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Self-Regulation of Homework Behavior: Homework Management at the Secondary School Level

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ABSTRACT. The authors examined empirical models of variables posited to predict homework management at the secondary school level. The participants were 866 eighth-grade students from 61 classes and 745 eleventh-grade students from 46 classes. Most of the variance in homework management occurred at the student level, with affective attitude and homework interest appearing as 2 significant predictors at the class level. At the student level, homework management was positively associated with learning-oriented reasons, affective attitude, self-reported grade, family homework help, homework interest, teacher feedback, and adult-oriented reasons. On the other hand, homework management was negatively associated with time spent watching television. In addition, Black girls, compared with Black boys, were more likely to manage their homework assignments.

Keywords: homework, secondary school students, self-regulated learning

Homework is a widespread educational activity across cultures, grades, and ability levels (Cooper, 1989; Warton, 2001), and for most school-age children it is an important part of their daily routine (Cooper, Robinson, & Patall, 2006; Corno, 2000). Doing homework has been long viewed as an important vehicle for developing better study habits and desirable self-regulatory strategies (e.g., better time organization; Cooper, 1989; Corno, 1996; Corno & Xu, 2004; Epstein, 1983; Warton, 2001), as (a) it often takes place amidst the pull of multiple competing after-school activities and as (b) children are challenged to maintain the needed focus and effort to complete assignments with less structure, supervision, and time constraints than exist in the classroom (Cooper et al., 2006; Wolters, 2003). Not until recently, however, has research begun to examine students' efforts to manage their own homework.

Several studies investigated homework management strategies as reported by secondary school students (Deslandes, Rousseau, & Nadeau, 2008; Xu, 2007; Xu & Corno, 2003). However, these studies were based on samples of largely middle-class White students. In addition, these studies did not incorporate important variables included in research and theorizing on self-regulated learning.

Consequently, there is a need to examine a range of variables that may influence homework management strategies used by secondary school students from diverse backgrounds. This line of research is important, as homework becomes "a source of complaint and friction between home and school more often than other teaching activities" (Cooper, 2001, p. ix), and as the use of homework management strategies is positively associated with homework completion (Xu, 2008b, 2008c) and academic achievement (Deslandes et al., 2008).

Theoretical Framework

One theoretical framework that bears direct relevance to homework management is self-regulated learning, particularly from the perspective of volitional control (Boekaerts & Corno, 2005; Corno, 1994, 2001; Kuhl, 2000; Winne, 2004). The term *volition* refers to both the strength of will needed to complete a task and the diligence of pursuit (Corno, 1993). Volitional control is concerned primarily with issues of implementation that occur after the goal is set, to protect the intention to pursue that goal in the face of potential distractions and other obstacles. Specifically, it is characterized by the self-regulation activities of purposive and persistent striving, including, for example, planning goals, setting priorities, bypassing barriers, managing resources, budgeting time, and monitoring emotion (Boekaerts & Corno, 2005; Corno, 2004).

Volitional control is particularly important to the task of homework management because goals of homework tasks are typically set by school teachers. The main charge for students is to navigate the demands of doing homework (i.e., engaging purposively in maneuvers that effectively protect homework intention). They are asked to independently manage

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homework, including, for example, allocating their time, organizing the workspace, staying focused, keeping themselves on track, maintaining or enhancing the strength of their homework intention, minimizing homework distractions, and coping with unwanted emotions surrounding homework tasks (Corno, 2004; Xu, 2008b, 2008c). It is not surprising that secondary school students continue to have difficulties managing their homework. Indeed, trying to get students to complete their homework has become one of the most frequent and frustrating behavioral problems for educators (Killoran, 2003).

In their work on volition in the learning process, Garcia, McCann, Turner, and Roska (1998) linked volition with expectancy-value theory (Eccles, 1983), particularly Eccles's (1983) construct of task value to intention formation, implementation, and protection. They stated that volitional control may be influenced by the pleasure one experiences when engaging in a task, as well as utility value as the instrumental benefit. More specifically, based on Eccles's theory, Warton (2001) discussed the important role of task value in following through on homework, including (a) task interest (i.e., the extent to which homework is rated as interesting) and (b) task utility (i.e., children's understanding of the purposes of homework).

Research and theorizing on self-regulation further suggests that the use of self-regulatory strategies may be influenced by goal orientation (purpose for engaging a task), task value (the importance and utility of a task), and task interest (the appeal of a task or an activity). As students with a greater interest in an activity and those who view the activity as important or useful are more likely to use adaptive self-regulatory strategies (Pintrich & Zusho, 2002), interest and value may influence self-regulation, in general (Schunk, 2005), and homework management, in particular.

In addition, as self-regulated learning perspective recognizes that there are biological, developmental, sociocultural, and individual differences that can affect a student's efforts at regulation (McCaslin & Hickey, 2001; Pintrich, 2004), homework management may further be influenced by student and family characteristics (e.g., gender, ethnicity, grade level, academic achievement, parent education) as well as by adult monitoring (by parents and teachers). For example, children's previous performance influences their beliefs about their abilities (Wigfield, Tonks, & Eccles, 2004), and high-achieving students were found to exhibit more self-regulated learning skills (Zimmerman & Martinez-Pons, 1990).

Whereas no study has examined explicitly whether ethnicity may influence homework management, research on school engagement raises an intriguing question about the relationship between ethnicity and homework management. One branch of research on school engagement that bears relevance to the present investigation is those studies that conceptualize student effort in doing homework as one important aspect of school engagement. Past research in this area, however, has produced mixed evidence on racial/ethnic differences. Several studies found that Black students spent less time on homework than did White students (Ainsworth-Darnell & Downey, 1998; Steinberg, Brown, & Dornbusch, 1996). Other studies have found no difference in school engagement between Black and White students, as measured by a composite of attendance, class preparedness, and time spent on homework (Kelly, 2008a; Smerdon, 1999). Still other studies have reported that racial and ethnic minority students were more academically engaged than White students (going to class, paying attention, and doing homework; Johnson, Crosnoe, & Elder, 2001; Shernoff, Knauth, & Makris, 2000).

Taken together, this body of literature suggests that homework management may be influenced by a number of variables, including goal orientation, task value, task interest, affective attitude, the influence of others, and background variables. Consequently, it is important to incorporate these variables in models of homework management.

Empirical Studies

Several studies examined homework management strategies used by secondary school students (Deslandes et al., 2008; Xu & Corno, 2003, 2006). These studies found that certain student and family characteristics influenced students' use of homework management strategies. Deslandes et al. (2008) examined the relationship between students' homework management strategies and family homework help. Data were drawn from 101 student-parent dyads who participated in a 2-year study (from Grades 7 to 9). Findings indicated that family homework help fostered certain homework management strategies (e.g., controlling homework emotion).

Xu and Corno (2006) linked gender, family help, and grade level to homework management strategies while controlling for parental level of education. The participants were 238 students in Grades 7 and 8. There were no significant differences across the two grade levels studied on homework management strategies. In addition, homework management strategies appeared unrelated to parental education level. On the other hand, girls and students who received family help reported more frequently using certain homework management strategies (e.g., being more self-motivating during homework).

Other studies suggest that student attitude toward homework may play an important role in homework management. Xu and Yuan (2003) examined how homework was perceived by middle school students, based on open-ended interviews. Although acknowledging that some assignments were interesting, many students complained that other assignments were frequently boring, too easy or too hard, or irrelevant to their lives. One group of the students took a more matter-of-fact approach toward doing homework (e.g., "I'm not very excited about it, but I'm not bragging about it. . . . As soon as I get home, I'm just used to doing my homework and that's it"). Another group of the students took a

more negative approach toward doing homework (e.g., "I don't like doing it. It makes me upset, and I don't want to do it"). These findings implied that attitudes toward homework influenced the way that students approached homework in general and homework management in particular.

In another study, Xu (2007) linked a range of variables to homework management as reported by 194 students in Grades 5 and 6. The results revealed that girls and those students who received family help reported more frequently managing their homework. In addition, homework interest and affective attitude (i.e., the appeal of homework compared with other after-school activities) were positively related to the use of homework management strategies. Furthermore, intrinsic reasons (i.e., doing homework for reinforcement of school learning and the development of self-regulatory attributes) was positively associated with the use of homework management strategies.

Gaps in Previous Research and the Purpose of the Present Study

Taken together, several empirical studies allude to a number of factors that may influence homework management, including student and family characteristics (e.g., Xu & Corno, 2006), adult monitoring (e.g., Deslandes et al., 2008), and student attitudes toward homework (e.g., Xu, 2007; Xu & Yuan, 2003). Yet, much of what we know about homework management (a) is often based on samples of largely middle-class White students (Xu, 2007; Xu & Corno) and (b) has failed to incorporate a multilevel perspective (i.e., did not differentiate between class- and student-level effects). In addition, the Homework Management Scale used in these previous studies did not include certain items that reflect the ever-changing reality of doing homework at home (e.g., homework management challenges presented by Internet access).

There is also a need to incorporate teacher feedback, as teachers' control and feedback for homework completion may influence the level of student effort in doing homework (Natriello & McDill, 1986; Trautwein, Ludtke, Schnyder, & Niggli, 2006). For example, the study by Trautwein et al. (2006) revealed that perceived teacher control (e.g., the extent to which a teacher checks homework) was a statistically significant predictor of homework effort at the student level, implying that teacher feedback may influence students' homework management behavior.

To address these gaps in previous research on homework management, the aim of the present study was to propose and test empirical models of homework management at the secondary school level, using the recently validated Homework Management Scale (Xu, 2008b, 2008c). These models differ with respect to the specific predicator variables they include and the level of these variables. Model 1 includes 13 student-level variables relating to student and family characteristics (gender, ethnicity, free lunch, parent education, and self-reported grade), adult monitoring (family help and teacher feedback), student attitude toward homework (peer-, adult-, and learning-oriented reasons; homework interest; affect attitude), and time spent watching television. As high-achieving students were found to exhibit more self-regulated learning skills (Zimmerman & Martinez-Pons, 1990), it was hypothesized that homework management would be positively related to self-reported grade. Meanwhile, in line with self-regulation literature (Pajares, 2002; Zimmerman & Martinez-Pons, 1990) and related empirical studies on homework (Xu & Corno, 2006; Younger & Warrington, 1996), it was hypothesized that girls would be more likely to manage their homework than boys. In addition, in line with the literature on self-regulation (Pintrich, 2004) and previous findings (Deslandes et al., 2008; Xu & Corno, 1998), it was hypothesized that homework management would be positively associated with adult monitoring (family homework help and teacher feedback).

As students with greater interest in an activity and who view it as important are more likely to use adaptive self-regulatory strategies (Pintrich & Zusho, 2002; Schunk, 2005), it was hypothesized that homework management would be positively associated with homework interest and homework reasons. In addition, as students' efforts to manage homework are likely to be influenced by the relative attractiveness of competing activities during after-school hours, it was also hypothesized that homework management would be positively related to affective attitude toward homework. Finally, as students often found that television interfered with their efforts to follow through their homework (Benson, 1988; Wober, 1992), it was further hypothesized that homework management would be negatively related to time spent on watching television.

On the other hand, information is lacking regarding whether White students or Black students may take more initiative in managing homework, as the literature on school engagement (which often conceptualizes student effort in doing homework as one important aspect of school engagement) have yielded mixed results (Johnson et al., 2001; Kelly, 2008a; Shernoff et al., 2000; Smerdon, 1999). Meanwhile, parent education and free lunch status were used proxy variables for background variables that may influence individual efforts at regulation (Pintrich, 2004; Wigfield et al., 2004; Zimmerman & Martinez-Pons, 1990).

Model 2 incorporated five variables at the class level (grade level, parent education, teacher feedback, homework interest, and affective attitude), as the use of regulation strategies may be influenced by social and academic contexts of doing homework (Corno & Mandinach, 2004), including peer, parent, and teacher influences at the class level (e.g., norm, expectation, student engagement in homework). For example, students' shared affective attitude toward homework in a given class might have an effect on homework management above and beyond the effect of affective attitude at the student level. In addition, in line with the call to attend possible interactions among ethnicity, gender, and age in motivation theory and research (Graham & Taylor,

2002), Model 2 includes three interaction terms (Ethnicity × Gender, Ethnicity × Grade Level, and Gender × Grade Level).

Method

Participants

To address the concern that previous studies tended to focus on middle-class White students (e.g., Cooper, Lindsay, Nye, & Greathouse, 1998; Xu, 2005), the present study attempted to recruit school districts that enrolled a relatively high percentage of Black students. In addition, the present study made a deliberate attempt to select eighth- and 11th-grade students, as the grade level used for comparison in previous studies was over a relatively small grade span: Grade 5 versus Grade 6 in one study (Xu, 2007) and Grade 7 versus Grade 8 in another study (Xu & Corno, 2006).

The participants were 1,611 students from 107 classes in the Southeast, including 866 eighth-grade students from 61 classes and 745 eleventh-grade students from 46 classes. The sample included 57.5% White students and 42.5% Black students. The survey response rate was 89%, and the racial/minority breakdown of the students who responded to this survey was comparable to that of these districts. The mean educational level for the parents was 13.51 years ($SD = 2.67$). The percentage of the students who received free meals (36.7%) was close to the national average (37.8%; Common Core of Data, 2010).

Specifically, for the Black and White students, the mean educational level for their parents was quite close (13.43 years for Blacks and 13.63 years for Whites). Meanwhile, these two groups differed, relating to the percentage of students who received free meals (64.0% for Blacks and 16.0% for Whites). This difference is not surprising, due to the higher average incomes of Whites relative to the U.S. population as a whole (Ralston, Newman, Clauson, Guthrie, & Buzby, 2008). For example, shares of free-lunch recipients were divided nearly equally among the three major ethnic groups (i.e., Blacks, Whites, and Hispanics), although the percentage of Whites participated in the national school lunch program (53.5%) far outweighs that of Blacks (16.6%) and Hispanics (21.9%).

Measures

The homework survey incorporated items relating to gender, ethnicity, free lunch, self-reported grade, parent education, family homework help, and time spent on television. Students were asked about their grade average for all their subjects taken during the previous 2 years. Possible responses included the following: below D (1), mostly Ds (2), mostly Cs (3), mostly Bs (4), and mostly As (5). This item was adapted from the National Education Longitudinal Study of 1988. Concerning the reliability of students' self-reported grades, several researchers found a very strong or quite high correlation between self-reported grade and actual academic performance (Dickhaeuser & Plenter, 2005; Kelly, 2008b).

Two items asked about parent education (one for father or guardian, and another for mother or guardian). Possible responses for both items included: less than high school (scored 6 years), some high school (scored 10 years), high school graduate (scored 12 years), some college or 2-year college graduate (scored 14 years), 4-year college graduate (scored 16 years), some graduate school (scored 17 years), and graduate degree (scored 19 years). A composite variable for parent education was then obtained by averaging these two items (Cronbach's $\alpha = .73$). For single-parent/guardian families, the response to either item was used for parent education. In addition, students were asked about the frequency of family homework help and responses were rated on a 5-point Likert- type scale ranging from 1 (*never*) to 5 (*routinely*).

The survey also incorporated one item relating to time students spent on television. Possible responses included the following: none (scored 1), half an hour or less (scored 2), more than half an hour to 1 hr (scored 3), more than 1 hr to 1.5 hr (scored 4), more than 1.5 hr to 2 hr (scored 5), more than 2 hr to 2.5 hr (scored 6), more than 2.5 hr to 3 hr (scored 7), and more than 3 hr (scored 8). Following the work of Cooper et al. (1998), an approximate measure of time spent on television was constructed by converting each student's response to the midpoint of time associated with each scale value (1 = 0 min; 2 = 15 min; 3 = 45 min; 4 = 75 min; 5 = 105 min; 6 = 135 min; 7 = 165 min; and 8 = 195 min).

Furthermore, the survey incorporated multi-item scales, including teacher feedback, reasons for doing homework, homework interest, affective attitude toward homework, and homework management (see Table 1). Some items were adapted from standard instruments (e.g., Cooper et al., 1998) or taken from related literature (e.g., Warton, 2001), whereas others were derived from previously validated measures (e.g., Xu, 2008b).

Teacher feedback. Five items were used to assess the extent to which teachers provide homework feedback (Cronbach's $\alpha = .79$), informed by related literature (e.g., Walberg, Paschal, & Weinstein, 1985). It measured how much of the assigned homework was monitored (e.g., discussed and checked).

Reasons for doing homework. Three subscales assessed reasons for doing homework, based on the recently validated Homework Purpose Scale through the use of confirmatory factor analysis (Xu, 2010a). Three items measured peer-oriented reasons (Cronbach's $\alpha = .78$), relating to working with and seeking approval from peers. Three items measured adult-oriented reasons (Cronbach's $\alpha = .79$), relating to seeking approval from parents and teachers. Nine items measured learning-oriented reasons (Cronbach's $\alpha = .89$), relating to reinforcing school learning and developing a sense of responsibility. The decision for using the Homework

TABLE 1. Alpha Reliability of Multi-item Scales

Scale	Items	α	95% CI
Teacher feedback[a]	How much of your assigned homework is discussed in class?	.79	[.77, .80]
	How much of your assigned homework is collected by teachers?		
	How much of your assigned homework is checked by teachers?		
	How much of your assigned homework is graded by teachers?		
	How much of your assigned homework is counted in your overall grade?		
Peer-oriented reasons[b]	Doing homework brings you approval from classmates	.78	[.76, .80]
	Doing homework gives you opportunities to work with classmates		
	Doing homework gives you opportunities to learn from classmates		
Adult-oriented reasons[b]	Doing homework brings you teacher approval	.79	[.77, .80]
	Doing homework brings you family approval		
	Doing homework makes your family more aware of your learning at school		
Learning-oriented reasons[b]	Doing homework helps you understand what's going on in class	.89	[.88, .90]
	Doing homework helps you learn how to manage your time		
	Doing homework gives you opportunities to practice skills from class lessons		
	Doing homework helps you develop a sense of responsibility		
	Doing homework helps you learn to work independently		
	Doing homework helps you develop good discipline		
	Doing homework helps you learn study skills		
	Doing homework helps you get a good grade		
	Doing homework helps you prepare for the next lesson		
Homework interest	Overall, do you think the homework you get is _____?[c]	.83	[.81, .84]
	How do you feel about homework in general?[d]		
	How does your homework affect your interest in school?[e]		
Affective attitude	My motivation or desire to do homework is _____[f] other after-school activities	.86	[.85, .87]
	My attention while doing homework is _____[f] other after-school activities		
	My mood while doing homework is _____[g] other after-school activities		
	Compared with other activities I do after school, homework is my _____[h]		
Homework management[i]	Locate the materials I need for my homework	.88	[.87, .89]
	Find a quiet area		
	Remove things from the table		
	Make enough space for me to work		
	Turn off the TV		
	Set priority and plan ahead		
	Keep track of what remains to be done		
	Remind myself of the available remaining time		
	Tell myself to work more quickly when I lag behind		
	Find ways to make homework more interesting		
	Praise myself for good effort		
	Praise myself for good work		
	Reassure myself that I am able to do homework when I feel it is too hard		
	Tell myself not to be bothered with previous mistakes		
	Tell myself to pay attention to what needs to be done		
	Tell myself to calm down		
	Cheer myself up by telling myself that I can do it		
	Daydream during a homework session[j]		
	Start conversations unrelated to what I'm doing[j]		
	Play around with other things while doing my homework[j]		

(Continued on the next page)

TABLE 1. Alpha Reliability of Multi-item Scales *(Continued)*

Scale	Items	α	95% CI
Homework completion	Stop homework repeatedly to find something to eat or drink[j] Stop homework to send or receive instant messages[j] How much of your assigned homework do you usually complete?[a] How often do you come to class *without* your homework?[ij]	.72	[.69, .74]

Note. The 95% confidence intervals (CI) for coefficient alpha were calculated using a method employing the central *F* distribution (see Fan & Thompson, 2001).
[a]Responses were 1 (*none*), 2 (*some*), 3 (*about half*), 4 (*most*), and 5 (*all*).
[b]Responses were 1 (*strongly disagree*), 2 (*disagree*), 3 (*agree*), and 4 (*strongly agree*).
[c]Responses were 1 (*very boring*), 2 (*boring*), 3 (*neither boring nor interesting*), 4 (*interesting*), and 5 (*very interesting*).
[d]Responses were 1 (*don't like it at all*), 2 (*don't like it some*), 3 (*neither like it nor dislike it*), 4 (*like it some*), and 5 (*like it very much*).
[e]Responses were 1 (*decreases it a lot*), 2 (*decreases it some*), 3 (*does not make a difference*), 4 (*increases it some*), and 5 (*increases a lot*).
[f]Responses were 1 (*much lower than*), 2 (*lower than*), 3 (*about the same as*), 4 (*higher than*), and 5 (*much higher than*).
[g]Responses were 1 (*much worse than*), 2 (*worse than*), 3 (*about the same as*), 4 (*better than*), and 5 (*much better than*).
[h]Responses were 1 (*least favorite activity*), 2 (*less favorite activity*), 3 (*about the same as other activities*), 4 (*more favorite activity*), and 5 (*most favorite activity*).
[i]Responses were 1 (*never*), 2 (*rarely*), 3 (*sometimes*), 4 (*often*), and 5 (*routinely*).
[j]The item was reverse scored.

Purpose Scale, instead of the scales relating to achievement goals (Harackiewicz, Barron, Elliot, Tauer, & Carter, 2000), was based on the consideration that achievement goals (e.g., mastery and performance goals) focus on more general goal orientation (without specific items relating to homework utility).

Homework interest. Three items were used to assess the level of homework interest as perceived by students (Cronbach's $\alpha = .83$), informed by literature on interest and intrinsic motivation, in general (Deci, Vallerand, Pelletier, & Ryan, 1991; Isaac, Sansone, & Smith, 1999; Wigfield, 1994; Wigfield & Eccles, 2000), and homework interest, in particular (Cooper et al., 1998; Xu & Corno, 1998, 2003). These items measure the extent to which students view homework interesting and to what extent they like or dislike homework assignments.

Affective attitude toward homework. Informed by related literature (Leone & Richards, 1989; Verma, Sharma, & Larson, 2002; Warton, 2001; Xu, 2006, 2007), four items were used to assess the appeal of homework compared with other after-school activities, relating to students' motivation, attention, and mood (Cronbach's $\alpha = .86$). The previous two scales (Homework Interest and Affective Attitude Toward Homework) were found to be empirically distinguishable (i.e., factorially distinct) for secondary school students (Xu, 2008b, 2008c).

Homework management. The students were asked about their homework management strategies, using the Homework Management Scale (Xu, 2008b, 2008c). The scale consisted of 22 items (Cronbach's $\alpha = .88$), related to arranging the environment (e.g., finding a quiet place), managing time (e.g., planning ahead), handling distraction (e.g., stopping homework to send instant messaging), monitoring motivation (e.g., making homework more interesting), and controlling emotion (e.g., calming myself down). These items were initially derived from videotaped observations (Xu & Corno, 1998), where children were observed doing homework using these strategies to manage their homework and where the use of these strategies contributed to timely homework completion.

As previous homework research tended to focus on White students, it would be important to examine alpha coefficients of the previous scales for White and Black students separately. Results indicated that the corresponding coefficients were quite comparable for these two groups: teacher feedback (.76 and .79 for White and Black students, respectively), peer-oriented reasons (.79 and .76, respectively), adult-oriented reasons (.80 and .74, respectively), learning-oriented reasons (.90 and .87, respectively), homework interest (.83 and .79, respectively), affective attitude (.84 and .85, respectively), and homework management (.89 and .86, respectively).

Statistical Analyses

Hierarchical linear modeling (HLM) allows for the inclusion of variables at multiple levels while taking into account the nonindependence of observations by addressing the variability associated with each level of nesting (Raudenbush & Bryk, 2002). Multilevel analyses were conducted using HLM 6. Before performing the multilevel analyses, all continuous variables were standardized ($M = 0$, $SD = 1$) to enhance the interpretability of the resulting regression coefficients. Thus, the regression weights for all variables (except the dummy-coded variables, including ethnicity, gender, free lunch, and

grade level) are approximately comparable with the standardized weights that result from multiple-regression procedures (Trautwein et al., 2006; Xu, 2008a).

Model 1 included 13 student-level variables, including gender, ethnicity, free lunch, parent education, self-reported grade, family homework help, teacher feedback, peer-oriented reasons, adult-oriented reasons, learning-oriented reasons, homework interest, affective attitude, and time spent watching television. Model 2 incorporated five class-level variables (grade level, parent education, teacher feedback, homework interest, and affective attitude), along with three interaction terms (Ethnicity × Gender, Ethnicity × Grade Level, and Gender × Grade Level). In the present study, parent education was aggregated at the class level to form an index of parent education at the class level. Similarly, teacher feedback was aggregated at the class level to form an index of students' shared assessment of teacher feedback, homework interest was aggregated at the class level to form an index of students' interest of their homework, and affective attitude was aggregated at the class level to form an index of students' affective attitude toward homework.

Full maximum likelihood was used in all models. To disentangle individual level and compositional effects (Raudenbush & Bryk, 2002), four variables relating to students' shared learning environment (i.e., aggregated parent education, teacher feedback, homework interest, and affective attitude) were centered at the group mean. The other predictor variables were introduced as uncentered variables. There were few missing values (with a mean of 2.6%). These missing values were imputed using the expectation-maximization (EM) in SPSS 13.0. The EM algorithm is an iterative computation technique of maximum likelihood estimates for incomplete data, which yields more reliable and unbiased estimates compared with other imputation techniques such as simple regression techniques, mean substitution, and the last observation carried forward (Koszycki, Benger, Shlik, & Bradwejn, 2007; Schafer & Graham, 2002).

Results

Homework management was found to correlate significantly with all of the independent variables. Table 2 presents the descriptive statistics relating to the study variables. In addition, it includes zero-order correlations among independent variables and homework management.

The fully unconditional model was conducted to partition the variance in homework management into between- and within-class components. The results indicated that 92.3% of the variance in homework management occurred at the student level and 7.7% of the variance occurred at the class level. The deviance statistics and number of estimated parameters for the unconditional mode were 4525.08 and 3, respectively.

Model 1 included 13 student-level variables (gender, ethnicity, free lunch, parent education, self-reported grade, family homework help, teacher feedback, peer-oriented reasons, adult-oriented reasons, learning-oriented reasons, homework interest, affective attitude toward homework, and time spent watching television). The deviance statistics and number of estimated parameters for Model 1 were 3596.36 and 16, respectively. The likelihood ratio test comparing the unconditional model to Model 1 indicated that Model 1 was a significantly better fit to the data than the fully unconditional model, $\chi^2(13, N = 1{,}568) = 928.76, p < .01$. Model 1 explained 40.2% of the variance in homework management at the student level, and 44.8% of the variance at the class level (see Table 3).

Model 2 included five class-level variables (grade level, parent education, teacher feedback, homework interest, and affective attitude toward homework) and three interactions terms (Ethnicity × Gender, Ethnicity × Grade Level, and Gender × Grade Level). The equations for the final model (Model 2) included the following:

$$\begin{aligned}
&\text{Homework management}(Y_{ij}) = \beta_{0\text{j}} + \beta_{1j}(\text{gender})_{ij} \\
&\quad + \beta_{2j}(\text{ethnicity})_{ij} + \beta_{3j}(\text{lunch})_{ij} \\
&\quad + \beta_{4j}(\text{parent education})_{ij} + \beta_{5j}(\text{self-reported grade})_{ij} \\
&\quad + \beta_{6j}(\text{homework help})_{ij} + \beta_{7j}(\text{teacher feedback})_{ij} \\
&\quad + \beta_{8j}(\text{peer-oriented reasons})_{ij} \\
&\quad + \beta_{9j}(\text{adult-oriented reasons})_{ij} \\
&\quad + \beta_{10j}(\text{learning-oriented reasons})_{ij} \\
&\quad + \beta_{11j}(\text{homework interest})_{ij} \\
&\quad + \beta_{12j}(\text{affective attitude})_{ij} + \beta_{13j}(\text{time on TV})_{ij} \\
&\quad + \text{ß}_{14j}(\text{ethnicity} \times \text{gender})_{ij} + r_{ij}. \\
&\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{grade level}) + \gamma_{02}(\text{parent education}) \\
&\quad + \gamma_{03}(\text{teacher feedback}) + \gamma_{04}(\text{homework interest}) \\
&\quad + \gamma_{05}(\text{affective attitude}) + \mu_{0j}. \\
&\beta_{1j} = \gamma_{10} + \gamma_{11}(\text{grade}); \beta_{2j} = \gamma_{20} + \gamma_{21}(\text{grade}); \\
&\beta_{3j} = \gamma_{30}; \gamma_{4j} = \gamma_{40}; \beta_{5j} = \gamma_{50}; \\
&\beta_{6j} = \gamma_{60}; \beta_{7j} = \gamma_{70}; \beta_{8j} = \gamma_{80}; \\
&\beta_{9j} = \gamma_{90}; \beta_{10j} = \gamma_{100}; \beta_{11j} = \gamma_{110}; \\
&\beta_{12j} = \gamma_{120}; \beta_{13j} = \gamma_{130}; \beta_{14j} = \gamma_{140}.
\end{aligned}$$

The deviance statistics and number of estimated parameters for Model 2 were 3534.61 and 24, respectively. The likelihood ratio test comparing Model 2 to Model 1 indicated that Model 2 was a significantly better fit to the data than Model 1, $\chi^2(8, N = 1{,}568) = 61.75, p < .01$. Model 2 accounted for an additional 0.4% of the variance in homework management at the student level and an additional 44.1% of the variance at the class level.

Overall, the final model (Model 2) explained 40.6% of the variance in homework management at the student level,

TABLE 2. Descriptive Statistics and Pearson Correlations

Variable	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Gender (boy = 1)	0.46	0.50	—																	
2. Ethnicity (White = 1)	0.57	0.49	.02	—																
3. Free lunch (yes = 1)	0.37	0.48	−.04	−.49**	—															
4. Parent education	13.51	2.67	.05*	−.04	−.19**	—														
5. Self-reported grade	3.80	0.89	−.17**	.14**	−.21**	.15**	—													
6. Family homework help	2.45	1.32	−.01	−.07**	.04	.15**	−.07**	—												
7. Teacher feedback	3.61	0.83	−.02	−.19**	.13**	.07**	−.02	.21**	—											
8. Peer-oriented reasons	2.33	0.73	−.09**	−.16**	.11**	.00	.01	.21**	.20**	—										
9. Adult-oriented reasons	2.56	0.70	−.08**	−.16**	.10**	.03	.04	.20**	.29**	.67**	—									
10. Learning-oriented reasons	2.84	0.60	−.20**	−.21**	.13**	.02	.10**	.17**	.31**	.59**	.62**	—								
11. Homework interest	2.40	0.96	−.20**	−.28**	.18**	.04	.11**	.18**	.31**	.43**	.44**	.57**	—							
12. Affective attitude	2.17	0.85	−.14**	−.34**	.22**	.03	.01	.22**	.29**	.36**	.40**	.50**	.72**	—						
13. Time spent watching TV	121.22	71.78	−.02	−.23**	.13**	.00	−.08**	.04	.08**	.01	−.04	−.04	−.02	−.06*	—					
14. Grade level (class)	0.43	0.50	−.02	.00	−.01	−.12**	−.02	−.31**	−.19**	.04	−.03	.05*	.00	−.06*	−.06*	—				
15. Parent education (class)	13.60	0.99	−.01	−.03	−.18**	.37**	.14**	.10**	.03	−.06*	−.07**	−.06*	.01	.01	.00	−.30**	—			
16. Teacher feedback (class)	3.61	0.34	.00	−.24**	.20**	.02	−.14**	.23**	.40**	.10**	.17**	.14**	.18**	.24**	.05	−.45**	.03	—		
17. Homework interest (class)	2.42	0.41	−.03	−.38**	.35**	−.01	−.06*	.11**	.20**	.22**	.20**	.26**	.39**	.38**	.05	.02	.00	.48**	—	
18. Affective attitude (class)	2.21	0.40	.01	−.46**	.41**	.01	−.13**	.16**	.24**	.20**	.19**	.24**	.34**	.44**	.07**	−.16**	.04	.57**	.87**	—
19. Homework management	2.95	0.65	−.13**	−.20**	.11**	.08**	.19**	.26**	.31**	.33**	.41**	.54**	.49**	.52**	−.12**	−.10**	.06*	.20**	.22**	.27**

Note. In the study, *N* varied from 1,568 to 1,611 (11 students did not indicate their gender status, and 32 students did not indicate their lunch status).
*$p < .05$. **$p < .01$.

TABLE 3. Homework Management: Results from Hierarchical Linear Modeling

	Model 1		Model 2	
Model predictor	*b*	*SE*	*b*	*SE*
Student level				
Gender (girl = 0, boy = 1)	.01	.04	−.10	.06
Ethnicity (Black = 0, White = 1)	−.15**	.05	−.09	.07
Free lunch (no = 0, yes = 1)	.06	.05	.01	.05
Parent education	.00	.02	.00	.02
Self-reported grade	.17**	.02	.17**	.02
Family homework help	.13**	.02	.11**	.02
Teacher feedback	.06**	.02	.07**	.02
Peer-oriented reasons	−.05	.03	−.05	.03
Adult-oriented reasons	.07*	.03	.07*	.03
Learning-oriented reasons	.31**	.04	.30**	.04
Homework interest	.08**	.03	.10**	.03
Affective attitude	.20**	.03	.20**	.03
Time spent watching television	−.11**	.02	−.11**	.02
Class level				
Grade level (8 = 0, 11 = 1)			.06	.08
Parent education			.09	.07
Teacher feedback			.09	.06
Homework interest			−.28*	.11
Affective attitude			.60**	.12
Interaction				
Ethnicity × Gender			.17*	.08
Ethnicity × Grade Level			−.16	.09
Gender × Grade Level			.00	.08
R^2 individual level	.402		.406	
R^2 class level	.448		.859	
R^2 total	.405		.441	
Deviance statistics	3596.36		3534.61	
Number of estimated parameters	16		24	

Note. $N = 1{,}568$ from 107 classes.
*$p < .05$. **$p < .01$.

85.9% of the variance at the class level, and 44.1% of the total variance. As indicated in Table 3, eight student-level variables were found to have a statistically significant effect on homework management. Homework management was positively associated with learning-oriented reasons ($b = .30$, $p < .01$), affective attitude ($b = .20$, $p < .01$), self-reported grade ($b = .17$, $p < .01$), family homework help ($b = .11$, $p < .01$), homework interest ($b = .10$, $p < .01$), teacher feedback ($b = .07$, $p < .01$), and adult-oriented reasons ($b = .07$, $p < .05$). On the other hand, homework management was negatively associated with time spent watching television ($b = -.11$, $p < .01$).

At the class level, affective attitude was found to have a positive effect on homework management ($b = .60$, $p < .01$), whereas homework interest was found to have a negative effect on homework management ($b = -.28$, $p < .05$). Meanwhile, the interaction term of Ethnicity × Gender showed a statistically significant effect on homework management ($b = .17$, $p < .05$), suggesting that Black girls, compared with Black boys, are more likely to take initiative to manage their homework.

Ancillary Analyses

As previous findings imply that homework management is positively related to homework completion (Xu, 2005, 2011), the primary objective in the present study was to examine a range of variables that may influence homework management. On the other hand, it is important to conduct additional analyses to examine the relationship between homework management and homework completion in the present study.

For this purpose, the students were asked two additional questions, adapted from the National Education Longitudinal Study of 1988 and studies by Cooper et al. (1998). They were asked to indicate the amount of homework completion and the frequency of coming to class without homework (see Table 1). These two items were then combined in the

Homework Completion Scale (with the second item reverse scored; Cronbach's $\alpha = .72$).

Results from the fully unconditional model indicated that 6.3% of the variance in homework completion was at the class level. The deviance statistics and number of estimated parameters for the unconditional mode were 4499.11 and 3, respectively. Homework management was then introduced as a student-level variable. The deviance statistics and number of estimated parameters for this model were 4164.22 and 4, respectively. The likelihood ratio test comparing the unconditional model to the model with the model containing homework management indicated that the model containing homework management was a significantly better fit to the data than the unconditional model, $\chi^2(1, N = 1{,}568) = 334.89$, $p < .01$.

Homework management was related to homework completion ($b = .44$, $p < .01$). It explained 19.0% of the variance in homework completion at the student level, 16.1% of the variance at the class level, and 18.8% of the total variance. These results suggest that homework management is positively associated with homework completion, one of the important outcome variables in the homework process (Cooper et al., 1998; Xu, 2005). In addition, these findings provide further empirical support to the previous findings based on observational evidence that the use of homework management strategies positively influenced homework completion (Xu & Corno, 1998).

Discussion

The present study examined models of homework management at the secondary school level. Results from the multilevel analyses revealed that most of the variance in homework management occurred at the student level, with affective attitude and homework interest as two significant predictors at the class level. Homework management was positively associated with learning-oriented reasons, affective attitude, self-reported grade, family homework help, homework interest, teacher feedback, and adult-oriented reasons. On the other hand, homework management was negatively associated with time spent watching television. In addition, Black girls, compared with Black boys, were found to be more likely to manage their homework assignments.

How do we explain the finding that those students with higher self-reported grades reported that they were more likely to use homework management strategies? Although the present study is the first to link student achievement to homework management after controlling other important variables, this finding is in line with previous findings that student achievement was positively related to the use of self-regulated learning strategies in general and with certain homework practice in particular (Ablard & Lipschultz, 1998; Zimmerman & Kitsantas, 2005).

On the other hand, the finding that gender was not related to homework management is not consistent with previous findings that girls were more likely to take initiative to manage their homework than boys (Xu, 2007; Xu & Corno, 2006). However, these previous studies did not control a broad range of variables that may influence homework management. Indeed, by controlling other important variables at the student and class levels, the present study revealed that Black girls (as compared with Black boys) were more likely to take the initiative to manage their homework. One possible explanation is that Black girls are socialized to be self-reliant, resourceful, and assertive (Collins, 1998; Meece, Glienke, & Burg, 2006) and that Black girls have a stronger learning goal orientation than Black boys, whereas no differences in goal orientation for White students (Middleton & Midgley, 1997). These differences may contribute to a gender gap among Black students in how they value and approach homework, in general, and homework management, in particular.

The finding that homework management was positively related to adult monitoring (i.e., family homework help and teacher feedback) is in line with self-regulation literature (Pintrich, 2004) and previous findings (Corno & Xu, 2004; Xu & Corno, 1998). Meanwhile, the finding that homework management was negatively related to time spent watching television is consistent with other homework studies that television tended to interfere with students' effort to follow through their homework assignments (Benson, 1988; Wober, 1992).

In addition, the findings that learning- and adult-oriented reasons were positively associated with homework management provides empirical support for the theoretical claim of the importance of goals in self-regulation (Pintrich, 2004). On the other hand, how can the finding that peer-oriented reasons was not associated with homework management be interpreted? One possible explanation is that those students with higher scores in peer-oriented reasons are more likely to work with peers on homework. Yet, as distractions are often associated with cooperative learning situations (Corno, 2004; Rogers & Swan, 2004), working on homework together may lead students to engage in other attractive social activities unrelated to their homework at hand (Xu, 2010b; Zimmerman, Bonner, & Kovach, 1996), thereby displaying less initiative to manage their homework.

Affective attitude toward homework was positively related to homework management at the student and class levels. On the other hand, homework interest was positively related to homework management at the student level, yet negatively related to homework management at the class level. These findings suggest that affective attitude toward homework (i.e., its relative appeal compared to other afterschool activities) plays a more important role in homework management, as further shown in their respective regression coefficients at the student level (i.e., $b = .20$ for affective attitude and $b = .10$ for homework interest).

It is not surprising to find that homework management was positively related to homework interest and affective attitude toward homework at the student level, as students'

interest (Pintrich & Zusho, 2002; Schunk, 2005) and relative attractiveness in an activity may positively influence their use of adaptive self-regulatory strategies. On the other hand, how can the differential effect of homework interest on homework management at the student and class level (i.e., a statistically significant positive effect at the student level and a statistically significant negative effect at the class level) be explained? One possible explanation is that simply making homework more interesting, fun, or entertaining at the class level may serve to downgrade and undermine efforts of students in these classes to independently manage their homework assignments.

It is important to note that findings of the present study were based on a relatively large sample of students, through the use of hierarchical analyses. On the other hand, this study has some limitations that should be acknowledged as well. The present findings are based on self-reported data and may be subject to social desirability bias (Duncan & McKeachie, 2005; Wentzel & Wigfield, 2007). The students may have wanted to present themselves in a more favorable light (e.g., underreporting family help or overreporting grade average). Although it is difficult to determine the exact effects of self-reported data on the findings, some evidence suggests that social desirability bias is unlikely to be a major concern in the present study. For example, the percentage of eighth-grade students who reported that they received family help in the present study (75%) was close to that found in a nationally representative sample of eighth-grade students (71%) in the National Education Longitudinal Study of 1988 (Horn & West, 1992). As for self-reported grade, the eighth-grade students' responses in this sample were 25% mostly As, 40% mostly Bs, 26% mostly Cs, 7% mostly Ds, and 2% below D. This percentage breakdown was also close to statistics reported in the National Education Longitudinal Study of 1988, where the corresponding percentages for English, for example, were 31%, 38%, 23%, 6%, and 2%.

Although the present study included two age groups (eighth- and 11th-grade students), the findings were based on a cross-sectional survey, rather than repeated measures at different time points. Another related limitation relates to the issue of causation, a limitation facing virtually all nonexperimental research (Winship & Sobel, 2004). Although much care was taken to control for possible confounding variables (informed by research and theorizing on self-regulation), other predictor variables might have had an effect on homework management had they been included.

With respect to future research, it would be particularly important to conduct longitudinal studies that follow cohorts of students to examine how they plan and prioritize their homework assignments, how they implement homework management strategies, and how their homework management may be influenced by a range of variables such as those examined in the present study. Meanwhile, although ancillary analyses from the present study revealed that homework management was positively related to homework completion, there is a need to link homework management to the major homework outcome variables in Cooper's (1989) model (e.g., relating to homework performance and academic achievement), in a longitudinal design.

It would be informative to conduct qualitative studies to better understand the issue of homework management in cross-cultural settings, as student attitudes toward homework (e.g., affective attitude toward homework and perceived importance of doing homework) may be influenced by cultural differences relating to the availability and attractiveness of other after-school activities and the value of doing homework ascribed by parents and teachers (Dandy & Nettelbeck, 2002; Wigfield et al., 2004). Furthermore, there is a need to incorporate multiple methods (e.g., a diary study, think-aloud protocol measures, trace logs in computer-assisted environments, stimulated recall, experience sampling methods) to better capture the ongoing dynamic processes of homework management. Finally, although there are multiple barriers to random assignments in applied settings in general (Shadish, Cook, & Campbell, 2002) and with homework intervention in particular (Cooper et al., 2006), controlled experiments are needed to better address the issue of causation (e.g., to assess the effectiveness of interventions designed to engage recalcitrant students to better manage their homework).

With respect to homework practices, the finding that homework management was positively related to teacher feedback, family help, and adult-oriented reasons suggests that teachers and parents can exert an important influence on homework management well into the secondary school years. This is an important message for families from diverse educational backgrounds, as the present study implies that the kind of direction parents give to children matters even if parents do not have a higher education. This is also an important message for secondary school teachers in particular, as they tend to place less value on developing good study habits (e.g., managing homework time) than do their elementary counterparts (Muhlenbruck, Cooper, Nye, & Lindsey, 2000).

In line with findings that students' views about homework play an important role in their homework behavior (Cooper et al., 1998; Hoover-Dempsey et al., 2001; Warton, 2001; Xu, 2005), the present study further suggests that adolescents need to take a more proactive role in homework management. Therefore, a more coordinated effort ought to be made to help adolescents explore ways to make homework a more positive and meaningful learning experience for themselves during after-school hours. One way to do this is to help adolescents cultivate a learning goal orientation in homework, viewing it as an important vehicle for closing critical gaps in their academic experience (Corno, 2000) and for developing their subject competence and task mastery. Another way to approach this would be to help adolescents prioritize and structure their other after-school activities on a weekly basis (Xu & Yuan, 2003). If adolescents realize that they still have opportunities for other preferred activities during the week, they may be less sidetracked by thoughts of these

competing activities while doing daily homework, thereby viewing homework tasks in a more favorable light (Xu, 2008a). As a result, they may be more likely to take initiative to manage their homework and to persist in the face of an array of alluring distractions, enticing temptations, or competing personal strivings.

Finally, it would be important to encourage adolescents to discuss and share their worked homework strategies (Nathan, 1996) as well as their suggestions about what schools and families may do to help them to follow through their homework assignments (Benson, 1988). Armed with such information, teachers and parents can provide more specific and personalized feedback and guidance for efforts at homework management (e.g., expert and peer modeling on time management). This, in turn, will encourage adolescents to play a more proactive and responsible role in managing their homework (e.g., strategic planning and self-monitoring) and to refine their self-regulatory strategies in light of self-monitored outcomes. It can further empower them to develop and experiment with their emerging theories about how to navigate the demands of doing homework more effectively in their life contexts.

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