



## Modeling students' time management in math homework



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### ABSTRACT

This study examines empirical models of variables posited to predict time management in math homework for high school students, based on the data from 1799 students from 46 classes in China. The findings from multilevel analyses revealed that, at the class level, time management was positively related to time spent on homework, but negatively related to grade level. At the student level, time management was positively associated with monitoring motivation, arranging the study environment, peer- and learning-oriented reasons for doing homework, and family homework help. In addition, males (compared with females) were less likely to take initiatives to manage homework time. Possible explanations for and implications of these findings were discussed, and directions for future research were offered.

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### 1. Introduction

As a common and well-known educational activity in schools throughout the world (Chen & Stevenson, 1989; Cooper, Robinson, & Patall, 2006; Corno, 2000; Epstein & Van Voorhis, 2001; Warton, 2001), homework takes place in the middle of multiple competing activities during after-school hours (e.g., sports, television, and text messaging). With less time left to do more demanding academic work, many students often encounter the challenge of managing homework time independently (e.g., budgeting time and pacing themselves to meet homework deadlines; Corno, 1996; Forsberg, 2007; Xu, 2008b). Indeed, this has become more than a challenge for students, as family involvement in homework has often centered on homework time and time management (Forsberg, 2007; Xu & Corno, 1998). It is surprising to note, however, that homework time management has not received the attention it deserves.

Recently, Xu (2010b) examined multilevel models of factors to predict homework time management. The results revealed that a range of variables (e.g., learning-oriented reasons and arranging the study environment) explained 38.4% of the variation in homework time management. However, that study involved a sample of U.S. students on homework time management in general (i.e., without tapping into homework time management in a specific subject). In addition, no data were available about whether homework time management related to other important variables in the homework process (e.g., homework motivation).

The present study used the same methodology to model Chinese students' time management in math homework. This line of research is important, as time management has been found to have a positive effect on academic success (Britton & Tesser, 1991; McKenzie & Gow, 2004) and as homework time management is positively associated with homework completion (Xu, 2010b) and homework performance (Eilam, 2001). Specifically, this line of research may provide new insights into factors that influence homework time management and academic achievement in different countries, as Chinese students have more positive attitudes toward homework and spend more time on homework (Cai, 2003; Chen & Stevenson, 1989; Hong, Wan, & Peng, 2011), and as they often outperform U.S. peers in math and excel in many international assessments of math achievement (Stevenson & Stigler, 1992; Wang, 2004).

### 2. Related literature

The present study is informed by four lines of related literature. These included (a) research and theory on time management, (b) the literature pertaining to homework time management, (c) homework practices and attitudes in China, and (d) the possible influences of other important, yet overlooked, variables on homework time management.

#### 2.1. Research and theory on time management

Over the last two decades, there has been a growing interest in time management in the organizational literature (Claessens, van Eerde, Rutte, & Roe, 2007; Orlikowski & Yates, 2002) and in the literature on motivation and self-regulated learning (Pintrich, 2004; Schunk, 2005; Zimmerman, 2008). Time management has been found to promote a

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variety of desirable outcomes, including study habits (Claessens et al., 2007), class grades (Al-Ansari, 2005), cumulative grade point average (Britton & Tesser, 1991), work effectiveness (MacKenzie, 1990), as well as perceived control of time, job satisfaction, and health (Claessens et al., 2007).

Time management is viewed as one important aspect of academic self-regulation (Corno, 2004; Eilam & Aharon, 2003; Pintrich, 2004; Schunk, 2005; Zimmerman, 2008). Pintrich (2004) has classified four phases of self-regulation (forethought, monitoring, control, and reflection) and, for each phase, four possible areas for self-regulation (cognition, motivation, behavior, and context). In this classification, time management is conceptualized as a key aspect of behavior for self-regulation, which involves one's attempts to plan, monitor, and regulate time use (e.g., creating study schedules and allocating time for different learning activities). In addition, time management may be influenced by other variables in this classification, including cognition (e.g., goal setting), motivation, and context (e.g., arranging the study environment).

As self-regulated learning perspective recognizes that there are social and individual differences that can affect individual efforts at regulation (Pintrich, 2004), time management may be further affected by student and family characteristics (e.g., gender, academic achievement, and parent education) as well as adult monitoring (e.g., parents and teachers). This is consistent with the call for including variables such as personal characteristics and the influence of others in time management research (Claessens et al., 2007). This is further in line with other related empirical findings. For example, high achieving students were found to exhibit more self-regulated learning skills (Zimmerman & Martinez-Pons, 1990), with time management in particular (Eilam & Aharon, 2003).

## 2.2. Homework time management

Cooper (1989), in his homework model, conceptualizes that ability, motivation, grade level, and other individual differences (e.g., gender) are exogenous factors that influence the effectiveness of homework. The model's endogenous factors divide the homework process into assignment characteristics (e.g., purpose), initial classroom factors (e.g., provision of materials), home-community factors (e.g., others' involvement), and classroom follow-up (e.g., teacher feedback). This model further conceptualizes effects of homework as including assignment completion and performance, positive effects (e.g., nonacademic and academic), and negative effects (e.g., cheating). Under the category of positive effects, it considers better time organization as one of the nonacademic benefits. Thus, this model provides a useful framework to examine a range of variables that may influence homework time management, such as background variables (e.g., gender), assignment characteristics (e.g., purpose), home-community factors (e.g., family help), and classroom factors (e.g., teacher feedback).

Several studies have alluded to several factors that influence homework time management, including student and family characteristics (Xu & Corno, 2006), adult monitoring (Trautwein, Ludtke, Schnyder, & Niggli, 2006; Xu & Corno, 1998), and student attitudes toward homework (Xu & Corno, 2003). Parents were found to make sure that their children completed homework on time by helping them keep track of what remained to be done (e.g., asking a daughter to make a list of the assignments and to check off each assignment when she completed it; Xu & Corno, 1998). In line with associational evidence that homework purposes were positively related to homework time management (Xu, 2005), qualitative data from another study (Xu & Yuan, 2003) implied that student attitudes toward homework influenced how they approached homework and homework time management. Meanwhile, girls (compared with boys) reported working more frequently to manage homework time (Xu & Corno, 2006).

Yet, much of what we know about time management in homework (a) is informed by insights from qualitative data (e.g., Xu & Corno, 1998), (b) is inferred from studies that did not explicitly focus on homework time management (e.g., Trautwein et al., 2006) or studies that did

not control other important variables (e.g., Xu & Corno, 2006), and (c) has not differentiated between class- and student-level effects.

To address these gaps in the previous research, Xu (2010b) examined multilevel models of homework time management, as reported by 1895 U.S. students from 111 classes. These models were informed by research and theory on self-regulation (e.g., Pintrich, 2004) and on homework (e.g., Cooper, 1989). Data revealed that, at the student level, homework time management was positively related to arranging the environment, self-reported grade, learning-oriented reasons, and peer-oriented reasons. At the class level, parent education was found to have a positive effect on homework time management. Although these findings extended the previous research in the field, they were limited to a sample of U.S. students.

## 2.3. Homework practices and attitudes in China

One important factor that influences children's after-school activities is the attitude of the culture toward education and resulting educational practices (Newman et al., 2007). Chinese culture tends to place a high value on education (Ho, 1994), which is regarded as the primary means of upward social mobility (Sue & Okazaki, 1990). In addition, Chinese beliefs in human malleability and self-improvement lead to a strong emphasis on effort in educational endeavors (Chen & Uttal, 1988). Chinese parents typically have high expectations for their children's academic success, they emphasize effort over ability as the route to academic success, and they are less satisfied with their children's academic performance than American parents (Chen & Stevenson, 1995; Rao, Moely, & Sachs, 2000). These values and expectations influence the way Chinese families approach the main after-school activity (i.e., homework).

A number of studies have examined the East–West differences in homework practices and attitudes (Cai, 2003; Chen & Stevenson, 1989; Hong et al., 2000). Chen and Stevenson (1989) examined the differences in homework attitudes and the amount of time spent on homework. Data revealed that Chinese teachers viewed homework more important than American teachers and that Chinese children held more positive attitudes about homework than American children. In addition, Chinese children were assigned and spent more time on homework than American children. The researchers found that the motivation of Chinese children is especially interesting in that “despite the large amounts of homework they were assigned, they did not develop a negative attitude about homework.” (p. 358).

In the study by Chen and Stevenson (1989), Chinese children were also found to receive more help from family members with their homework than did American children. This finding is in line with findings from a study by Cai (2003), who examined parent involvement in children's math learning in U.S. and China. Data revealed that more Chinese than U.S. parents checked their children's homework regularly, were able to motivate their children to learn math well, and monitored the amount of time that their children spent on math at home.

Other studies have alluded to the issue of homework time management for Chinese students. Peng, Hong, Li, Wan, and Long (2010) examined students about their homework problems (10 items; e.g., “I forget to bring homework back to class” and “I put off doing homework as long as I can”). Males (compared with females) rated themselves as having more homework problems. As homework problems combined ten items, it is not clear whether the gender difference in homework problems was due to their ratings on items relating to managing homework time alone, on other items alone, or across these items.

Hong, Peng, and Rowell (2009) examined six homework self-regulation constructs (utility value, intrinsic value, effort, persistence, planning, and self-checking), reported by 330 7th and 407 11th graders in China. Data revealed that 11th graders (compared with 7th graders) viewed homework as less useful, enjoyed doing homework less, expended less effort, persisted less, and engaged in planning and self-checking less. In addition, math achievement was positively related

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