Determining the Psychometric Features of Reading Anxiety Scale

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Abstract

Reading anxiety is a reaction that is created against reading. It is one of the components that obstruct the process of transforming reading skill into a habit. For this reason, there is the necessity of knowing whether the student has a reading anxiety, or not; and to assign the level of the anxiety if he/she has it. This study aims to develop a scale oriented to determine the levels of reading anxiety in secondary school students. The data was collected through 616 students who were enrolled in 5 different secondary schools. For the development of the assessment instrument, the researcher followed literature review, creation of an item pool, content validity (consulting a specialist), pilot research phases; and made the required reliability calculations. Based on the scores gained through the scale, Exploratory and Confirmatory Factor Analyses (EFA and CFA) were applied to test the construct validity of the draft scale. Following the analysis, the researcher created a scale of 14 items. As a result of the factor analysis, the researcher found that the scale had a three-item structure which are "planning the reading process (0, 682-0, 544)", "components that support reading (0, 821-0, 774) ", "reading comprehension and analysis (0, 763-0, 471)"; and Cronbach's Alpha internal consistency coefficient was 0, 87. As a result of these analyses, the researcher created a valid and reliable scale to determine reading anxiety in secondary school students.

Introduction

Students who have reading difficulties not only experience problems of focusing, but also make reading mistakes such as reversing, skipping and repeating (Akyol, 2007). These problems cause the student to develop negative attitudes towards reading and to have high levels of reading anxiety (Murray and Janelle, 2003; Eysenck and Payne, 2006).

The notion of anxiety is defined by researchers as the stimulation of the nervous system by feelings like stress, fear and anger (Horwitz, Horwitz and Cope, 1986), as a discouraging emotional and motivational state that emerges in conditions of threat (Eysencek, Derakshon, Santos and Calvo, 2007), and as a state of nervousness that emerge in response to probable problems (Bandura, 1997). Based on these definitions, it could be stated that anxiety involves a process that disturbs the individual and it emerges as a reaction to a problem. Anxiety, which is among humans' essential feelings, manifests itself as concern (cognitive reactions) or as emotional (physical reactions) (Zeidner,

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1998). Anxiety may affect learning positively or negatively (Williams, Vickers and Rodriges, 2002). In this respect, anxiety can addressed under two headings based on its effect: facilitating anxiety and debilitating anxiety. *Facilitating anxiety* helps the student to be aware of the learning process by enabling her to focus on what she is reading. *Debilitating anxiety*, on the other hand, affects student performance by reducing her participation in the process and distancing her from the reading activity (Scarcella and Oxford, 1992).

Reading anxiety, which is a reaction developed against reading, can manifest itself not only in situations in which reading is required such as a classroom reading activity or an exam, but also as abstinence from reading (Goldston et al., 2007; Torgesen, 2000). Reason of reading anxiety are thought to be the student's thought that she will be evaluated after reading, and characteristics of the material to be read (fairy tale, dialogue, radio play etc.) (Bell and Perfetti, 1994). These reasons can be diversified when individual differences are considered.

Researchers suggest that it is necessary to consider the reading process in order to explain reading anxiety (Sellers, 2000; Zin and Rafik-Galea, 2010). Akyol (2007) addresses the reading process in three stages: before, during and after reading. Tobias (1986) maintains that these three stages should guide the examinations of reading anxiety. Factors that can create anxiety before reading are inability to define the purpose of reading, inability to choose the right strategy, distractibility, and lack of information regarding the material to be read. These factors foreclose a healthy reading process. Anxiety might increase after reading, if a connection cannot be established between what is learned through reading and previous experiences (Koizimu, 2002). Reading anxiety affects the student in all stages of reading skill, and the student avoids reading as the level of anxiety goes up. Once this situation arises, it might be too late to determine the student's reading anxiety and to improve her reading skill. Therefore, secondary school is a highly critical stage. The Turkish language education program lists the reading skills that students should acquire in secondary school as follows: *"Ability to read written texts, which can be encountered in daily life, accurately, fluently and using correct strategies; ability to assess and critically interpret what is read; and turning reading into a habit"* (MEB, 2006, p. 7).

This list is of importance in that it shows the level that a secondary school student should be expected to attain. In order to fulfill these requirements, efforts should be made to eliminate reading anxiety among students who have it. Reading anxiety often emerges when students encounter a reading situation that is difficult or that is totally new. It increases when the number of words that the reader does not know goes up or when the reader makes incorrect inferences. According to Eysenck and Payne (2006), a rise in the level of anxiety causes the student to develop a negative attitude towards the skill and to lose self-confidence. According to MacIntyre and Gardner (1991), the negative effects of anxiety begin to disappear and the student's positive experiences proliferate, as the student improves her reading skill. It is seen that this argument is confirmed by studies (Eysencek, 1992; Eysenck and Payne, 2006; Gomari and Lucas, 2013).

Goal

A review of literature indicated that there were no studies aiming to determine the levels of reading skills anxiety in secondary school students. This study aims to test the validity and reliability of this scale which has the capacity to determine secondary school students' reading anxiety levels based on the goals and attainments that are put forward in the program, regarding the findings and notions in literature related to the reasons of reading anxiety. This scale aims to be beneficial for the determination of reading anxiety levels in secondary school students.

Method

This chapter gives details about study group, development of scale items, validity and reliability studies.

Study Group

For the real application of the draft scale, data were collected from 639 5th, 6th, 7th and 8th grade students who were enrolled in five different schools located in the Yenimahalle District of Ankara in 2013-2014. For the number of students to be included in the study group, the criterion was the idea that for factor analysis "300 people is *'good'*, 500 people is *'very good'* and 1000 people is *'perfect'*" (Comrey and Lee, 1992 Transmitting Çokluk, Şekercioğlu ve Büyüköztürk, 2010, p. 206). That is, the number of participants of this study is considered to be "*very good*". After the application, the collected data were analyzed. 23 forms, on which students gave responses less or more than they were supposed to, were excluded from analysis. Distribution of the students of the study group by gender and grade level is presented in Table 1:

Table 1. Distribution of Students in Study Group by Gender and Grade Level

Grade Level	Gender		f	%
5	Girls		78	12,7
	Boys		78	12,7
		Total	**156**	**25,4**
6	Girls		78	12,6
	Boys		73	11,9
		Total	**151**	**24,5**
7	Girls		82	13,3
	Boys		72	11,6
		Total	**154**	**24,9**
8	Girls		98	15,9
	Boys		57	9,3
		Total	**155**	**25,2**
Total			**616**	**100,0**

As is seen in Table 1, it could be stated that the fact that the study group consisted of 5th, 6th, 7th and 8th graders will contribute to the scale's having high representative power for similar groups as well as having a larger variance in terms of age.

Watched Process Steps in the Process of Development of Scale

Forming an Item Pool

Reviewing the relevant literature was the first stage in the process of developing the scale (Pani, 2004; Goldston et.al., 2007; Zin and Rafik Galea, 2010; Sevim, 2012). Also the method which is following about writing items recommended by Tezbaşaran's (2008, p. 18) is used detecting anxiety items. According to this for determining specialities of anxiety levels, a paper that includes feeling, thoughts and habits requested from an small heterogen group. In the second stage, qualitative data were collected from 94 5th, 6th, 7th and 8th grade students attending the secondary school, in order to contribute to the formation of the item pool. These data were collected by asking the students to write essays on the topic of reading. Based on the literature review and student essays, an item pool consisting of 32 items that could reveal reading anxiety was formed. This sketch form checked in terms of their congruity with Turkish language rules, and then they were evaluated.

Acquiring Experts' Opinions (Content Validity)

At the stage, this sketch form content validity was addressed. According to Büyüköztürk (2007), a scale's success in measuring individuals' behaviors is closely linked to its validity and reliability. "Validity" refers to the degree to which a measurement instrument measures the variable

that it claims to measure. There are three types of validity: Content validity, concurrent validity, and construct validity (Tyler, 1971). In the study, the scale's content validity was measured. The 32 items that had been produced were reviewed by six experts (five on Turkish Language Education, and one on Measurement and Evaluation). These experts evaluated the items in terms of their expressive clarity, of whether they measure psychological factors other than anxiety, and of whether they measure only reading anxiety. Based on the experts' opinions and suggestions, six items were removed and three items were revised. That is, the draft scale included 26 items. This way, the scale's content validity was ensured.

Preliminary Test

A preliminary test application was carried out with 23 secondary school students, in order to check whether the items in the scale would be comprehensible to students. This application was carried out by the researcher, and students' feedbacks were taken into consideration. Based on the analysis performed on students' feedbacks, four items were removed from the draft scale. In order to find out whether all the 22 items in the draft scale would be accurately understood by the targeted students, two students were randomly selected from each grade level, who attended the schools where the preliminary test application had been conducted, yet who had not participated in that application. We worked with each of these students individually, who were asked to read out the draft scale's items. Then, they were asked comprehension questions. Eight students reported that they had comprehended the items. It was observed that one item was interpreted differently by six students, and this is why this item was removed from the scale. This way, the scale with 21 items became ready for preliminary test application. The researcher produced a measurement form in the following 5-point Likert-type format: "Never," "Rarely," "Sometimes," "Often," and "Always." This way, students would be given five different choices to respond to each item. At the end a form with five different categories for each item was given to students who already answered the scale.

Data Analysis

Within the framework of validity studies, SMRB's content and construct validity was investigated. An expert's opinion was taken for the measurement of content validity. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were used to determine the factor construct and sub-dimensions of the scale. The data set was divided into two equal parts; the data obtained from 612 students were used for EFA and those obtained from other 612 students were used for CFA. Acceptance level for factor load values was determined 0.30 in analyses. Cronbach Alpha reliability coefficient was examined to determine the reliability of the scale. In addition, t-test was used to compare the mean values of participants in 27% lower and upper groups for independent samples in order to determine item distinctiveness. CFA was used to test item-factor construct obtained from EFA. SPSS 22.0 program was used for reliability coefficient in EFA and LİSREL 8.8 program was used in CFA.

Findings and Interpretation

Data collected from 616 students were divided into two equal groups (308 forms each), which would then be subjected to explanatory and confirmatory factor analysis. For the scale's reliability, item-total score correlation was examined. Büyüköztürk (2007) suggests that correlation explains the relationship between scores received from items and the total score of the scale, and that those items whose item-total correlations are higher than 0.30 are considered to have high distinctiveness. Of the 21 items in the scale, seven that correlated with the total score below 0.30 were not included in factor analysis. Since all the remaining 14 items had positive statements, there was no reversely-scored item. The lowest possible score for the scale is 14, whereas the highest is 70. Higher scores represent higher levels of reading anxiety. In order to come up with the most suitable possible construct for the 14 items, factor analysis was employed. Item analyses were performed for the items that were included in the construct produced by the factor analysis.

Explanatory Factor Analysis

In order to evaluate the suitability of the data obtained from *The Reading Anxiety Scale for Secondary School Students* for explanatory factor analysis, Kaiser-Meyer-Olkin (KMO) and Bartlett's tests were performed. KMO test measurement value was found to be 0,913, whereas Bartlett Sphericity test is meaningful (X^2=1370,982, sd=91, p=,000). KMO values higher than 0,90 are interpreted to be indicative of the suitability of the data set for factor analysis (Kalaycı, 2006). After collecting these evidences about the suitability of the data set, factor analysis was performed using the Principal Components Analysis method (Tabachnick and Fidell,1996).

At the first stage, factor analysis was performed on 14 items. In item factor analysis, the value of 0,40 was taken as the base, and the difference between the item's loading value in the first factor and its loading values in other factors was ensured to be 0,10 or higher (Büyüköztürk, 2005). It was observed that the scale did not have any item, which would not fall under any factor or which would have similar loading values in more than one factor that could not be differentiated from one another. The 14 factors were grouped under three factors. Information about these factors are presented in the graph below:
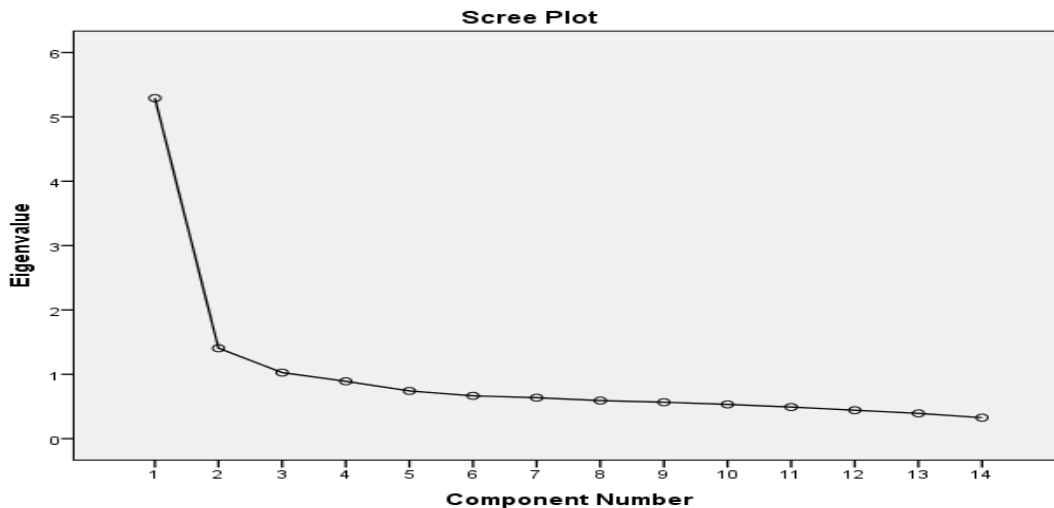

Figure 1. Scree Plot

The above scree plot shows that the scale has three factors that have eigenvalues of 1 or higher. Hutcheson and Sofroniou (1999) suggest that factors with eigenvalues of 1 or higher should be considered important factors. Therefore, eigenvalue criteria are employed in order to determine the number of factors that could most efficiently reveal the relationships among items (Büyüköztürk, 2007). In this study, eigenvalues regarding the scale's factors were examined.

Table 2. Eigenvalues and Variances of Factors

Factor	Rotation Sums of Squared Loadings		
	Eigenvalue	Variance Explained %	Total %
1	5,291	21,361	21,361
2	1,405	18,887	40,248
3	1,027	14,918	55,166

Table 2 demonstrates that the first factor, which has seven items, explains 21,361% of the total variance, and its eigenvalue is 5,291. On the other hand, the second factor, which consists of three items, explains 18,887% of the total variance, and its eigenvalue is 1,405. Finally, the third factor, which has four items, explains 14,918% of the total variance, and its eigenvalue is 1,027. The fact that 55,166% of the scale was explained is considered to be sufficient, because an acceptable variance ratio should be between 40% and 60% (Tavşancıl, 2002). Büyüköztürk (2007) suggests that the size of the variance explained demonstrates the extent to which the concept or construct in question is measured. Below is the distribution of items by factors as well as factor loadings:

Table 3. Results of Explanatory Factor Analysis for the Reading Anxiety Scale for Secondary School Students

Item No	Factor 1	Factor 2	Factor 3
I14	,682		
I8	,667		
I11	,626		
I10	,600		
I9	,599		
I13	,562		
I3	,544		
I7		,821	
I6		,801	
I5		,774	
I1			,763
I2			,710
I4			,581
I12			,471

As Table 3 demonstrates, factor loadings of the scale's items range between ,471 and ,821. Having factor loadings above 0,45 is a good criterion for item selection (Büyüköztürk; 2007). Factor loadings of the items of the first factor range between ,682 and ,544. This factor consisted of items pertaining to what a student should do in the reading process, and thus it was named *"planning the reading process."* On the other hand, factor loadings in the second factor, which consisted of three items, range between ,821 and ,774, This factor, which had items about visuals that support the text and the style as well as size of letters in the text, was named *"elements that support reading."* Finally, loadings in the third factor, which consisted of four items, range between ,763 and ,471. Since the items in this factor were about comprehending and analyzing the reading material, it was named *"reading comprehension and analysis."*

It was observed, when the scale's structure was examined, that the seven items in the first factor were about *"planning the reading process,"* the three factors in the second factor were about "*elements that support reading,"* and the four items in the third factor were about *"reading comprehension and analysis."* When naming these factors, the experts were also consulted.

Confirmatory Factor Analysis

In order to confirm that the scale consisted of three factors, confirmatory factor analysis was performed using qualitative data analyses. In confirmatory factor analysis, it is tested whether a model, which is produced on the basis of previously acquired data, will be confirmed by existing data. While implicit variables represent a theoretical construct in confirmatory factor analysis, observed measurements are designed as the indicators of this construct (Seçer, 2013). As is seen in Figure 2, the confirmatory factor analysis was built on an equation in which three implicit variables (three factors obtained in the explanatory factor analysis) accurately predict 14 observed variables.
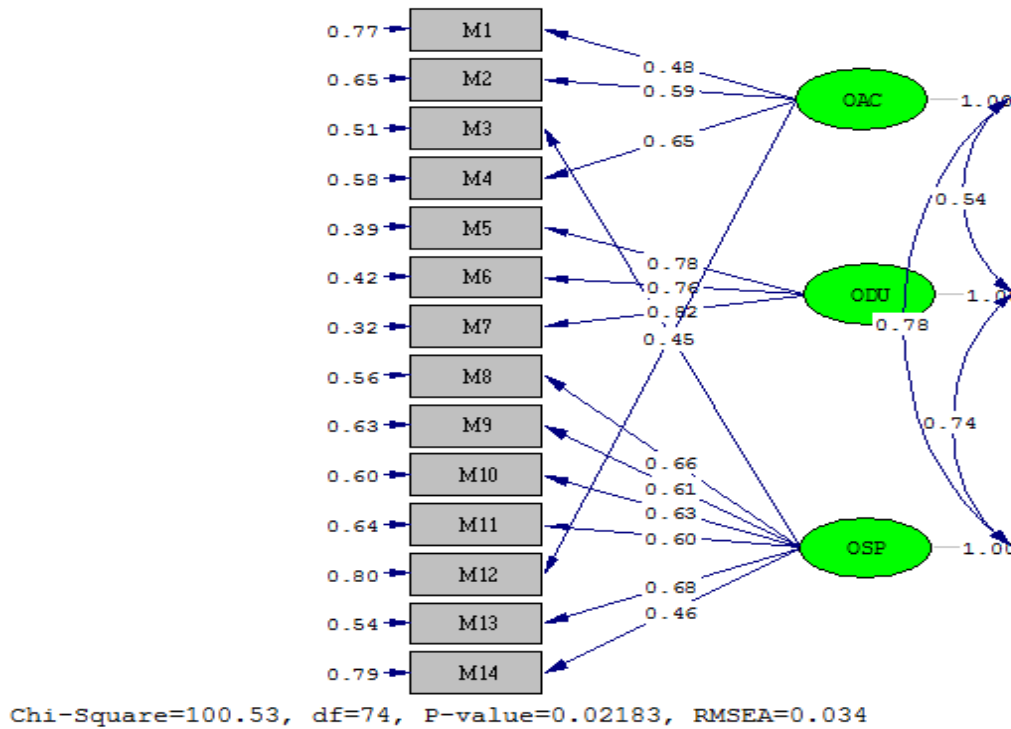

Chi-Square=100.53, df=74, P-value=0.02183, RMSEA=0.034

Figure 2. Results of Confirmatory Factor Analysis for the Reading Anxiety Scale for Secondary School Students

In the confirmatory factor analysis, the following model fit indexes were addressed RMSEA (Root Mean Square Error of Approximation), SRMR (Standardized Root Mean Square Residual), GFI (Goodness of Fit Index), AGFI (Adjusted Goodness of Fit Index), CFI (Comparative Fit Index), NFI (Normed Fit Index). The RMSEA value, which is supposed to be below 0,05 for the model's fitness, was found to be 0,034 and SRMR value, which is also supposed to be below 0,05, was found to be 0,045. Other values, which are supposed to be above 0,90 for the model's fitness, were the following GFI: 0,96; AGFI: 0,94, CFI: 0,99; NFI: 0,97 (Seçer, 2013). These findings indicate that the model was confirmed by the data.

Analysis of the Scale's Reliability

Cronbach's Alpha reliability coefficient was calculated in order to determine the extent to which the scale measures what it is supposed to measure (reading anxiety, for this scale). According to Büyüköztürk et al. (2008: 110), this coefficient is an indicator of the consistency between individual items' scores and the total test scores. The scale is "somewhat reliable" when this coefficient takes a value between 0,60 and 0,80, and it is "highly reliable" when the coefficient takes a value between 0,80 and 1,00 (Akgül and Çevik, 2003). The following Cronbach's Alpha values were calculated: 0,814 for the first factor, 0,831 for the second, 0,612 for the third, and 0,870 for the entire scale. For the scale's reliability analysis, lower and upper 27% groups were also compared. In order to test whether there

existed a significant difference between the groups' mean scores, scores of the lower 27% (n=166) and upper 27% (n=166) were analyzed using independent groups t-test. In the analysis, the items' mean scores were found to range between 1.25–4.13, the t values for the differences between the item scores of lower and upper groups were found to range between 10.53 – 24.83, and these differences were found to be statistically significant for all items (p <0.01). These values indicated that the items were adequately distinctive.

Discussion and Conclusion

The reliability of the "Reading Anxiety Scale for Secondary School Students," which was developed on the bases of the relevant literature, student essays and experts' opinions, was tested through Cronbach's Alpha Coefficient for the sub-dimensions of "planning the reading process," "elements that support reading," and "reading comprehension and analysis." The Cronbach's Alfa reliability coefficient was found to be 0,87, for the entire scale. This percentage is sufficient to demonstrate the scale's reliability for measuring reading anxiety among secondary school students. Since the internal consistency coefficients for the three sub-dimensions of the scale are between 0,61 and 0,81, it is possible to qualify this scale as highly reliable. These findings were supported by the results of confirmatory factor analysis. All model data fit indexes are above the criterion value, 0.85, and the RMSA value for the model is 0,034; p<0,01.

It is observed that most studies on reading anxiety are concerned with teaching of second language (Gardner, 1985; Dörnyei, 1998; Abu-Rabia, 2004; Lien, 2011; Gomari and Lucas, 2013), and that there are studies in which anxiety in first language acquisition is correlated with motivation (Marinak and Gambrell, 2008;Mihandoost et al., 2011; Dündar and Akyol, 2014). Reading, which is a skill that children start to acquire and improve with schooling, is different from other skills in that it guides the individual's personal learning processes in subsequent years (Grabe and Stoller, 2002). Before aiming to endow students with reading habit, it is necessary to firstly inquire whether they feel anxious about reading, and if they do, to plan the activities in order to eliminate this anxiety. It was found that students who had difficulty in reading also had higher levels of anxiety and lower levels of academic achievement (Buttler et al., 1985). This should not be seen only in terms of the impact of reading upon academic achievement (Pani, 2004). If students' reading anxiety is not taken care of early in their school lives, this anxiety might turn into a negative force that affects their lives (Grills-Taquechel, Fletcher, Vaughn and Stuebing, 2012; Torgesen, Wagner and Rashotte, 1994). It is believed that the reading anxiety scale will be of help in preventing this problem.

In the research, reading anxiety was addressed at the secondary school level, and a reading anxiety scale that targets secondary school students was developed. It is seen that studies on anxiety among this group concentrate on the skills of listening (Melanlıoğlu, 2013), speaking (Demir and Melanlıoğlu, 2014; Arslan, 2012; Sevim, 2012) and writing (Yaman, 2010; Zorbaz, 2010; Özbay and Zorbaz, 2011; Tiryaki, 2012). The reading anxiety scale developed in this study is a huge contribution to the relevant literature. Findings to be obtained using this scale might be used in examining the relationship between reading anxiety and the skill of reading, as well as in determining the variables that shape students' reading-related anxieties. Based on the data to be obtained using this scale, studies oriented towards reducing students' reading anxiety can also be carried out.

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