THE EFFECTS OF GRADE, SELF-EFFICACY, LEARNED-HELPNESSNESS, AND COGNITIVE ENGAGEMENT ON LIKING MATHMATICS AMONG PRIMARY SCHOOL STUDENTS

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ABSTRACT

This study aims at a) investigating the effects of grade, self-efficacy, learned-helplessness, and cognitive engagement on liking mathematics, and b) assessing the developmental trends of these variables across grade levels The subjects of the study are 159 primary school students. The results showed that the effect of the variables on liking maths was 44.8%, of which self-efficacy and cognitive engagement explained 24% and 11%, respectively. It was also found out that the variables affected liking maths directly. Trend curves revealed an increase in learned helplessness, but declining levels of cognitive engagement, and self-efficacy by grade. As elementary school is a foundation age for future educational development, students should be helped to avoid learned helplessness and develop a feeling of competence and engage themselves cognitively in learning mathematics.

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INTRODUCTION

The Relationship among Self-Efficacy, Cognitive Engagement, Learned Helplessness, and Interest·

The most single motivational construct that received a considerable focus in diverse disciplines is perceived self-efficacy. Since Bandura (1977) has proposed the theory that peoples' judgment of their competence to organize and execute a course of action determines their performance accomplishments, a large body of study has been conducted in various fields. The belief about ones ability to organize and perform a given task is termed by Bandura as self-efficacy. It attracted researchers to carry out studies in their fields probably because self-efficacy theory of Bandura has managed to overcome many of the conceptual and psychometric problems that were mainly the major drawbacks of other self-conception constructs (Zimmerman 2000). Achievement motivation researchers tried to investigate the diverse effects of personal efficacy beliefs individuals possess on their task accomplishments. Self-efficacy beliefs are found to act as mediators between the skills, previous performances, abilities, and future performances, as well as predictors of affective, cognitive and motivational variables such as anxiety, attitude as well as academic outcomes (Bandura 1986, 1995; Zimmerman 2000; Wigfield and Eccles 2000; Pajares, Miller and Johnson 1999; Yalew 1997).

Schunk (1988) has suggested that students' beliefs about their competence to perform learning tasks influence their cognitive engagement. Other researchers have also concluded that self efficacy played a predictive role in relation to cognitive engagement (Pintrich and De Groot 1990), which includes attending to instruction, processing and integrating knowledge, completing home and class works in time, rehearsing information, being involved in self-regulated learning, participating in learning activities, and focusing on mastering the learning task. Pintrich and De Groot have

suggested that improving the self efficacy beliefs of students can lead to increased use of cognitive strategies.

According to Bandura and other researchers (Bandura 1977, 1992; Pajares, 1996a, b; Zimmerman 2000), self-efficacy beliefs emanate from four sources: previous performances, vicarious experiences, verbal persuasion, and physiological states. Of these sources, states the theory, the influence of previous experiences is by far strong, which either facilitates or stunts their development. Success boosts the level of self-efficacy while failure lowers it. Similarly, cognitive engagement is influenced by previous performances.

A model developed by Schunk (1988) clearly depicts that aptitude and previous performances directly affect self-efficacy beliefs which, in turn, directly influenced task engagement. In a study of mathematics skills development, Schunk (1984) further indicated that self efficacy was found to enhance the mastery of mathematics skills directly by influencing the quality of thinking and use of acquired knowledge and skills. A recent study has also shown that cognitive engagement correlated with competence beliefs (Lau, Roeser, and Kupermintz 2002). These researchers reported that students' classroom engagement was found to mediate between competence beliefs and science grades.

Social cognitive psychologists firmly believe that previous performances enhance or debilitate students' self-efficacy beliefs and their willingness to engage in learning tasks. Specially repeated failures in the early years of schooling could have the most adverse effects on the personal efficacy beliefs of the learners before they adequately developed. Such repeated failures may lead to the development of learned helplessness. Although their interest rests mainly on previous performances of learners, social cognitive psychologists do not address the role of learned helplessness in affecting self-efficacy beliefs and cognitive engagement of students. They repeatedly argued that previous achievement is one of the most important variables that determines efficacy beliefs and other motivational resources.

The question here is why and how? Previous performances *per se* do not lead to low or high self-efficacy beliefs. It is the associated affects that have negative or positive consequences. If, for instance, we say that repeated failures lead to lowered self-efficacy, it is tantamount to say that students have developed a negative expectation of success. This feeling of anticipating the negative side of success is termed as learned helplessness.

Seligman (1975), who developed the concept of learned helplessness, stated that learned helplessness negatively affects learning, the self system, and could lead to emotional disturbances such as depression.

According to Seligman (1975), learned helplessness is a mental set that stems from the conviction that one's effort and actions do not have an effect on one's performances or accomplishments. Slavin (1994: 361) defined learned helplessness as "the expectation, based on experience, that one's action will ultimately lead to failure."

Learned helplessness is a manifestation of pessimism and negative expectations about the future. Accordingly, the higher the learned helplessness, the lower the goals people set for themselves, and the weaker will be their commitment to the goals as well as the lower the anticipation of success. Some researchers (e.g., Stipek 1992: 591) disclosed that students' perceptions of their ability and the expectation for success are "simply the reflections of their experiences in school" that depend mainly on their achievement history. As stated earlier, students who have successful experiences tend to have high level of self-efficacy and expect to succeed (Stipek and Hoffman 1980). For these researchers, learned helplessness is a motivational problem that arises from failure in one or two tasks in the past caused by either teachers, parents or both. When individuals feel that they are incapable of doing tasks, cannot control their environment, and attributed their failure to lack of competence rather than lack of effort and working hard, they develop

learned helplessness (Ramirez, Maldonado, and Martos 1992; Cullen and Boersma 1982).

Peterson, Maier and Seligman (1992) argued that learned helplessness creates three basic deficits in the child - cognitive, emotional, and motivational - that destroy the child's desire to learn. Learned helplessness aborts the child's initiation to learn, causes the child to believe that he/she has no control over the learning process and his/her behaviour, and to expect that the outcomes are inevitable, as well as leads the child to develop a lowered self-esteem. In other words, learned helplessness will impair learning and is detrimental to the child's cognitive and psychological development.

Moreover, studies conducted to investigate the trend of self-efficacy across grade levels showed that perceived efficacy increased from lower to higher grade levels (Zimmerman and Martinez-Pons 1990; Shell, Colvin, and Bruning 1995). However, other studies reported opposite results. For instance, citing some studies; Stipek (1992: 581) stated that "...children's ratings [of self-perceptions of competence] are near the top of the scale through the elementary grades and then decline, on average, thereafter."

THE CONCEPTUAL MODEL

Research has indicated that learned-helplessness has no direct effect on achievement; rather its effect was mediated by attitude. The effect learned helplessness has on attitude was strong but negative, which connotes its aversive role on the affective component of the learners (Mehari and Yalew 1999). Since learned helplessness develops as a result of repeated failures, and because academic history helps create personal efficacy judgments (Pajares and Kranzler 1995; Zimmerman 2000; Bandura 1995), and determines the degree of cognitive engagement (Pintrich and De

Groot, 1990; Schunk 1988), it is possible to hypothesize that these two factors are affected directly by learned helplessness.

On the other hand, self-efficacy beliefs influence the learning methods students choose to employ, their choice of activities they undertake, and their motivational processes, i.e., their cognitive engagement (Schunk 1991), which both will determine the interests and choices of students to learn the subjects.

This study attempts to integrate the social cognitive theory (Bandura 1995; Pajares and Kranzler 1995; Zimmerman 2000) and expectancy value model of Wigfield, Eccles, and colleagues (2000). According to these theories, personal self-efficacy affects the motivational, cognitive and affective aspects of the learners (Bandura and his colleagues). In this regard, therefore, it was hypothesized that self-efficacy predicts the degree to which students like maths, their interest in the subject. Wigfield and Eccles (2000) showed that previous achievement-related experiences influence the child's goal setting and general self-schemata, which include self-schemata, short- and long-term goals, self-concept of one's abilities, ideal self, and perceptions of task demands.

Based on these theories, learned helplessness was presumed to influence directly self-efficacy, cognitive engagement, and liking mathematics; and self-efficacy was hypothesized to have direct influences on cognitive engagement and liking mathematics. In the model, grade was treated as an exogenous variable and hypothesized to have direct effects on all the other variables.

It was also assumed that learned helplessness should increase with the increase in grade level because once it started developing, the probability that it becomes strong as one grows old tends to be high. This should parallel decreasing levels of self-efficacy, cognitive engagement and liking of mathematics by the students.

The study was initiated based on data secured from interviews conducted with 5 of the 7 teachers of mathematics who have been teaching the subject in the school where this study was conducted. According to them, students have problems of learning mathematics that are manifested in the form of low interest, unwillingness to do homework, and considering mathematics as a difficult subject. Thus, on the basis of these claims, the researcher was instigated to investigate the motivational aspects of the learners across grade levels. If the teachers' claims hold true, then there should be an increasing tendency of learned helplessness which corresponds mainly to declining levels of self efficacy, cognitive engagement, and interest in learning mathematics.

Mathematics is one of the most challenging subjects that needs high degree of cognitive engagement, persistence, high expenditure of effort to master it, and a good deal of competence. Once failure starts, the effect is not only discernible in learning maths itself in the next grade levels but also in other number-oriented subjects. Many students are heard and observed as having maths-phobia. To check whether or not students have developed a negative expectation of success in maths, the trend of the problem across grade levels would be examined.

Mathematics was chosen as a treatment subject because it is one of the two subjects (the other is English) that determines students' chance to join almost all higher learning institutions in the country. That is, students should get a grade of at least D in the national examination to be admitted to any university, college, or learning institute. Even in the National Educational and Training Policy of the country, it is emphasized clearly that students should be well equipped with mathematical knowledge and skills. Hence, students should, being cognizant of this fact, develop some form of beliefs about their competence in mathematics beginning from the earlier years of schooling. It is at this stage that the foundations for the development of basic skills, habits of work, feeling competent, and knowledgeable are laid down.

METHOD

Participants

Participants of this study were 159 lower and middle primary school students from 5th (n=50), 6th (n=68), and 7th (n=41) grades in Ewuket Fana Elementary School in Bahir Dar town. All students who were in their regular classes at the time of data collection were given the questionnaires. The total number of students who filled in the questionnaires was 191 from all grade levels. However, during data screening it was found that only 159 students completed the questionnaires properly and they were included in the study.

Variables and Measurements

Questionnaires were used to gather data from the students on the following variables:

Mathematics Perceived Self-Efficacy: A modified version of a scale adapted originally from Pintrich and De Groot (1990) and extended by the researcher to measure self-efficacy beliefs of college students was employed. A 10-items instrument was used to assess students' perceptions of their efficacy to do mathematical problems and the beliefs they have to understand the subject and to succeed in learning it. Some of the items were "I can do mathematical problems even when they are challenging", "I believe I can do an excellent job on the problems of mathematics", "I am confident that I can surpass other students in my class in mathematical problem solving". The instrument was rated on a 4-point scale ranging from 1 (not true of me) to 4 (completely true of me), when the items were phrased positively. Reverse coding was used when the items were stated negatively. The alpha coefficients of the measure ranged from 0.86 to 0.89 for the three grade levels. The overall coefficient alpha was 0.87. A

high score in the scale represented a high level of perceived self-efficacy in maths.

Learned Helplessness: This measure was used to evaluate the degree to which students feel helpless and hopeless to succeed, understand and learn maths. They were asked to assess the extent of their feelings of pessimism and negative expectations about their success in maths. The scale consisted of 2 items scored on a 5-point Likert type scale ranging from 1 (strongly disagree) to 5 (strongly agree). This measure was developed by the researcher based on Seligman's (1975) theory of learned helplessness The items read "I have no any hope that I can succeed in maths", and "I never understand and master the simplest contents of maths now and in future grades". The estimated alpha coefficients of this measure were 0.45, 0.49, and 0.55 for 5th, 6th and 7th graders, respectively. The overall reliability was 0.52. These low reliability indices could be due to the number of items included in the scale. The size of reliability estimate increases with the increase in the number of items, other things being equal.

Cognitive Engagement: This scale assessed the extent of attention students paid in class, amount of homework completed, their active participation in class discussions, and their self-regulated learning activities. Eight items were used to measure this variable. Sample items included "I feel no responsibility when I fail in maths", "I actively participate in class activities during maths lesson", "I do mathematics class and homework", and "I easily give up when I find mathematical concepts difficult to comprehend". The coefficient alphas for this scale were 0.83, 0.85 and 0.79 for 5th, 6th, and 7th grade students, respectively. The overall reliability was 0.82.

Liking Maths: This variable epitomized the degree to which students like mathematics in comparison to other academic subjects they were learning. The students were asked to rank order the academic subjects according to the extent they like them beginning with 1 representing the most liked subject, 2 the next most liked subject, and so on, to the least liked one. A

single item was used for this purpose. In this case, the lower the score, the more the students like mathematics. In other words, a student who assigned a score of 1 liked maths more than a student who ranked maths 2nd or 3rd. So when correlated with self efficacy and cognitive engagement, we expect negative correlations, but positive correlation with learned helplessness.

Procedures of Data Collection

To gather the data from the students, permissions were first obtained from the school principal. Then the questionnaires were group administered to the students in their regular classes in cooperation with their maths teachers. Instructions and illustrations were given to the students how to fill in the questionnaires. To avoid reading difficulties among the students, the administrator read each item aloud to them so that students react to each item at a time in a similar pace. All the instruments were prepared in Amharic.

Data Analysis Methods

To investigate the effects of grade, self-efficacy, learned helplessness, and cognitive engagement on liking maths, a path analysis was carried out. Two models were tested. First the proposed model was tested, and then non-significant paths were removed from the model and further analysis was run. Regression analysis was computed to identify the joint and individual contributions of the independent variables to variance in the dependent variable. Analyses were made by taking all students simultaneously as one group, to single out the most important predictor variables. This could help us to broaden our understanding of the consistency of the variables across grade levels. To visualize the trends of the variables across the grade levels, trend curves were utilized based on the mean scores of the students. Correlation coefficients were also used to see the degree of relationships among the variables treated in the study.

Means and standard deviations were also reported. The data were analyzed using SPSS version 11.0 and AMOS version 4.01

RESULTS

A correlation matrix, including means and standard deviations, was presented in Table 1. The results from the correlation analyses for the overall sample showed that the variables correlated significantly and all relations were in the expected directions. The strongest correlation was between self-efficacy and liking maths (r=-0.555). Liking maths also correlated significantly and strongly with cognitive engagement (r=-0.472), and learning helplessness (r=0.428). The correlations of self-efficacy with cognitive engagement (r=0.369) and learned helplessness (r=-0.464) were also significant. A moderate and significant negative correlation was also found between cognitive engagement and learned helplessness (r=-0.279). A grade-wise correlation analysis showed similar patterns of relationships between the variables. All the variables correlated significantly with each other in the expected directions.

Table 1: Means, Standard Deviations, and Zero-order Correlation Coefficients for the Entire Sample and by Grade Level

Grade	Variables	Mean	SD	1	2	3
5(n=50)	1. Liking Maths	2.98	1.363	1.000		
	2. Self-efficacy	32.20	5.163	-0.522**	1.000	
	3. Cognitive engagement	20.10	6.625	-0.529**	0.420**	1.000

	4. Learned Helplessness	3.60	1.714	0.529**	-0.528**	-0.318*
6 (n=68)	1. Liking Maths	2.28	1.208	1.000		
	2. Self-efficacy	27.74	7.481	-0.694**	1.000	
	3. Cognitive Engagement	18.07	5.326	-0.470**	0.782**	1.000
	4. Learned Helplessness	4.21	1.905	0.254*	-0.341**	-0.284**
7 (n=41)	1. Liking Maths	2.83	1.340	1.000		
	2. Self-efficacy	27.07	6.296	-0.785**	1.000	
	3. Cognitive Engagement	18.00	4.506	-0.352**	0.335*	1.000
	4. Learned Helplessness	4.83	2.479	0.676**	-0.530**	-0.448**
Overall (n=159)	1. Liking Maths	2.64	1.323	1.000		
	2. Self-efficacy	28.97	6.848	-0.555**	1.000	
	3. Cognitive Engagement	18.69	5.630	-0.472**	0.369**	1.000
	4. Learned Helplessness	4.18	2.055	0.428**	-0.464**	-0.279**

*p<0.05, **p<0.001

Another purpose of this study was to examine the joint and independent contributions of grade, self-efficacy, learned helplessness, and cognitive engagement to the variance in liking mathematics. To achieve this purpose

regression analyses were run for the overall sample. The results are presented in Table 2.

Table 2: Standardized Regression Coefficients (β) for Grade, Self-Efficacy, Cognitive Engagement, and Learned Helplessness in Predicting Liking Mathematics (n = 159).

Predictor	**Beta**	**t-value**	**p**	**R**	**R^2**	**AdjR^2**
Grade [a]	-0.199	-3.014	0.003	0.669*	0.448	0.433
Self-efficacy	-0.432	-5.856	0.000			
Cognitive Engagement	-0.225	-3.292	0.001			
Learned Helplessness	0.210	3.049	0.003			

* F (4,154) =31.192, p=0.000

[a] Grade is coded: 1 = grade 5; 2 = grade 6; and 3 = grade 7

As can be observed in Table 2, the combined effect of the independent variables treated in the study on liking maths was 44.80% (R = 0.669, R^2 = 0.448, $F_{4, 154}$ = 31.192, $p<0.00001$). When the independent contributions of the variables were considered, self-efficacy (which is 23.98% or 53.59% of R^2) explained the highest proportion of the variance in liking mathematics, followed by cognitive engagement (which explained

10.62% of the variance in liking maths), and learned helplessness (which accounted for 8.99% of the variance).

To succinctly display the direct and indirect effects of the variables on liking maths, a path model was constructed. Two path models were tested. The first model consisted of all hypothesized links between the variables. The statistical test of the model showed that the model fitted the data very well, which was indicated by the fit indices (Root Mean Square Residual, RMR, = 0.000, Goodness-of-fit index, GFI, =1.000, Normed Fit Index, NFI, = 1.000, Comparative Fit Index, CFI, = 1.000). The second model was constructed after non-significant paths were removed. In the first model (Figure 1), all the variables had significant direct influences on the students' liking of mathematics. However, it was self-efficacy that had a strong direct effect on liking mathematics (β =-0.41). The effect of self-efficacy on cognitive engagement of students in learning activities was also very strong (β=0.51) as well. The direct influence on self-efficacy of learned helplessness was also high (β=-0.42). Another factor that directly and significantly affected students' cognitive engagement, learned helplessness, self-efficacy, and liking mathematics was grade level.

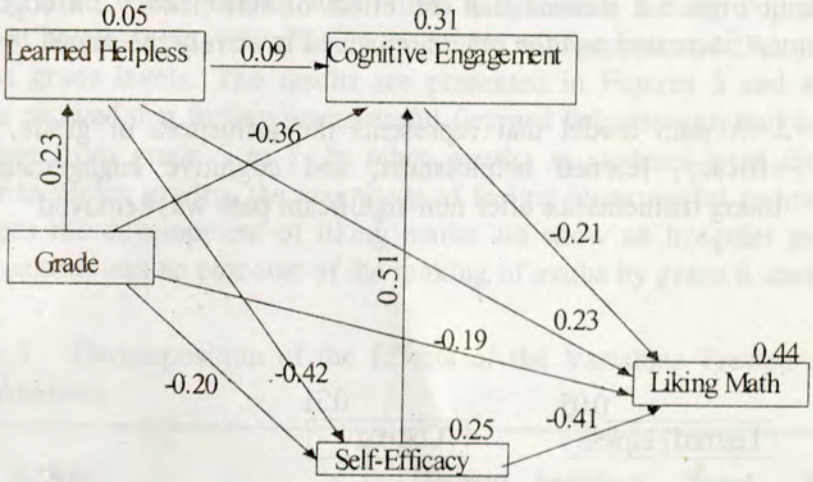


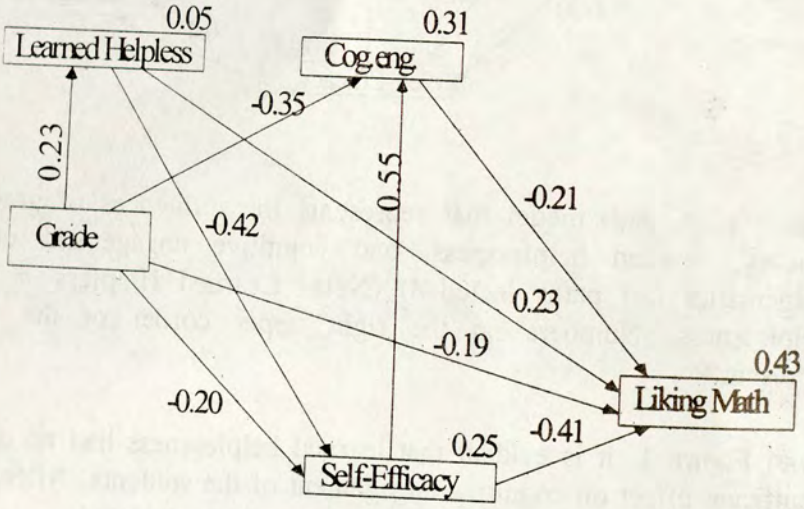
Figure 1. A path model that represents the influences of grade, self-efficacy, learned helplessness, and cognitive engagement on liking mathematics (all paths included) (Note: Learned Helpless = Learned Helplessness, Numbers on the right upper corner of the variables represent R^2)

From Figure 1, it is evident that learned helplessness had no direct and significant effect on cognitive engagement of the students. After this path was eliminated from the model, the paths were recalculated.

The fit indices indicated that the model fitted the data satisfactorily. A non-significant χ^2 value ($\chi^2=1.4332$, df=1, p=0.231) and high values of the other fit indices, i.e., GFI=0.9930, AGFI = 0.9460, IFI = 0.9979, as well as low and non-significant RMSEA (Root Mean Square Error Approximation), which was 0.052, p=0.3187, represented that the model is acceptable. The difference between the two models was not significant ($\chi^2_{diff} = 1.4322$, df = 1, p = 0.231) implying that the models are similar.

Results in Figure 2 showed that the effect of self-efficacy on cognitive engagement increased and the others remained relatively the same.

Figure 2. A path model that represents the influences of grade, self-efficacy, learned helplessness, and cognitive engagement on liking mathematics after non-significant path was removed



An examination of the total effects showed that grade had modest influences on self-efficacy (-0.292) and learned helplessness (0.226). The total effects of self-efficacy on cognitive engagement (0.546), and liking maths (-0.526) were strong. Moreover, learned helplessness had strong total direct effect on self-efficacy (-0.419) and liking maths (0.452).

Furthermore, trend curves were fitted to examine the development of learned helplessness, self-efficacy, cognitive engagement and liking maths across grade levels. The results are presented in Figures 3 and 4. The trends showed that feeling unsuccessful (learned helplessness) had a linear increase from grade 5 to 7. In other words, as students went up from lower to higher grades, the magnitude of feeling unsuccessful zoomed up, whereas the development of liking maths did show an irregular pattern. Such pattern was an outcome of the ranking of maths by grade 6 students.

Table 3. Decomposition of the Effects of the Variables Treated in the Path Analysis

Effect	**Direct**	**Indirect**	**Total**	**R^2**
On Learned Helplessness				0.05
of Grade	0.226	0.000	0.226	
On Self Efficacy				0.25
of Grade	-0.197	-0.095	-0.292	
of Learned Helplessness	-0.419	0.000	-0.419	
On Cognitive Engagement				0.31
of Grade	-0.350	0.159	-0.191	
of Learned Helplessness	0.000	-0.229	-0.229	
of Self-Efficacy	0.546	0.000	0.546	

On Liking Maths			0.43
of Grade	-0.192	0.133	-0.059
of Learned Helplessness	0.231	0.221	0.452
of Self Efficacy	-0.413	-0.113	-0.526
of Cognitive Engagement	-0.208	0.000	-0.208

Grade 6 students ranked it high compared to grades 5 and 7 students. If 6th graders were ruled out from the curve, the trend could be relatively linear which increases from the lower to upper grades. The results for liking maths and learned helplessness are presented in Figure 3.

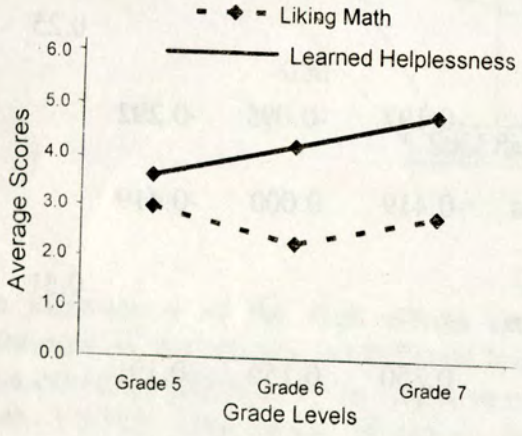


Figure 3: Trends of Learned Helplessness and Liking Maths across Grade Levels

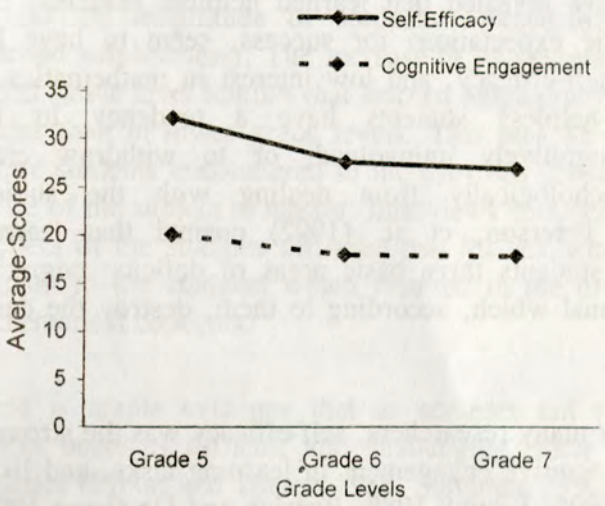


Figure 4: Trends of Self-efficacy and Cognitive Engagement across Grade Levels

Similar treatments done on self-efficacy and cognitive engagement demonstrated a decreasing tendency from lower to higher grade levels. Grade 5 students reported higher levels of efficacy and cognitive engagement than students in grades 6 and 7. Grade 6 students scored relatively higher means in the two variables compared to grade 7 students (see Figure 4). These results supported both the path and correlation analyses.

DISCUSSION

The purposes of the present study were to examine the effects of grade, self-efficacy, cognitive engagement, and learned helplessness on liking maths among primary school students, and the developmental trends of these variables across grade levels.

Results from all analyses revealed that learned helpless students, i.e., students with pessimistic expectations for success, seem to have low cognitive engagement, self-efficacy, and low interest in mathematics. In other words, learned-helpless students have a tendency to feel incompetent, to be cognitively uninvolved, or to withdraw either physically and/or psychologically from dealing with the subject. Regarding this point, Peterson, et al. (1992) posited that learned-helplessness creates in students three basic areas of deficits: cognitive, motivational and emotional which, according to them, destroy the desire to learn.

As has been reported by many researchers, self-efficacy was the strongest predictor of students' cognitive engagement in learning tasks, and liking mathematics (Bandura 1995; Schunk 1988; Pintrich and De Groot 1990). This research has also substantiated those findings. However, self-efficacy itself was influenced by learned helplessness and grade level. The results suggest that with the increase in grade level, students seem to be uncomfortable with the learning of mathematics. That is, students who experienced learned helplessness tended to believe that they have no confidence and competence to deal with mathematical tasks.

In the path model, it was indicated that students' negative expectations for success (learned helplessness) had a strong direct but negative effect on their perceptions of competence which, in turn, had a direct strong effect on cognitive engagement and liking maths. Perceived self-efficacy mediated the effects of grade and learned helplessness on cognitive engagement and liking maths. In other words, when students have no hope to be successful and when their grade level increases, they tend to feel incompetent, which ultimately leads them to have a propensity to divorce themselves emotionally and cognitively from dealing with mathematical problems.

The trend curves fitted on Figure 3 illustrated that as grade level ascended so did the magnitude of students' expectations of unsuccessfulness (learned helplessness). The increase in its magnitude from lower grade to higher grade level implies that learned helplessness manifests more in later grades than in lower grade levels. This may be an outcome of repeated failure students encountered in the previous grades or due to the difficult nature of the subject to master. Interviews conducted with the mathematics teachers of the students affirmed that the mathematics curricula are very difficult to the students which resulted in the problem of understanding mathematical concepts.

There is ample evidence that as students fail repeatedly or when the subject becomes difficult and challenging, their expectation to succeed dwindles (Elliott and Dweck 1988; Seligman 1990). According to Gordon and Gordon (1996:3), students who have developed learned-helplessness behaviour "see failure as permanent (ability not effort), pervasive ... and very personal", which signifies that learned helplessness leads to perceived incompetence in students.

Many psychologists argued that this negative behaviour ruins the positive self-esteem and cognitive development. Seligman (1990) stated that a learned-helpless student cannot invest the required amount of effort simply because that aversive behaviour prevents him/her from utilizing his/her intelligence and endowed potentials. Brophy (1998) labelled learned helplessness in students as the "failure syndrome". Failure syndrome is used to "describe students who approach assignments with very low expectations of success and who tend to give up at early signs of difficulty".

It is also interesting to note that students' level of cognitive engagement waned as they went up from lower to middle primary classes (see Figure 4). In addition to affecting the students' expectations for success, repeated failures or conceiving the subject as difficult could hamper their cognitive strategies. As stated earlier by Brophy (1998), it is likely that when

students develop learned helplessness, the amount of effort they exert on a given task and the motive to do assignments decreases. They become less concerned about their achievements and feel irresponsible for their behaviour, which could be regarded as a form of despair in learning mathematics.

The developmental trend of self-efficacy did support the findings of other researchers (e.g., Stipek 1992; Wigfield and Eccles 2000). These researchers reported that as children went from lower to middle primary school their feelings of competence decrease. Wigfield and Eccles (2000) stated that children's ability, beliefs and expectations for success become more negative as they get older, especially in the preadolescence period. This crystallized the presupposition that the increase in learned helplessness brings about lowered self-efficacy.

There was, however, an irregular pattern in the increase in the level of liking mathematics across the grades, with 6th graders ranking it the second most liked subject compared to students in grades 5 and 7. Grade 5 students ranked it almost the third liked subject, and 7th graders gave it a rank a little more than grade 5 students did. Theoretically, there should be a declining trend in the development of liking maths from lower to higher grade levels. However, that did not occur. This could be accounted for by different factors, of which teacher variation could be one. The students in each grade level were taught by different teachers that might have brought about variations in students' interest in the subject. The classroom environments that facilitate or hinder effective maths learning could be different for the students in these grades.

In sum, the results suggest that perceived self-efficacy and learned-helplessness play a considerable role in affecting students' attitudes toward and interests in learning mathematics. Learned helplessness strongly and negatively affects competence beliefs of students and the

latter affect strongly and positively motivational and cognitive aspects of students in learning maths.

Children with learned helplessness use poor problem solving strategies, and their attention drifts into other things or events and feel that they are in the class for nothing. This situation might put them behind a grade or two in academic subjects and hamper their social skills which communicate to the children that they are worthless and hopeless (Berger 1983). Helpless students feel that they are failures and give up trying to do their academic tasks and never expect to gain respect through their academic performance, so they turn to other means of gaining recognition such as bullying or teasing. When they reach the adolescence stage they try to gain recognition through antisocial behaviour (Berger 1983). A study by Yalew (2004) has also reported that students who are involved in aggressive actions are those who are academically lower achievers. The disciplinary problems in most schools in Bahir Dar, for example, could be a witness for such feelings of hopelessness.

This research, though cross-sectional in nature, has important implications for the teaching-learning processes. As has been repeatedly indicated, learned helplessness parallels the increase in grade levels, whereas self-efficacy and cognitive engagement decrease as grade level increases.

To minimize this problem, if not to avoid, teachers should be trained in such a way that they take into account the psychological make up of their students. Research has also indicated that training students to attribute their failure to lack of effort than to lack of ability increased their effort expenditure and success in learning (Schunk 1991).

Further research should be conducted to examine the effects of other variables such as maths anxiety and parental encouragement in the child's learning. Besides, researchers may also look into how really difficult the mathematics contents of various primary grade levels and their organizations are. Hence, content analyses may help to figure out core

problems of the curricula in order to take proper measures that focus on curving out the difficulties students encounter. For example, revisions could be made to adjust the difficulty level of the contents to the age level of the learners. Teachers' methods of teaching should also be considered in future analysis of mathematical learning problems of students.

Elementary school is a foundation for later educational, social, and other aspects of the child's development, and any impairment at this formative stage could be irreversible. Therefore, attention should be drawn to this level of schooling.

Finally, it should be noted that the major source of data used for this study is questionnaire which depends on self-reports of individual respondents where the researcher has little chance to control the accuracy of responses. Therefore, to better understand the problem, longitudinal designs that make use of interviews, observations and group discussions may be more appropriate.

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