragement and praise, non-verbal support, and understanding and friendly communication behaviors. This finding clearly revealed that teacher in 4 and 5 th grades give more importance to promote an environment for positive interactions with their students in their science classrooms.