

Attitudes toward School, Homework, Subject Matter Value, Self-Concept and Positive Affect: A Structural Equation Model

Maher M. Abu-Hilal^a, Faisal Abdelfattah^b, Adel Abduljabbar^b, Herbert W. Marsh^{bc}

^aSultan Qaboos University, ^bKing Saud University, ^cUniversity of Western Sydney

Almost every teacher assigns homework to students. Teachers, parents as well as students believe that this activity -which should be done in non-school hours- enhances achievement. The amount of time students spend doing homework has been the focus of national surveys and international comparisons. According to Kackar, Shumow, Schmidt & Grzeticzage (2011) age and gender are powerful influences in human development...and Time use is a fundamental indicator of cultural practices, values, and behavior. Kackar et al. (2011) argued that time spent doing homework is related to academic success (([Schmitz & Skinner, 1993](#)). However, the empirical evidence of such association is not consistent (Cooper, Lindsay, Nye, & Greathouse, 1998).

One important aspect of this study is that its sample comes from a country where education is single sex. Most research on homework, attitudes, parental involvement and self-concept has been conducted in western settings or eastern coeducational settings. It is interesting to see how these variables correlate, and if the correlations vary by gender. As for differences across gender, girls, in general, tend to have more positive attitudes toward homework than boys, showing more persistence in completing homework (Harris, Nixon, & Rudduck, 1993; Honigsfeld & Dunn, 2003) and spending more time doing math homework (Trautwein, Lüdtke, Schnyder, & Niggli, 2006). However, İflazoğlu Hong (2012) found no gender differences in homework attitudes and homework achievement. Kackar et al. (2001) found little difference in homework experience between boys and girls. Trautwein, Lüdtke, Schnyder, & Niggli (2006) revealed that boys expressed more expectancy and more concentration than girls; however, girls spent more time on homework than boys did.

The relation between school liking (or belonging or connectedness) and academic attainment is an important aspect of motivation. Belonging or connectedness to school has been perceived to be associated with pupil wellbeing and academic achievement. As positive attitudes toward homework are part of the sense of belonging to school, researchers have found very small correlation between attitudes homework and time spent on homework (Cooper et al., 1998).

Our research builds on expectancy value theory (Eccles & Wigfield, 2002). According to the expectancy-value theory ([Eccles & Wigfield, 2002](#)), homework motivation is conceptualized to have an expectancy and a value component. A student's belief in being able to execute goal-oriented behavior successfully represents the expectancy component. The value component has several facets: a) attainment value (it is important to do well in the task of homework); b) intrinsic value (homework is an enjoying task); c) utility value (homework will have a future benefits); and d) cost (homework may represent punishment by exerting extra effort). Other dimensions of motivation are also included in our study. Liking school, subject value and self-concept are essential components of motivation (Marsh et al., 2012).

The aim of this study was to test the relationships among attitudes to school, homework given, and time spent on homework, value of subject matter (math and Science), self-concept and positive affect of both math and science. All of the variables are measured as perceived by students. Students vary on their attitudes to school and their perception of the value of homework. Also, students vary on the time they spend on homework. They vary on the value they assign to each of the subjects. Students also have varying assessment of their competence in learning school subjects, and how much they like each subject (positive affect). Finally, students vary on their perception of parental involvement. It is, therefore, interesting to find out how these constructs are related. Also, can we predict subject value from homework, parental involvement and attitudes to school? What effect does homework and subject value have on perceived competence and affect in math and science?

The expectancy-value model of achievement motivation suggests that students will be more likely to engage in tasks that are perceived as emotionally rewarding and valuable. Students may perceive homework as rewarding activity if they find that homework brings them together with the family. Oostdam & Hooge (2013) stated: "By engaging in educational activities with their children at home (homework, reading, modeling), parents communicate their expectations for achievement." (p. 338). Homework, nevertheless, is among the school tasks that most students think of as a burden and as an extension of the school day. Eccles (1983) argued that for children, the negative factors regarding homework are often substantial. Homework importance (utility), intrinsic value and perceived costs are commonly regarded as relevant to homework. Often, researchers distinguish between homework assigned to students and time spent on doing homework and the latter is usually more related to achievement.

METHOD

Sample and Data

The sample consisted of $n=4099$ [girls $n=2170$ (52.9%) and boys $n=1929$ (47.1%)] eighth grade Saudi students enrolled in the TIMSS program in 2007. Data for this study were drawn from the Trends in International Mathematics and Science Study (TIMSS) database.

Instrument

Participants responded to the Student Background Questionnaire (SBQ) that comprised demographic and academic related items. Some items of interest are Likert type with four points: strongly disagree (1) to strongly agree (4). Question 8 is concerned with mathematics self-concept and positive affect ($\alpha = 0.75$). Four items are affective, and four are cognitive. Question 9 comprises four items measuring mathematics value ($\alpha = 0.70$). The items are measuring the value of mathematics in school, for university, and life. Question 11 is concerned with self-concept in science; it comprises eight four-point Likert-type items ($\alpha = 0.76$). Four items are affective, and four are cognitive. Question 12 comprises four items measuring science value ($\alpha = 0.75$). The items are measuring the value of science in school, for university, and life. Nine other items are used that measure like being in school, students want do their best, and teachers want their students do their best. These

three items are measured on Likert-scale of four points from 1 "strongly disagree" to 4 "strongly agree." Four other items are included in which students report how often they get homework (4 = every day to 1 = less than once a week); and how many minutes students spend on doing homework every day (1 = zero minutes a day, to 6 = more than 90 minutes). Studies of the homework–achievement relationship typically use time spent on task as the central predictor variable. As for parental involvement, the scale has two items (e.g., "parents support student's achievement", and "parents are involved in school activities") with 5 points very low = 1 to very high = 5 ($\alpha = .695$).

RESULTS

Both descriptive statistics and structural equation modeling (SEM) were used in data analysis.

Descriptive statistics. Descriptive cross-tabulation of single items with indexes of math value and science value, math SC, science SC, positive affect math, and positive affect science revealed that as students perceive their teachers want students to do their best they tend to have more positive self-concept, more positive affect and more valuing of the two subjects. Also, homework given was significantly related to valuing, and positive affect in math and science but not related to self-concept in the two subjects. The relation of homework given and time spent on homework with valuing math and science, self-concept in math and science and positive affect in the two subjects are not consistent. Whereas homework given was related to valuing and positive affect in math and science, it was not related to self-concept. Time spent on doing homework was related to positive affect but not to valuing subject matter. Also, it was related to science self-concept but not to math self-concept.

As for parents involvement in school activities like being in school has nothing to do with such involvement. Parents' support of student's achievement was significantly related to time on homework both in math and science. Parental involvement in school activities was significantly related to time on science homework but not to math homework.

Gender differences in perception of parents' involvement. Few differences occurred between the two genders. Probably, the most important one was that 100% of those who indicated very high parental support of students' achievement were boys; and 67% of those who reported very low support of students' achievement were girls. Similarly, fewer girls reported very high parental involvement in school activities (36.6%) compared to 61% for boys. Boys and girls did not differ significantly on the time they spent on science homework but girls spent more time doing math homework than boys. Of those who spent more than an hour doing math homework, 58.7 % were girls and 41.3% were boys.

Exploratory factor analysis. Factor analysis revealed that homework given (HW) is distinct from time spent on doing homework (THW) and like being in school (LS). Like being in school, students try their best (SB) and teachers want their students to do their best (TSB) make one factor. Also, the items that measure subject value (V), self-concept (SC) and positive affect (PA) produce three constructs for math and

three constructs for science. Finally, the two items that measured parental involvement produce one factor. All factor loadings were substantial. However, we will use the indexes included in the TIMSS data set for subsequent analysis. The indexes of interest for the path model (Figure1) are: time spent on math homework (TonHM), time spent on science homework (TonHS), positive affect math (PAM), positive affect science (PAS), math self-concept (SCM), science self-concept (SCS).

Insert Table 1 about here

SEM revealed homework in math and science had very little association with students' positive affect, value of subject matter and self-concept both in math and science. This was true for boys and girls. In fact, the significant relationships were unfortunately negative. That is, more time spent on homework translate to lower subject value and lower self-concept. However, time spent on math homework was significantly related to time spent on science homework.

Positive affect in math had significant relations with math value, science value, and math self-concept. Science positive affect was significantly related to science value, math value and science self-concept. Subject value was only related to self-concept in matching subject but not across subjects. The pattern of relations were similar across gender.

Insert Figure 1 about here

It is worth noting that the result arrived by using the indexes in the dataset produced a little different results from the raw data. In the SEM of the raw data we found the following: Homework given (HW) significantly influenced math value but not science value. Time spent on homework had a negative effect on science value. Liking school had positive effects on both science value and math value.

HW had positive influence (direct and indirect) on math positive affect and science positive affect. Time spent on homework positively influenced math self-concept, math positive affect and science positive affect. Liking school had positive influence on math positive affect, math SC and science SC, but only indirect influence on math SC. Also, liking school had positive influence on math positive affect and science positive affect. Valuing math had positive influences on both math SC and math positive affects, but negative influences on science SC and science positive affect. However, valuing science had positive influence on science SC and science positive affect, but negative influence on math SC and math positive affect.

Discussion

We start the discussion of our results with a methodological note. Analyzing the data using single items revealed significant associations among liking school, homework assigned, time on homework, confidence in learning math and science, valuing subject matter are consistent with previous studies that correlated time on homework and motivation variables. Trautwein et al. (2006), for example found

statistically significant positive correlations between the expectancy and value components and homework effort but non-significant or negative correlations between the motivation variables and time on homework in mathematics.

These results can be explained in that information about the quality of homework given is not enough. According to Trautwein & Lüdtke (2007) "High-quality homework assignments are carefully prepared and selected to reinforce classroom learning and diagnose individual students' learning progress and difficulties." (p. 433). In a study by Trautwein et al. (2006), students who had a more favorable perception of homework quality reported more homework effort. In the present study, homework quality was not one of the variables in TIMSS dataset. An inside look into students in the Gulf region, including Saudi Arabia, students are spoiled, especially boys. It is our guess that teachers assign homework because they have to. Possibly, they put small effort in designing and preparing homework not because they are not capable of doing so, but because they will be under pressure from their students and in some cases from the administration. As evidence to this view, Abu-Hilal et al. (in press) and Marsh et al. (2012) found that Saudi girls outperformed Saudi boys both in math and science. Also, our results revealed that girls spend more time doing math homework than boys. This is in support of the results of Trautwein et al. (2006) who found that Swiss girls spend more time doing math homework than boys. Teachers' expectations from their students maybe another factor in preparing homework. It is possible that teachers have low expectation from male students and they may assign simple assignment which may cause boredom among students and may find homework unrelated to subject difficulty they encounter in class, particularly in math and science.

As for parents' involvement and support, they were not consistently related to homework engagement. This is not unique to our sample. Trautwein et al. (2006) and Trautwein & Lüdtke (2007) reported that parent-child communication and parental valuation of school subjects were positively related to homework effort, but the quantity of direct parental engagement in the homework process was unrelated or negatively related to homework effort.

If we take the data at face value, another explanation of the weak relation between parents' involvement and positive affect toward subjects and school at large, valuing subjects and self-concept. Education in Saudi Arabia is new phenomenon and many parents have low level of education. Level of education has been found to mediate the relation between parents' involvement and affect and achievement (Oostdam & Hooge, 2013). Oostdam & Hooge (2013) cited studies finding that direct parents' involvement in subject like mathematics led to negative effects.

Conclusions

Several conclusions can be drawn from the results. First, researchers need to attend to the fact that assigning homework and time spent on homework are distinct constructs. Several researchers distinguished between homework given, time spent on homework and homework completion (e.g. Cooper et al., 1998; Harris et al., 1993; Kackar et al., 2001). The influence of homework given and time spent on homework on other cognitive and affective constructs are not consistent. When

researchers and educators deal with student's motivation they need to distinguish between competences, affect and value. Although related but these constructs are distinct and have different relations with other construct both in strength and direction.

Whether for parents' involvement, time on homework or self-assessment (positive affect or self-concept), self-report method is probably a risky method to draw sound conclusions. This is particularly true for students in the Arab culture that have not been trained on self-assessment. As training to do objective assessment is still weak in Saudi schools as well as other Arab schools, it is hard to expect accurate assessment of self-qualities and characteristics or even judge accurately time spent on studying. The fact that relationships among the variables included in this study were inconsistent, with a sample as large as the present one; more research may be needed using different methods of data collection including observation and interview.

References

- Abu-Hilal, M. M., Abdelfattah, F., Shumrani, S., Abduljabbar, A. S. & Marsh, H. W. (in press). Construct validity of self-concept in TIMSS's student background questionnaire: a test of separation and conflation of cognitive and affective dimensions of self-concept among Saudi 8th graders. *European Journal of Psychology of Education*. doi: 10.1007/s10212-012-0162-1
- Arens, A. K., Yeung, A. S., Craven, R. G., & Hasselhorn, M. (2011). The twofold multidimensionality of academic self-concept: Domain specificity and separation between competence and affect components. *Journal of Educational Psychology, 103*, 970–981. doi:10.1037/a0025047
- Cooper, H.; Lindsay, J. J.; Nye, B. & Greathouse, S. (1998). Relationships among attitudes about homework, amount of homework assigned and completed, and student achievement. *Journal of Educational Psychology, 90*(1), 70-83. doi: [10.1037/0022-0663.90.1.70](https://doi.org/10.1037/0022-0663.90.1.70)
- Eccles, J. S. (1983). Expectancies, values, and academic choice: Origins and changes. In J. Spence (Ed.), *Achievement and achievement motivation* (pp. 87–134). San Francisco: W. H. Freeman.
- Eccles, J. S., & Wigfield, A. (1995). In the mind of the actor: The structure of adolescents' achievement task values and expectancy-related beliefs. *Personality and Social Psychology Bulletin, 21*(3), 215–225. doi:10.1177/0146167295213003
- Harris, S., Nixon, J., & Rudduck, J. (1993). School work, homework and gender. *Gender and Education, 5*, 3–14.
- Honigsfeld, A., & Dunn, R. (2003). High school male and female learning-style similarities and differences in diverse nations. *Journal of Educational Research, 96*, 195–206.
- İflazoğlu, A. & Hong, E. (2012). Relationships of homework motivation and preferences to homework achievement and attitudes in Turkish students. *Journal of Research in Childhood Education, 26*(1), 57-72.
- Irvin, M.J., Meece, J.L., Byun, S., Farmer, T.W. & Hutchins, B.C. (2011). Relationship of school context to rural youth's educational achievement and aspirations. *Journal of Youth and Adolescence, 40*, 1225–1242

- Kackar, H. Z., Shumow, L., Schmidt, J. A. & Grzetich, J. (2001). Age and gender differences in adolescents' homework experiences. *Journal of Applied Developmental Psychology*, 32, 70–77
- Marsh, H. W., Abduljabbar, A. S., Abu-Hilal, M. M., Morin, A., Abdelfattah, F., Leung, K., Xu, M. K., Nagengast, B. & Parker, P. (2012). Factorial, convergent and discriminant validity of TIMSS math and science motivation measures: a comparison of Arab and Anglo-Saxon countries. *Journal of Educational Psychology*. doi:10.1037/a0029907
- Oostdam, R. & Hooge, E. (2013). Making the difference with active parenting; forming educational partnerships between parents and schools. *European Journal of Psychology of Education*, 28, 337–351 doi: 10.1007/s10212-012-0117-6
- Riglin, L., Frederickson, N., Shelton, K. H. & Rice, F. (2013). A longitudinal study of psychological functioning and academic attainment at the transition to secondary school. *Journal of Adolescence*, 36 (3), 507-517. doi.org/10.1016/j.adolescence.2013.03.002
- Trautwein, U.; & Lüdtke, O.; Schnyder, I. & Niggli, A. (2006). Predicting homework effort: Support for a domain-specific, multilevel homework model. *Journal of Educational Psychology*, 98(2), 438-456. doi: [10.1037/0022-0663.98.2.438](https://doi.org/10.1037/0022-0663.98.2.438)
- Trautwein, U., & Lüdtke, O. (2007). Students' self-reported effort and time on homework in six school subjects: Between-students differences and within-student variation. *Journal of Educational Psychology*, 99(2), 432-444. doi:10.1037/0022-0663.99.2.432
- Wigfield, A., & Eccles, J. S. (2000). Expectancy-value theory of motivation. *Contemporary Educational Psychology*, 25, 68–81. doi:10.1006/ceps.1999.1015

Table 1. Pattern Matrix of the Items of Homework and Liking School

| | Factors | | | |
|---|---------|------|------|-------|
| | 1 | 2 | 3 | 4 |
| I like being in school | | | | -.726 |
| Students try their best | | | | -.622 |
| Teachers want students to do best | | | | -.559 |
| Minutes spend do homework | | | | .395 |
| How often homework in math is given | -.885 | | | |
| How many minutes math homework | | | .883 | |
| How often homework in science is given | -.886 | | | |
| How many minutes science homework | | | .891 | |
| In school\parents support students achievement | | .837 | | |
| In school\parents involved in school activities | | .793 | | |
| In school\studs desire to do well | | .645 | | |

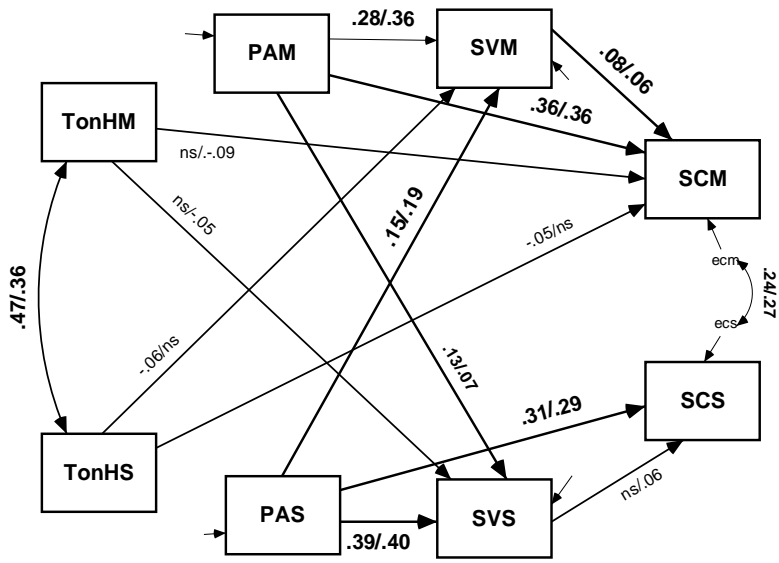


Figure 1. Path model of Relations among Time on Homework, Positive Affect, Subject Value and Self-concept.

Note. TonHM: time on math homework; TonHS: time on science homework; PAM: positive affect math; PAS: positive affect science; SVM: subject value math; SVS: subject value science; SCM: math self-concept; SCS: science self-concept. Male coefficients presented first

None-significant paths have been omitted. Bold arrows indicate both paths significant ($p < .05$); light arrows indicate one path significant and the other not significant ($p < .05$).