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## Investigation of the level of prospective teachers' learned helplessness in mathematics in relation of various variables

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### Abstract

One of the lessons in where learned helplessness is most observed is maths. Learned helplessness behavior towards maths can affect students' maths performance greatly. The first formation of students' learned helplessness behavior towards maths usually starts at primary school ages. Accordingly, classroom teachers and maths teachers have a crucial role in whether students exhibit learned helplessness behavior towards maths or not. Within the context of this study, the purpose is to investigate the maths-related learned helplessness levels of prospective teachers who are receiving education in the departments of primary mathematics teaching and classroom teaching in faculties of education with regard to different variables. The study sample comprised 305 students receiving education in the Programs of Primary Mathematics Teaching and Classroom Teaching in Hasan Ali Yucel Education Faculty at Istanbul University during the 2012-2013 academic year. In this study, students' learned helplessness levels in maths were measured through "Learned Helplessness in Mathematics Scale", which was developed by Biber and Başer (2012). Within the context of the study, significant results were obtained in relation to the prospective teachers' learned helplessness levels in maths as a result of the analyses carried out with regards to gender, program of study and grade level variables. It is believed that the obtained results will contribute greatly to the mathematics education provided in the programs of primary mathematics teaching and classroom teaching.

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*Keywords:* Learned helplessness behavior, causality dimensions, maths education

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### 1. Introduction

Dividing learning into three domains, Bloom et al. define learning capacity of the individual as the cognitive (reading, writing, math and book subjects), the affective (feelings, motivation and values) and the psychomotor (physical education) According to Bloom, it is a necessity that the students in the educational environment should primarily be brought to the same level in two of the domains of Mastery Learning covers and for this teaching model's being effective in students' learning. These domains are the affective domain (affective input features) and the cognitive domain (cognitive input).

The affective input features are the students' positive and negative emotional approaches towards the subject or the lesson (Yeşilyaprak, 2006). Human characteristics in the scope of the affective domain includes trends of variety

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of ways of feeling and behavior of the individual like having attitudes towards something, his interest to do something, his self-confidence, caring for something, commitment to national ideas, being tolerant of others' ideas, keeping the environment and equipment clean, and managing the time effectively and so on (Senemoğlu, 2005).

One of the affective factors known to have an impact on the individual's learning and academic success is called learned helplessness. The notion of the learned helplessness is used for the first time by Seligman et al. in consequence of some of the studies they carried out at the University of Pennsylvania. Learned helplessness according to Stipek (1988) is a motivational problem that causes the individual, who fails to success at work, to feel him/her inadequate in the way to improve his/her work performance (Shields, 1997).

When the individual, according to the learned helplessness model, experiences that he has a perception of a loss of control resulting in negative effects, in another case, he can't help thinking that he has the potential to cause a failure even he in real can control the outcome of the event, and this probability, even in cases he can control the result in a positive way with his actions, tends him not to show the right behavior that helps him reach achievements (Abramson et al., 1978).

The failure experienced by the individual as a result of his experiences or the likelihood of his inability of controlling the result of his own behavior, may lead to failures in many areas of life, such as academic, social and personal dimensions of the individual's life. Even in cases where the results can be controlled, occurrence of feeling likely to face an obstacle is considered as a cognitive error (Abramson et al., 1978). As a result of learned helplessness experiences, the individual is becoming afraid of not only the likelihood of making a failure, but also he cannot notice his proficiency, enough for performing a specific task.

The occurrence of learned helplessness in the individual according to Abramson et al., (1978) depends on the individual's way of explaining his behaviors and the results of the reasons of these behaviors. According to Peterson&Seligman (1984), there are three explanatory causality dimensions that describe learned helplessness. These are: the internal-external dimension, the hard-to-change/stable or changeable dimension, and the global-specific dimension. Internal dimension indicates the results related to the feeling inside of the individual himself; the external dimension yet refers to a reason related to the situation and the conditions for the individual's participation. The cause points out the stable dimension if it is a factor which continues over time or the changeable dimension if it is temporary.

In the end, the cause indicates the general dimension if it can affect many results or the specific dimension if it is limited with only the event in question (Demir, 2003). According to Abramson et. al., (1980), the causes of the cognitive and affective overload expected to cause learned helplessness mostly and to facilitate the generalization to the new media are internal, stable and global dimensions. Because of these causative factors of such an overload, there leads the individual to be in a state of fear that he cannot avoid of the likelihood of a general failure.

The learned helplessness model is characterized as the state of depression occurred by the individual's inability of controlling the results of his own behaviors. It can be mentioned about the existence of conditions that affect and are affected by learned helplessness. The environment the students mostly spend their time is the class environment. It is clearly seen that the class atmosphere will affect the behavior of all students. In this case, it can be said that learned helplessness experiences will be affected by the atmosphere of the class (Cananoğlu, 2011).

The classroom management approach adopted by the teachers is thought to be an important factor causing the occurrence of learned helplessness in children. The teachers who creates an authoritarian environment in the class by shouting at the students, using physical force, putting unnecessary authoritarian rules might be considered to motivate the students towards the lesson in a negative way and to cause them to display learned helplessness, a complex behavior.

Of the lessons in which learned helplessness is encountered most frequently is primarily Mathematics. In the emergence of this case, besides mathematics' being seen as a difficult and obscure course, also the foundations of mathematics required to be acquired enough by the students in order to reach high-level information have a significant impact on this case. At this point, the crucial role of primary school teachers that give the students the basic math skills, also the role of elementary mathematics teachers in the occurrence of learned helplessness are so important. Classroom teachers and elementary mathematics teachers' mathematical thinking skills and their perspectives of mathematics are thought to likely cause the emergence of learned helplessness in students towards

mathematics. In this context, the study, according to different variables, aims to investigate the classroom and elementary mathematics teachers of the future are at which level of learned helplessness in mathematics. It is believed that the results obtained may provide important contributions to mathematics education and teaching training programs. In this research, the answers sought to the following questions;

1. Do the levels of learned helplessness of the pre-service teachers in the matter of mathematics differentiate by the kind of gender?
2. Do the levels of learned helplessness of the teacher candidates on the subject of mathematics differentiate based on which grade they are in?
3. Do the pre-service teachers' levels of learned helplessness in the realm of mathematics differentiate according to the departments they study in?

## 2. Method

The research was carried out by using the scanning model. The sample of the study is 391 teachers of Primary Education Programs and studying Elementary Mathematics Education in Hasan Ali Yucel Faculty of Education at Istanbul University in the academic year of 2012-2013.

### 2.1. Data collection tool

In this study, 'The Learned Helplessness Scale in Mathematics' developed by Biber and Baser (2012) is used to determine the levels of learned helplessness in mathematics of the pre-service teachers. The Learned Helplessness Scale in Mathematics consists of 34 items designed to measure the attribution internal, stable and overall dimensions which are unique to learned helplessness and also called depressive attributional forms. In each item of the scale, a positive or negative event is being determined and an option of two causal attribution dimensions is offered for this event. 11 items of the scale are respectively related to internal-external; 13 are private-general; and 10 are stable-changeable causal attribution dimensions. The Reliability Coefficient of The Cronbach Alpha was found to be 0,82 as a result of the validity and reliability study made by Biber and Başer (2012).

### 2.2. Data analysis

The data used in this study were obtained by a data acquisition tool and they were analyzed using the SPSS 20.0 software package. During data analysis, t-test and one-way ANOVA were used for arithmetic mean, standard deviation and unrelated samples.

## 3. Findings and comments

This part includes the findings and interpretations obtained for each sub-problem in the study.

### 3.1. Findings for the first sub-problem

The findings on the first sub-problem (Do the levels of learned helplessness for the pre-service teachers differentiate in mathematics according to their type of gender?) are shown in Table 1;

Table 1. T-Test results of the teacher candidates' levels of learned helplessness in mathematics according to their type of gender

Gender	N	$\bar{X}$	S	sd	t	p
Female	259	42,12	4,94	389	-4,81	.000
Male	132	44,93	6,35			

When Table 1 is examined, it is seen that there is a significant difference between the levels of learned helplessness on the subject of mathematics among the teacher candidates by gender [ $t(389)=-4,81$ ;  $p<.01$ ]. These findings reveal that the levels of learned helplessness of the female students ( $\bar{X}=42,12$ ), are lower than that of the male students ( $\bar{X}=44,93$ ). This finding may be interpreted as there has been a significant relationship between the gender and learned helplessness in the matter of mathematics.

### 3.2. Findings for the second sub-problem

The findings related to the second sub-problem (Do the pre-service teachers' levels of learned helplessness differentiate in mathematics by the grade levels at which they take lessons?) are indicated in Table 2;

Table 2. ANOVA results of the teacher candidates' levels of learned helplessness in mathematics by the grade levels at which they take lessons

Source of Variance	Sum of Squares	df	Mean Square	F	Sig.	Significant Dif.
Between Groups	373,45	3	124,48	4,03	.008	3-4
Within Groups	11932,24	387	30,83			
Total	12305,69	390				

When Table 2 is examined, it is obviously seen that learned helplessness levels of the pre-service teachers differentiate significantly in the matter of mathematics at which grade they are according to their success [ $F(3,387)=4,03$ ;  $p<.01$ ]. This finding reveals that the class level is an important factor in learned helplessness on the subject of mathematics.

According to the results of Scheffé Test carried out to find in which classes there occur a difference, it is seen that the levels of learned helplessness for 4th grade students ( $\bar{X}=44,58$ ) are significantly higher than that of 3rd grade students ( $\bar{X}=41,98$ ).

### 3.3. Findings for the third sub-problem

The findings for the third sub-problem (Do the pre-service teachers' levels of learned helplessness differentiate in mathematics according to the departments they study in?) are presented in Table 3;

Table 3. T-Test results of the teacher candidates' levels of learned helplessness in mathematics according to the departments they study in

Department	N	$\bar{X}$	S	sd	t	p
Primary Mathematics Education	182	41,60	4,42	389	-4,96	.000
Classroom Teacher Education	209	44,35	6,21			

## 4. Results, discussion and recommendations

Examining Table 3, it can be said that there is a significant difference between the levels of learned helplessness of the teacher candidates' knowledge of mathematics as to the departments they studied in [ $t(389)=-4,96$ ;  $p<.01$ ]. These findings show that compared with that of the students of the classroom teaching department ( $\bar{X}=44,35$ ), the levels of learned helplessness of the students in the department of elementary school mathematics ( $\bar{X}=41,60$ ) are found to be lower.

According to the results obtained in the study, it is concluded that in levels of learned helplessness of the pre-service teachers in the matter of mathematics, there seems a difference by gender; and the girls are seen to display learned helplessness possibly less than the boys. When the related literature is examined, we see that some of the research results are in support of the conclusion derived from this study. In other studies made by Valaes (2001a), Valaes (2001b) and Duzgun and also Hayalioglu (2006), it can be observed that boys much likely have tendency of displaying learned helplessness than the girls do. Dweck ve Repucci (1973) indicate that generally the girls more

than the boys are displaying learned helplessness. In another study conducted by Biber and Baser (2012), it is pointed out that learned helplessness of the students in the matter of mathematics does not differentiate by gender.

Another result obtained in the context of research is that the candidate teachers' levels of learned helplessness on the subject of mathematics vary according to the class level at the university. The results of the study point out that the pre-service teachers display learned helplessness at least in third grade and at most in 4th grade. Accustomed to the university life and completely focused in the area from which they will graduate, in parallel to this, it is expected to result that the third grade students display rather less learned helplessness than the 4th grade students. It can also be explained with the increase in their self-confidence towards mathematics courses as a result of their taking the most intensive courses of mathematics in 3rd grade. The students' self-confidence decreases because the students at 4th grade cannot get ahead of the professional concerns they have about their future, and this may affect in a negative way of the levels of learned helplessness of the students in the area of mathematics. In another study conducted by Biber ve Baser (2012), they reach such a variety of results that support the results obtained in this study.

Another result obtained in the context of research has such a meaning that the levels of learned helplessness of the pre-service teachers in the matter of mathematics differentiate according to the grade levels at which they are grouped. Results of the study indicate that the pre-service teachers display learned helplessness on the subject of mathematics at least in 3rd grade and mostly in 4th grade. It is an expected result that grade 3 students getting oriented to the university life and fully focusing on the area they will graduate display, in parallel to this, learned helplessness less than grade 4 students. It can also be explained by the increased self-confidence of the students towards mathematics as a result of their taking the most intensive mathematics courses in grade 3. In 4th grade, raising serious professional concerns make students' self-esteem decrease and this may also cause a negative impact on the students' levels of learned helplessness in mathematics. In the study conducted by Bayer and Baser (2012), the conclusions they reach are of the ones that support the results which are obtained in this study.

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