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## Does High School Homework Increase Academic Achievement?

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**Abstract:** Although previous research has shown that homework improves students' academic achievement, the majority of these studies use data on students' homework time from retrospective questionnaires, which may be less accurate than time-diary data. We use data from the combined Child Development Supplement (CDS) and the Transition to Adulthood Survey (TA) of the Panel Study of Income Dynamics to explore the effects of time spent on homework while attending high school on two measures of academic achievement: high school GPA and college attendance by age 20. We find that homework time has no effect on these measures of academic achievement.

**Keywords:** Academic achievement, homework, GPA, human capital, education

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## **I. Introduction**

Employment has been shown to reduce the time high school students spend on homework (DeSimone 2006; Kalenkoski and Pabilonia 2009; Kalenkoski and Pabilonia 2012). In addition, while employment can potentially provide students with valuable work experience, some researchers have found that employment and working many hours while in high school negatively affect academic outcomes such as high school grades and the probability of completing high school (DeSimone 2006; Dustmann and Van Soest 2007; Lillydahl 1990; Montmarquette et al. 2007; Oettinger 1999; Ruhm 1997; Tyler 2003). Thus, one potential channel through which high school employment has a negative effect upon academic achievement is through its effects on homework. However, only a few economic studies have directly investigated this channel and they (Betts 1996; Aksoy and Link 2000; Eren and Henderson 2008) have examined the effects of completed or assigned homework in high school classes on students' performance on math tests only. Studies of middle school students (Eren and Henderson 2011) and college students (Stinebrickner and Stinebrickner 2008; Grodner and Rupp 2013) have found that homework similarly improves students' performance on math and other tests as well as first-semester grade point averages (GPA).<sup>1</sup> A concern with these studies, however, is that the majority are based on retrospective questionnaire data that provide information about assigned or completed homework during a typical week, which may not be accurate and also may be subject to social desirability bias. Time-diary data, on the other hand,

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<sup>1</sup> Cooper, Robinson, and Patall (2006) provide a nice overview of the effects of homework on academic achievement in the education, psychology, and sociology literatures. In general, small positive effects have been found. More recently, using 1990 data from National Education Longitudinal Study (NELS) and 2002 data from Education Longitudinal Study (ELS), Maltese, Tai, and Fan (2012) found no effect of math and science homework on final course grades, but a significant positive association between homework time and the SAT-Mathematics subscore.

are more accurate because of a shorter recall period and are not subject to social desirability bias because they are collected for all activities over an entire 24-hour period rather than just for specific activities (Juster, Ono, and Stafford 2003). In addition, time-diary data may be more detailed than questionnaire data if they capture the presence of secondary activities (i.e., activities performed at the same time as a reported main activity) that the usual survey questions do not.

Unfortunately, most time-diary data sets do not contain information on the future outcomes of those completing the diaries and thus are limited in the questions they can answer.<sup>2</sup> One data set that does have both homework and outcome information, however, is the combined Child Development Supplement to the Panel Study of Income Dynamics (PSID-CDS) and its follow-up, the Transition to Adulthood Study (TA). Students participate in the TA a few years after participating in the CDS. The CDS data provide information from two time diaries, one for a weekday and the other for a weekend day. Some students are tracked in high school according to ability and thus some may be assigned more homework than others. However, the CDS data provide scores on students' standardized tests taken before high school, which we include to control for this. These scores also control for cognitive ability given that ability may directly affect academic performance. The TA data provide information on high school GPA and college attendance.

We measure homework time in four ways. Three of our measures account for the fact that multitasked homework may be less productive than sole-tasked homework. These include total homework time (homework performed as either a primary or secondary activity), time spent

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<sup>2</sup> Stinebrickner and Stinebrickner (2008) is the exception that uses time-diary data to examine outcomes. However, their sample is a small, non-representative one. They sample students from one college only.

doing homework as a primary activity (homework may be combined with another activity but homework is deemed the more important activity by the respondent), and time spent doing homework as a sole activity (homework performed when no other activities were also being performed). Our fourth measure examines whether students did any homework during their two diary days. This is used as a measure of homework frequency. This last measure is included because Trautwein (2007) found a positive effect of homework frequency on achievement. Using each of these measures alternately, we estimate the effects of time spent on homework on high school GPA and college attendance by age 20, both long-term measures of academic achievement. We examine whether these effects differ by gender, given substantial differences in how girls and boys spend their time. Because homework, however measured, is potentially endogenous in that an omitted factor, such as motivation, may affect both homework time and academic performance directly, we take an instrumental variables approach in this paper. Our results show that time spent in homework, however measured, has no effect on either high school GPA or college attendance.

## **II. Data**

The data used in our analyses primarily come from all waves of the CDS (1997, 2002-2003, 2007-2008) and TA (2005, 2007, 2009, and 2011) (PSID 2013). Information about children aged 0-12 first was collected in the 1997 CDS (CDS1) and additional information about them was collected in the 2002-2003 CDS (CDS2) when they were aged 5-19 and in the 2007-2008 CDS (CDS3) when they were aged 10-19. Even more information about former CDS respondents is provided in the TA for those aged 18 and older at the time of that survey. The CDS1 provides background information on the parent/caregiver of the CDS child as well as

information on the child's race. The CDS2 and CDS3 provide time-diary information for a weekday and a weekend day for a subset of CDS children, with diaries collected for up to two children per family. Each randomly-assigned diary day records the child's primary and secondary activities from midnight to midnight. By the time the child was in high school, most filled out the diaries themselves instead of the parent. The TAs provide information on high school GPA and college attendance for high school graduates. We obtain information on each child's gender, family structure, parental education, and family income from the main PSID survey.<sup>3</sup> We also control for school-level characteristics by matching our sample to the NCES' Common Core of Data (CCD) using school identifiers from the restricted-use version of the PSID-CDS.

In the CDS2 and CDS3 there were 1,648 students who attended grades 9 through 12. We limit our sample to high school graduates.<sup>4</sup> We further exclude those who did not complete both a weekday and a weekend day diary, those who completed their time diaries over winter break or on any day in June when they did not attend school,<sup>5</sup> those who were missing the child interview in 2007, those who were missing information on race, one respondent whose family income was negative, those who were missing TA information on college attendance by age 20, those who were missing a diary date, those who attended private school, and those who were missing a

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<sup>3</sup> Our measure of family income comes from the main PSID interviews. It is constructed to be the average of yearly family income reported in the three PSID main interviews prior to completing the CDS high school diary, in 2006 dollars. If one or more years is missing, then the remaining values are used to create the average. Family structure and parental education are obtained from 2003 and 2007 main PSID surveys.

<sup>4</sup> High school GPA and information on college attendance are available only for high school graduates. In the PSID-CDS, ninety-two percent of high school students graduated, which is close to the graduation rate reported by the U.S. Department of Education (2013) for 2011.

<sup>5</sup> We defined winter break to be an approximately two-week period around Christmas and New Year's Day.

2003 main family interview. This leaves us with an analysis sample of 817 respondents that includes 440 females and 377 males. Online Appendix Table A1 provides further details on sample construction.

Our measures of academic achievement are a continuous measure for high school GPA that ranges from 0 to 100 and an indicator variable for college attendance by age 20.<sup>6</sup> College attendance by age 20 is equal to 1 if a respondent attended college before the month of his or her 20<sup>th</sup> birthday and 0 otherwise.<sup>7</sup>

Our key explanatory variables are total weekly hours spent doing homework, weekly hours spent doing homework as a primary activity, weekly hours spent doing homework as a sole activity, and an indicator for whether any homework was performed over the two diary days. Total homework time includes time spent on homework, regardless of whether it was reported to be the main activity. Primary homework time may be multitasked time. However, it may be a measure of higher quality homework time than total homework time because it includes only homework time when homework is reported as the main (or viewed by the student as the most important) activity. Time spent doing homework as a sole activity may be a measure of even higher quality homework because it captures homework time when homework is the only activity being performed. One study by Rosen, Carrier, and Cheever (2013) found that those who checked Facebook while studying had lower GPAs. A study by Pool, Koolstra and van der Voort (2003) found that those who watched TV simultaneously while studying completed their

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<sup>6</sup> GPA scales vary by school. Because we have only the reported GPA and the maximum possible GPA for each observation, we created this variable by dividing the reported GPA by the maximum possible and multiplying by 100.

<sup>7</sup> In each TA, the student reported the first enrollment date for “current / last college attended” and then the first enrollment date for one additional prior college attended. We compare the first reported enrollment date in months with the month that the student would have turned age 20 to determine college attendance by age 20.

homework less accurately. Any homework is a measure of the frequency of homework performed.

Because we have only two days of time-diary information, one weekday and one weekend day, we constructed each of our weekly homework measures by multiplying the weekday time spent by 5, multiplying the weekend day time spent by 2, and then adding these two products together, as in Hofferth (2010). A disadvantage of time-diary data compared to survey data is that time diaries usually cover only one or two days of a person's time use. Given that we are interested in examining the effect of time spent on homework during a student's high school career on future outcomes, our time use variables, which are based on two diary days, may be measured with error, biasing our estimated effects toward zero. However, this criticism applies to many survey data questions as well, as they often measure "usual" or "last week's" activity. Fortunately, instrumental variables techniques may be used not only to control for the potential endogeneity of a variable, they may also be used to correct for measurement error (Frazis and Stewart 2012). Therefore, our instrumental variables approach will address this measurement error issue.

All four of our homework measures include the following activity codes: 5040 (using a computer for homework, studying, or research), 5192 (being tutored), 5490 (general homework/studying), 5491 (non-computer-related homework), 5492 (studying, research, reading related to classes, or working on school project), 5493 ("Went to library"), and 5494 (reviewing homework with a parent/caregiver). Common activities performed while doing homework were listening to music and watching TV (Pabilonia 2015). Our measures do not capture homework done while in class.

We control for a rich set of individual, family, and school characteristics. Our individual controls include indicators for being female, being black or Hispanic, the Census region of residence in high school, and a set of year dummies indicating the year prior to the student graduating high school. The year dummies control for the fact that students are interviewed in different grades and in different time periods.<sup>8</sup> We also control for whether a student was living in a state that required all high school students to take a college entrance exam as this could affect students' motivation. To control for ability, we include age-adjusted broad-reading and applied-problems standardized test scores from the Woodcock-Johnson Revised Tests of Basic Achievement (WJ-R).<sup>9</sup> These scores are from the CDS interview occurring five years prior to the CDS high school interview and are more likely to measure inherent ability than tests administered during high school.

We control for several family characteristics, including the number of other household children under age 20, average real family income over the five years prior to the time diary and its square, and indicators for whether the mother has a college degree, mother's degree is missing, whether the student lives with a single mother, and whether the student lives in some other family arrangement that was not a two-parent family.<sup>10</sup> We also control for three school-level characteristics: the fraction of the respondent's high school that was white (averaged over the respondent's high school years)<sup>11</sup>, the fraction of the respondent's high school that was free- or reduced-price-lunch eligible (also an average over the respondent's high school years), and the

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<sup>8</sup> Some years had to be combined in order to achieve convergence – specifically, 2002 was combined with 2003, 2007 was combined with 2008, and 2009 was combined with 2010.

<sup>9</sup> We also include an indicator for missing scores and assign the average score to those missing scores.

<sup>10</sup> Parents in two-parent families could be biological, adoptive, or step parents.

<sup>11</sup> If a year is missing, then the average over the non-missing years is used.

respondent's high school's student-teacher ratio (also an average over the respondent's high school years).<sup>12</sup> <sup>13</sup> Several additional variables are used as exclusion restrictions to identify homework in the outcome equations. That is, these variables are expected to affect how much time was spent on homework on the diary days but should otherwise be uncorrelated with high school GPA and college attendance. They include indicators for whether the weekday diary day was a Friday, whether the weekend diary day was a Saturday, whether the diary was in a spring month, and whether the student was older than the state minimum driving age at the time of the weekday diary. There is existing support for using temporal variables in time-use equations as Robinson and Godbey (1997) found that the day of the week and the season of the year affect time allocation. Intuitively, whether a diary day was a Friday or Saturday could affect a student's homework time because students are less likely to be assigned homework to do on the weekend. Whether a diary day occurred during a particular season could affect a student's homework time because of seasonal sports or exams. In the fall, many students play or watch football. In the spring, students may be taking and need to study for state standardized tests. However, neither the day or week nor the season of year indicator variables should affect a long-term outcome measure such as high school GPA or college attendance. Regarding the final instrumental variable, eligibility for a driver's license, such eligibility provides a student with more opportunities for work and socializing, which could leave less time for homework. However, all students will encounter this eligibility at some point based on their age and state of

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<sup>12</sup> The student-teacher ratio in each year is the total number of students in the school divided by the number of full-time-equivalent classroom teachers.

<sup>13</sup> We also include an indicator for missing school characteristics variables. Some of these are due to a missing school-level identifier in the PSID-CDS and some are simply missing values. We assign the average of the non-missing values to those with a missing value.

residence. Therefore, it should not directly affect our long-term academic performance measures either.

### **III. Descriptive statistics**

For our sample of 817 high school graduates, Table 1 provides the weighted means for all variables used in the analyses and the standard deviations for the continuous variables. The outcome variables are presented first. The average high-school GPA was 81 out of 100. Girls had slightly higher GPAs than boys (83 versus 78 out of 100). Eighty-eight percent of high school graduates enrolled in college by the age of 20.

[Table 1 near here]

Table 1 also presents descriptive statistics for our explanatory variables. On average, students did 6.4 hours of total homework (primary plus secondary) over the course of a week. Girls engaged in 7.6 hours of total homework while boys averaged 5.2 hours. These means may surprise some, given a popular belief that children today are assigned too much homework (Lahey 2012).<sup>14</sup> However, these weekly averages are not that different from retrospective questions on homework per week in recent history. Using the National Education Longitudinal Study of 1988 (NELS), McMullen (2011) found that 10<sup>th</sup> graders in 1990 did about 8 hours of homework per week and 12<sup>th</sup> graders in 1992 did about 14 hours of homework per week, including homework that they did while in school.<sup>15</sup> According to the Higher Education Research Institute at UCLA (Loveless 2014), only 33 percent of college freshman in 2002 reported spending six or more hours per week doing homework in their senior year.

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<sup>14</sup> See Eren and Henderson (2011) for a review of the historical debate about the merits of assigning homework over the last century.

<sup>15</sup> These weekly homework averages were calculated from a series of categories.

The average time spent in homework as a primary activity is, of course, smaller than that for total homework because it does not include homework performed as a secondary activity, but girls still have a higher average than boys (7 hours versus 5 hours). The results also show that students often are doing other things while doing their homework. Time spent doing homework as a sole activity is roughly half the amount of total homework time, with an average of 3.6 hours for girls and 2.4 hours for boys.

Over the course of the two observed diary days, 66 percent of students did some homework outside of school hours, but there were large differences in homework frequency by gender. While 72 percent of females did some homework outside school hours, only 58 percent of males did some homework. These figures are consistent with measures from other time-diary data from the American Time Use Survey (ATUS). Using these data, Kalenkoski and Pabilonia (2012) found that, on any given school day, only 51 percent of teenagers aged 15-18 did some homework and that, on any given non-school day, only 29 percent of teenagers did some homework. In addition, according to the 2008 National Assessment of Educational Progress (NAEP) (Loveless 2014), about 28 percent of all seventeen year olds were not assigned any homework and another 12 percent did not do their homework the day before. Loveless (2014) also shows that 17 year olds did not significantly change the amount of homework they did over the 1984-2012 period. In addition, in 2004, 12 percent of 17-year-old respondents to the NAEP reported doing no homework on a “usual” day while another 12 percent reported doing more than two hours.

Table 2 shows differences in hours spent on homework across GPA quartiles and between those attending or not attending college by age 20. Panel A shows the results using the total homework measure, Panel B shows the results using the homework as a primary activity

measure, Panel C shows the results using the homework as a sole activity measure, and Panel D shows the results using the any homework measure. Regardless of measure, those students in the top GPA quartile did statistically significantly more homework, on average, than those in the bottom GPA quartile. Those in the top GPA quartile also did more than those in the middle quartiles though the difference was not statistically significantly different for the homework as a sole activity measure. In every quartile, girls did more homework than boys. On average, students who attended college did about two hours more homework than those who did not. The difference in homework time by college attendance was largest for boys. Boys who attended college did 3.22 hours more homework than those who did not. Differences in average homework time were not statistically significant for girls. However, even girls who did not attend college did more homework than boys who attended college.

[Table 2 near here]

#### **IV. Econometric analyses**

For high school GPA, we first estimate the following linear regression model using Ordinary Least Squares (OLS):

$$Z = b_0 + b_1*H + b_2*X + u \quad (1)$$

where  $Z$  represents high school GPA;  $b_0$ ,  $b_1$ , and  $b_2$  are the coefficients to be estimated;  $H$  is a measure of time spent on homework,  $X$  is the matrix of control variables, and  $u$  is a normally-distributed error term. The subscripts indicating observation are suppressed. For college attendance, which is a discrete outcome, we estimate a probit model via maximum likelihood:

$$Y^* = a_0 + a_1 * H + a_2 X + e \quad (2)$$

$$Y = 1 \text{ if } Y^* > 0$$

$$Y = 0 \text{ otherwise}$$

where  $Y^*$  is the latent variable representing the net benefit of attending college;  $Y$  is the observed outcome;  $a_0$ ,  $a_1$ , and  $a_2$  are the coefficients to be estimated; and  $e$  is a normally-distributed error term. As in (1), the subscripts indicating observation are suppressed.

Table 3 shows the effects of the different homework measures on student achievement.<sup>16</sup> Panel A shows the results for the total homework measure, Panel B shows the results for the homework as a primary activity measure, Panel C shows the results for the homework as a sole activity measure, and Panel D shows the results for the any homework measure. In each panel, Columns 1-3 report results from the GPA regressions for all students and for the female and male subsamples separately. Columns 4-6 report the results from the college attendance models for all students and for the female and male subsamples separately. For the college attendance probits, we report the average marginal effects and their standard errors. All estimates are weighted

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<sup>16</sup> Results for the other marginal effects in these models are in online appendix Tables A2 and A3. For females, the applied-problems score has a positive significant effect on GPA and living in a family arrangement other than a two-parent family has a negative significant effect on GPA. For males, having a mother with a college degree and the fraction free-or-reduced-price-lunch eligible in high school have positive significant effects on GPA. For females, being black or Hispanic, the reading score, the applied-problems score, living in a state that mandates a college exam, the number of household children, having a mother with a college degree, and household income all have positive effects on attending college by age 20. For males, the applied-problems score and living in a state that mandates a college exam have positive effects on college by age 20 while the fraction free-or-reduced-price-lunch eligible in high school has a negative significant effect on attending college by age 20.

using survey weights and standard errors are adjusted for clustering on state because we include some state-level regressors (Cameron and Miller 2015).

[Table 3 here]

Not surprisingly given the large mean differences for males, we find a significant positive relationship between the hours spent on homework and college attendance by age 20 for males. The magnitude of the effect is also economically significant. An extra hour of total homework per night (i.e. 7 hours per week) would increase the probability of attendance by about 5 percentage points. We also find that homework measured as a sole activity is related positively to GPA for males. The effects of homework as a sole activity on GPA are quite small, however, with the effects of an increase in homework on GPA by one hour per night being about 2.5 percentage points on a scale of 100 for males. We find no significant relationship between homework and any outcome measure for females. We do not find a relationship between homework frequency and either outcome for either males or females.

We next model homework time as endogenous. Although teachers assign a certain amount of homework, students choose their level of effort, which may depend on an unobserved factor such as motivation, which also affects academic achievement directly.<sup>17</sup> We therefore add the following homework equation to each of the previous models:

$$H = d_0 + d_1X + d_2W + \gamma \quad (3)$$

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<sup>17</sup> We did include test scores to control for ability and we do find that their inclusion slightly decreases the magnitude of the effects in the OLS specifications (results available upon request).

where  $W$  includes our instrumental variables (indicators for whether the weekday diary day was a Friday, whether the weekend day diary day was a Saturday, an indicator for whether the diary was in a spring month, and whether the student was older than the state minimum driving age) to identify homework in the outcome equation,  $d_0$ ,  $d_1$  and  $d_2$  are the coefficients to be estimated, and  $\gamma$  is an error term. Joint estimation of the outcome equation (either [1] or [2]) and the homework equation (3) is achieved via limited information maximum likelihood using the `cmp` command in Stata and assumes that the error terms in the outcome and homework equations are jointly normally distributed. We use this method of estimation because joint estimation of the homework equations is more efficient than two-stage estimation such as two-stage least squares (2SLS) because it allows the error terms in the homework and outcome equations to be correlated and also because it allows us to model a binary endogenous regressor, any homework, with a probit model. 2SLS allows only continuous endogenous regressors.

Table 4 presents the effects of homework on achievement when we control for endogeneity.<sup>18</sup> We find that homework is no longer a significant predictor of college attendance by age 20 for males, although the point estimates change little.<sup>19</sup> In most cases, at least two of the instrumental variables are individually significant in the homework equation at the 1% or 5% level. However, the estimated correlation coefficients between the error terms across equations are mostly not significant. The exception is any homework for females in the GPA equation. Thus, joint estimation of the outcome and homework equations in most cases has not led to

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<sup>18</sup> Results for the other coefficients in these models are available in online appendix Tables A4-A7.

<sup>19</sup> We also estimated a Tobit model for homework as there are a fair number of students who do not report doing any homework (see online appendix Table A8) and some studies (Kalenkoski and Pabilonia 2012) have used Tobits to estimate homework equations. In these specifications, we find no significant effects of homework on academic achievement.

increased efficiency of the estimates. This is not surprising, however, given the extensive set of control variables included in each equation.

[Table 4 here]

A drawback to using `cmp` to estimate the “first-stage” equation jointly with the “second stage” equation, however, is that standard instrumental variables tests cannot be performed. Thus, to verify the validity of our instruments, we use two-stage least squares (2SLS) to re-estimate our GPA specifications as this estimation technique allows weak-instruments and overidentification tests to be performed.<sup>20</sup> Results are presented in Table 5. A problem with 2SLS, however, is that, for the “any homework”/GPA specification (Panel D), we must incorrectly treat our any homework indicator variable as a continuous variable in order to run these tests. Regardless, our 2SLS estimates are quite similar to our `cmp` estimates. In the pooled models, the robust F-statistic for the exclusion restrictions in the first stage is greater than 10, with the exception of the “any homework”/GPA specifications, suggesting that we do not have a weak instruments problem; however, it is less than 10 in models in which we focus on the separate boy and girl samples. Perhaps this is a small sample size issue. For the overidentifying restrictions tests based on Hansen’s J-statistic, we fail to reject the null that the instruments are uncorrelated with the error term.

[Table 5 here]

## V. Conclusion

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<sup>20</sup> We do not present analogous results for the college specification because the `IVPROBIT` command must be used in STATA and it does not allow such tests when robust clustered standard errors are used.

In this paper, we examine the effects of high school homework time on two long-term academic outcomes, high school GPA and college attendance by age 20, using time-diary data. These data may be more accurate and less subject to social desirability bias than data from retrospective survey questions, and they allow us to examine several different measures of homework. We control for a rich set of variables that includes students' characteristics, such as early test scores to control for ability, family variables, and school-level characteristics. Given that student motivation is unmeasured and may affect both homework and academic performance, we take an instrumental variables approach to control for this omitted variable bias. Once we do this, all the positive effects of homework on high school GPA and college attendance become statistically insignificant.

Time spent on homework may not accurately capture the quality of homework, however. Studies that examine specific types of homework assignments (reading, writing, etc.) and how they are graded (carefully or points just for turning it in) are needed to truly discover what types of homework assignments may improve students' long-run academic outcomes.

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**Table 1. Weighted Means and Standard Deviations for High School Graduates Sample**

	All (N=817)		Females (N=440)		Males (N=377)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
<i>Dependent Variables</i>						
High-school GPA (percent)	81.25	12.51	83.36	11.47	78.84	13.16
College attendance by age 20	0.88		0.89		0.88	
<i>Individual Control Variables</i>						
Total homework (primary + secondary activity)	6.44	7.88	7.55	7.94	5.18	7.62
Homework as a primary activity	6.05	7.66	7.02	7.76	4.96	7.40
Homework as a sole activity	3.03	5.17	3.58	5.78	2.42	4.29
Any homework	0.66		0.72		0.58	
Black/Hispanic ethnicity	0.28		0.29		0.27	
WJ-R broad-reading score 5 years before HS	108.75	15.78	109.01	15.75	108.46	15.81
WJ-R applied-problems score 5 years before HS	111.22	15.22	108.59	14.14	114.20	15.81
Missing a WJ-R score	0.13		0.12		0.14	
Lived in North Central region in HS	0.24		0.25		0.22	
Lived in South region in HS	0.30		0.32		0.28	
Lived in West region in HS	0.31		0.29		0.35	
Year before graduate HS - 2002/2003	0.25		0.24		0.27	
Year before graduate HS - 2004	0.12		0.13		0.11	
Year before graduate HS - 2005	0.13		0.13		0.14	
Year before graduate HS - 2007/2008	0.27		0.27		0.26	
State-mandated college entrance exam	0.08		0.08		0.09	
<i>Family Control Variables</i>						
Single mother	0.20		0.21		0.20	
Other family arrangement	0.04		0.03		0.06	
Number of other household children < age 20	1.13	1.11	1.21	1.14	1.04	1.05
Mother college degree (non-missing)	0.27		0.28		0.26	
Mother education missing	0.08		0.06		0.10	
Average real family income over last 5 years (in 2006 \$1,000s)	99.08	115.54	97.52	100.66	100.85	130.05
<i>School-level Control Variables</i>						
Fraction white (average while in high school)	0.61		0.60		0.62	
Fraction free-or-reduced-price lunch eligible (average while in high school)	0.37		0.37		0.38	
Student-teacher ratio (average while in high school)	17.57	5.14	17.73	4.65	17.38	5.64
Missing school	0.09		0.09		0.08	
<i>Instruments</i>						
Friday diary	0.19		0.20		0.18	
Saturday diary	0.48		0.47		0.50	
Older than state minimum driving age	0.56		0.53		0.58	
Spring interview	0.09		0.10		0.09	

Note: These results use CDS child weights.

**Table 2. Differences in Time Spent on Homework by GPA and College Attendance by Age 20**

<i>Panel A. Total Homework</i>						
	GPA bottom quartile	GPA 2nd quartile	GPA 3rd quartile	GPA top quartile (comparison)	Attend College	Not Attend College
All (N=817)	5.32*** (8.69)	6.28** (8.25)	5.53*** (6.44)	8.53 (7.67)	6.68** (7.92)	4.60 (6.71)
Female (N=440)	5.71*** (7.25)	8.10 (8.99)	6.48** (6.71)	9.16 (7.60)	7.63 (7.94)	6.88 (7.66)
Male (N=377)	5.10 (9.99)	4.84 (6.72)	3.95* (6.69)	6.23 (7.03)	5.58*** (7.76)	2.36 (4.17)
<i>Panel B. Homework as a Primary Activity</i>						
	GPA bottom quartile	GPA 2nd quartile	GPA 3rd quartile	GPA top quartile (comparison)	Attend College	Not Attend College
All (N=817)	5.07** (8.67)	5.81** (7.99)	5.34*** (6.17)	7.91 (7.44)	6.27** (7.72)	4.37 (6.25)
Female (N=440)	5.26** (7.31)	7.37 (8.70)	6.30* (6.45)	8.47 (7.53)	7.09 (7.80)	6.43 (7.03)
Male (N=377)	4.89 (9.92)	4.84 (6.72)	3.66* (6.28)	5.88 (6.64)	5.33*** (7.53)	2.36 (4.17)
<i>Panel C. Homework as a Sole Activity</i>						
	GPA bottom quartile	GPA 2nd quartile	GPA 3rd quartile	GPA top quartile (comparison)	Attend College	Not Attend College
All (N=817)	2.34** (4.29)	2.79 (5.36)	3.04 (4.85)	3.89 (5.45)	3.14 (5.20)	2.20 (4.46)
Female (N=440)	2.77* (4.66)	3.71 (6.62)	3.02 (4.51)	4.46 (6.08)	3.64 (5.79)	3.02 (5.51)
Male (N=377)	1.59* (3.70)	2.42 (3.56)	2.48 (4.93)	2.95 (4.47)	2.56** (4.38)	1.39 (2.66)
<i>Panel D. Any Homework</i>						
	GPA bottom quartile	GPA 2nd quartile	GPA 3rd quartile	GPA top quartile (comparison)	Attend College	Not Attend College
All (N=817)	0.64* (0.64)	0.63* (0.63)	0.63* (0.63)	0.74 (0.74)	0.67 (0.67)	0.60 (0.60)
Female (N=440)	0.74 (0.74)	0.73 (0.73)	0.68 (0.68)	0.74 (0.74)	0.72 (0.72)	0.74 (0.74)
Male (N=377)	0.57 (0.57)	0.55 (0.55)	0.57 (0.57)	0.64 (0.64)	0.60 (0.60)	0.46 (0.46)

Notes: Standard deviations are in parentheses. These results use CDS child weights. Significant difference from top GPA quartile or not attend college: \*\*\*p<0.01; \*\*p<0.05; \*p<0.10.

**Table 3. The Effects of Homework Time on Achievement**

	GPA			College Attendance by Age 20 (Probit)		
	All (N = 817)	Female (N = 440)	Male (N = 377)	All (N = 817)	Female (N = 440)	Male (N = 377)
<b><i>Panel A. Total Homework</i></b>						
Homework	0.0426 (0.0738)	0.0630 (0.0824)	0.0506 (0.1420)	0.0004 (0.0018)	-0.0021 (0.0019)	0.0073** (0.0035)
R <sup>2</sup>	0.1677	0.1360	0.1893			
Pseudo R <sup>2</sup>				0.2694	0.3923	0.2912
<b><i>Panel B. Homework as a Primary Activity</i></b>						
Homework	0.0390 (0.0665)	0.0762 (0.0873)	0.0313 (0.1396)	0.0003 (0.0018)	-0.0024 (0.0020)	0.0072** (0.0035)
R <sup>2</sup>	0.1676	0.1367	0.1889			
Pseudo R <sup>2</sup>				0.2693	0.3934	0.2904
<b><i>Panel C. Homework as a Sole Activity</i></b>						
Homework	0.0931 (0.0786)	-0.0120 (0.1133)	0.3583*** (0.1288)	0.0005 (0.0024)	-0.0034 (0.0029)	0.0080** (0.0035)
R <sup>2</sup>	0.1684	0.1345	0.2007			
Pseudo R <sup>2</sup>				0.2693	0.3927	0.2854
<b><i>Panel D. Any Homework</i></b>						
Homework	0.4569 (1.1968)	-0.8734 (1.1811)	2.1203 (1.8046)	-0.0009 (0.0238)	-0.0111 (0.0282)	0.0337 (0.0317)
R <sup>2</sup>	0.1674	0.1355	0.1935			
Pseudo R <sup>2</sup>				0.2693	0.3879	0.2777

Note: Survey weights are used. Average marginal effects are presented for probit models. Standard errors are in parentheses and are adjusted for clustering on state. All regressions include WJ-R reading and applied-problems scores, the number of household children under age 20, family income and its square, the fraction of the respondent's high school that was white, the fraction of the respondent's high school that was free-or-reduced-price-lunch eligible, and the respondent's high school's student-teacher ratio, and indicators for WJ-R score missing, race, Census region, year prior to the student graduating from high school, living in a state that requires college entrance exam, lives with single mother, lives in other family arrangement, mother college degree, mother college degree missing, high school missing, and a constant. A female indicator was included in the pooled specifications. Significance levels: \*\*\* p<0.01; \*\* p<0.05; \* p<0.10.

**Table 4. The Effects of Homework on Achievement with Controls for Endogeneity (LIML)**

	GPA			College by 20		
	All (N=817)	Female (N=440)	Male (N=377)	All (N=817)	Female (N=440)	Male (N=377)
<b><i>Panel A. Total Homework</i></b>						
Homework	0.0090 (0.2423)	0.1098 (0.3160)	-0.1273 (0.3655)	0.0013 (0.0044)	-0.0011 (0.0048)	0.0067 (0.0104)
<i>Exclusion restrictions</i>						
Friday diary	-4.7307*** (0.5836)	-5.5363*** (0.9715)	-2.7464*** (0.7025)	-4.7440*** (0.5881)	-5.5338*** (0.9688)	-2.7739*** (0.6995)
Saturday diary	-1.5037** (0.6942)	-1.2794 (1.0690)	-1.7645** (0.7756)	-1.5060** (0.6941)	-1.3427 (1.0393)	-1.8852** (0.8338)
Spring interview	-0.9005 (0.9537)	-2.1233** (0.9319)	0.4119 (1.3407)	-0.9367 (0.8859)	-2.0571** (0.8246)	0.3902 (1.5737)
Older than state minimum driving age	2.6077* (1.4769)	1.2640 (1.2844)	3.8884* (2.0073)	2.5547* (1.4345)	1.2543 (1.2374)	3.7119** (1.8463)
$\rho$ , correlation coefficient	0.0226 (0.1471)	-0.0334 (0.2110)	0.1070 (0.2029)	-0.0447 (0.2472)	-0.0675 (0.3089)	(0.0292) (0.5045)
<b><i>Panel B. Homework as a Primary Activity</i></b>						
Homework	0.0065 (0.2532)	0.1113 (0.3251)	-0.1604 (0.3696)	0.0013 (0.0048)	-0.0005 (0.0048)	0.0063 (0.0107)
<i>Exclusion restrictions</i>						
Friday diary	-4.3243*** (0.5658)	-5.0798*** (0.9668)	-2.6328*** (0.6623)	-4.3375*** (0.5735)	-5.0692*** (0.9615)	-2.6603*** (0.6668)
Saturday diary	-1.5620** (0.6645)	-1.5174 (1.0089)	-1.6179** (0.8135)	-1.5644** (0.6648)	-1.5959* (0.9634)	-1.7469** (0.8540)
Spring interview	-0.8854 (0.8292)	-2.3040*** (0.8503)	0.6249 (1.1940)	-0.9190 (0.7601)	-2.2478*** (0.7724)	0.6114 (1.4063)
Older than state minimum driving age	2.4946* (1.4414)	1.1179 (1.2343)	3.8603** (1.9668)	2.4433* (1.3949)	1.0741 (1.1805)	3.6873** (1.8263)
$\rho$ , correlation coefficient	0.0211 (0.1498)	-0.0245 (0.2189)	0.1121 (0.2022)	-0.0486 (0.2655)	-0.1211 (0.3006)	0.0396 (0.5072)
<b><i>Panel C. Homework as a Sole Activity</i></b>						

Homework	0.2863 (0.7310)	0.2883 (0.9731)	0.7376 (0.8385)	0.0061 (0.0114)	-0.0008 (0.0162)	0.0081 (0.0208)
<i>Exclusion restrictions</i>						
Friday diary	-2.3368*** (0.3621)	-2.6137*** (0.6377)	-1.6839*** (0.3238)	-2.3362*** (0.3536)	-2.6168*** (0.6352)	-1.7249*** (0.3307)
Saturday diary	-0.7809* (0.4621)	-0.0690 (0.7215)	-1.4780** (0.6938)	-0.7908* (0.4634)	-0.2131 (0.6503)	-1.4570* (0.7952)
Spring interview	-0.3003 (0.6995)	-0.2143 (0.9321)	-0.3686 (0.7267)	-0.2257 (0.5579)	0.0166 (0.6468)	-0.3491 (0.8217)
Older than state minimum driving age	0.0822 (0.6990)	-0.3658 (1.1438)	0.1426 (0.7789)	0.1161 (0.6403)	-0.3472 (1.3461)	0.2994 (0.5297)
$\rho$ , correlation coefficient	-0.0847 (0.3101)	-0.1504 (0.4654)	-0.1327 (0.2836)	-0.1893 (0.3706)	-0.1214 (0.7508)	-0.0020 (0.6074)
<b><i>Panel D. Any Homework</i></b>						
Homework	0.3013 (5.1035)	13.2080* (6.8013)	2.2699 (6.6893)	0.0792 (0.1374)	-0.0069 (0.1339)	-0.0566 (0.2989)
<i>Exclusion restrictions</i>						
Friday diary	-0.2301*** (0.0437)	-0.1490* (0.0767)	-0.2045*** (0.0625)	-0.2285*** (0.0470)	-0.2062*** (0.0585)	-0.1951** (0.0792)
Saturday diary	-0.0922** (0.0382)	0.0134 (0.0400)	-0.1871*** (0.0388)	-0.0927** (0.0375)	0.0007 (0.0588)	-0.1906*** (0.0366)
Spring interview	-0.0129 (0.0651)	-0.0376 (0.0541)	-0.0586 (0.0933)	-0.0196 (0.0641)	0.0111 (0.0761)	-0.0468 (0.1003)
Older than state minimum driving age	-0.0015 (0.0602)	0.0111 (0.0662)	-0.0125 (0.0859)	-0.0075 (0.0572)	0.0027 (0.0880)	-0.0205 (0.0910)
$\rho$ , correlation coefficient	0.0086 (0.2524)	-0.7100*** (0.2276)	-0.0083 (0.3187)	-0.3311 (0.5140)	-0.0229 (0.6552)	0.3621 (1.0802)

Note: Survey weights are used. Average marginal effects are presented for the probit models. Robust standard errors are in parentheses and are adjusted for clustering on state. Regressions include all control variables listed in Table 3. Significance levels:

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.10$

**Table 5. The Effects of Homework on GPA with Controls for Endogeneity (2SLS)**

	All (N=817)	Female (N=440)	Male (N=377)
<b>Panel A. Total Homework</b>			
Homework	0.0123 (0.2190)	0.1048 (0.2621)	-0.0920 (0.2599)
R <sup>2</sup>	0.1674	0.1353	0.1836
<i>Tests:</i>			
Robust F-statistic (4, 41)	16.0945	8.2144	5.2845
Hansen's J-statistic (p-value)	0.3754	0.3089	0.3874
<b>Panel B. Homework as a Primary Activity</b>			
Homework	0.0099 (0.2296)	0.1073 (0.2731)	-0.1223 (0.2657)
R <sup>2</sup>	0.1673	0.1363	0.1825
<i>Tests:</i>			
Robust F-statistic (4, 41)	13.9138	8.1529	5.1330
Hansen's J-statistic (p-value)	0.3764	0.3085	0.3901
<b>Panel C. Homework as a Sole Activity</b>			
Homework	0.2492 (0.5651)	0.1985 (0.6303)	0.6744 (0.6187)
R <sup>2</sup>	0.1647	0.1250	0.1912
<i>Tests:</i>			
Robust F-statistic (4, 41)	14.3803	4.9130	7.7260
Hansen's J-statistic (p-value)	0.3854	0.3092	0.3669
<b>Panel D. Any Homework</b>			
Homework	2.4622 (5.4218)	1.9763 (7.2024)	6.1083 (5.8998)
R <sup>2</sup>	0.1623	0.1245	0.1758
<i>Tests:</i>			
Robust F-statistic (4, 41)	7.1759	3.3041	8.1232
Hansen's J-statistic (p-value)	0.3196	0.3142	0.4192

Note: Survey weights are used. Robust standard errors are in parentheses and are adjusted for clustering on state. Regressions include all control variables listed in Table 3. Significance levels: \*\*\* p<0.01; \*\* p<0.05; \* p<0.10

## Online Appendix

**Appendix Table A1. Sample Selection**

	<b>Number of Observations</b>
Attend high school in CDS2 or CDS3 (27 dropouts prior to interview)	1,648
Drop those who didn't complete both a weekday and weekend day diary	1,429
Drop those interviewed during winter break and in June when they do not attend school on diary day	1,287
Drop those missing child interview in 2007	1,270
Drop if missing race	1,266
Drop if family income is negative (1 case)	1,265
Drop if missing follow-up TA information on education (including high school completion, college attendance by age 20 – but not GPA)	1,073
Drop those with missing diary date	1,027
Drop private high school students	953
Drop if no 2003 main family interview	949
Drop if did not graduate from high school	817
<b>Analysis Sample</b>	<b>817</b>
<b>Females</b>	<b>440</b>
<b>Males</b>	<b>377</b>

**Table A2. GPA Regressions (Exogenous Homework): Other Coefficient Estimates**

Variables	Total Homework			Homework as a Primary Activity			Homework as a Sole Activity			Any Homework		
	All (1)	Female (2)	Male (3)	All (4)	Female (5)	Male (6)	All (7)	Female (8)	Male (9)	All (10)	Female (11)	Male (12)
Homework time	0.0426 (0.0738)	0.0630 (0.0824)	0.0506 (0.1420)	0.0390 (0.0665)	0.0762 (0.0873)	0.0313 (0.1396)	0.0931 (0.0786)	-0.0120 (0.1133)	0.3583*** (0.1288)	0.4569 (1.1968)	-0.8734 (1.1811)	2.1203 (1.8046)
Female	4.8981*** (0.8510)			4.9177*** (0.8431)			4.8831*** (0.8188)			4.9425*** (0.8175)		
Black/Hispanic	-2.7302* (1.3731)	-2.0452 (1.8915)	-2.3435 (2.1180)	-2.7286* (1.3714)	-2.0377 (1.9112)	-2.3587 (2.1027)	-2.7822** (1.3644)	-2.1244 (1.8668)	-2.8361 (2.0705)	-2.7756** (1.3304)	-2.1287 (1.8963)	-2.5491 (2.0801)
Reading score	0.0412 (0.0510)	0.0412 (0.0499)	0.0593 (0.0796)	0.0412 (0.0509)	0.0411 (0.0509)	0.0588 (0.0793)	0.0413 (0.0508)	0.0428 (0.0500)	0.0648 (0.0840)	0.0418 (0.0510)	0.0424 (0.0496)	0.0560 (0.0811)
Applied-problems score	0.1073** (0.0473)	0.1482** (0.0713)	0.0752 (0.0598)	0.1073** (0.0475)	0.1473** (0.0710)	0.0764 (0.0606)	0.1055** (0.0476)	0.1480** (0.0711)	0.0583 (0.0637)	0.1073** (0.0473)	0.1457** (0.0710)	0.0720 (0.0637)
State-mandated college exam	1.7116 (1.4302)	-0.1747 (2.5799)	3.1830 (2.0212)	1.7185 (1.4263)	-0.1595 (2.5771)	3.1337 (2.0364)	1.6570 (1.4428)	-0.2184 (2.5618)	3.1464 (1.8854)	1.6562 (1.4566)	-0.1935 (2.5384)	3.3024 (2.0141)
Lives with single mother	-3.8879** (1.8660)	-1.9082 (1.4654)	-5.9215 (3.7263)	-3.8896** (1.8597)	-1.9210 (1.4566)	-5.8977 (3.7243)	-3.8725** (1.8856)	-1.8387 (1.4685)	-5.7527 (3.5777)	-3.8797** (1.8960)	-1.7505 (1.5021)	-5.8060 (3.6165)
Lives in other family arrangement	-6.3249* (3.6842)	-6.9019* (4.0608)	-6.4842 (8.0359)	-6.3805* (3.6440)	-7.0472* (4.0667)	-6.5338 (7.9687)	-6.3629* (3.6030)	-7.0778* (3.9577)	-6.6707 (7.4621)	-6.3517* (3.5215)	-7.1710* (3.8788)	-6.1271 (7.6314)
Number of household siblings	0.6396 (0.4662)	0.6441 (0.5400)	0.9462 (0.6914)	0.6409 (0.4659)	0.6529 (0.5353)	0.9511 (0.6934)	0.6216 (0.4680)	0.6370 (0.5532)	0.7906 (0.6770)	0.6349 (0.4660)	0.6449 (0.5592)	0.9267 (0.6659)
Household income (in \$1,000s)	-0.0059 (0.0128)	-0.0056 (0.0154)	-0.0010 (0.0200)	-0.0058 (0.0129)	-0.0058 (0.0153)	-0.0009 (0.0201)	-0.0066 (0.0133)	-0.0039 (0.0160)	-0.0020 (0.0199)	-0.0056 (0.0135)	-0.0037 (0.0160)	-0.0026 (0.0207)
Household income squared (in \$1,000s)	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)
Mother college	4.4694*** (1.3180)	2.5755 (1.7476)	6.2024*** (1.6422)	4.4881*** (1.3137)	2.5310 (1.7559)	6.2700*** (1.6576)	4.5851*** (1.3250)	2.7678 (1.6904)	6.5372*** (1.7264)	4.5478*** (1.3482)	2.8717* (1.6657)	6.0318*** (1.7536)
Fraction free/reduced-price lunch	5.6881*** (1.7153)	3.8198 (2.9270)	8.3175** (3.9629)	5.6748*** (1.7095)	3.7855 (2.9524)	8.3191** (3.9796)	5.6723*** (1.7311)	3.8678 (2.9734)	8.4436** (3.9226)	5.7494*** (1.7386)	3.8097 (2.9792)	8.6652** (4.1341)
Student-teacher ratio	-0.1235 (0.1054)	0.0453 (0.1948)	-0.2717 (0.1687)	-0.1234 (0.1051)	0.0457 (0.1940)	-0.2700 (0.1670)	-0.1289 (0.1021)	0.0348 (0.1962)	-0.2564 (0.1585)	-0.1249 (0.1043)	0.0323 (0.1945)	-0.2643 (0.1616)
Fraction white	0.4921 (2.1275)	1.5152 (2.0378)	0.6297 (3.5316)	0.4920 (2.1303)	1.5480 (2.0334)	0.5688 (3.5152)	0.4658 (2.1582)	1.4628 (2.0522)	0.6803 (3.7366)	0.5150 (2.2091)	1.4264 (2.0955)	1.2288 (3.8237)
Observations	817	440	377	817	440	377	817	440	377	817	440	377

Notes: Survey weights are used. Standard errors clustered on state are in parentheses. All regressions also include indicators for Census region, year effects, missing WJ-R score, missing mother's education, missing school, and a constant. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table A3. College by Age 20 Probits (Exogenous Homework): Other Marginal Effects**

Variables	Total Homework			Homework as a Primary Activity			Homework as a Sole Activity			Any Homework		
	All (1)	Female (2)	Male (3)	All (4)	Female (5)	Male (6)	All (7)	Female (8)	Male (9)	All (10)	Female (11)	Male (12)
Homework time	0.0004 (0.0018)	-0.0021 (0.0019)	0.0073** (0.0035)	0.0003 (0.0018)	-0.0024 (0.0020)	0.0072** (0.0035)	0.0005 (0.0024)	-0.0034 (0.0029)	0.0080** (0.0035)	-0.0009 (0.0238)	-0.0111 (0.0282)	0.0337 (0.0317)
Female	0.0312 (0.0235)			0.0316 (0.0232)			0.0321 (0.0237)			0.0327 (0.0238)		
Black/Hispanic	0.0585* (0.0310)	0.1008** (0.0436)	0.0027 (0.0466)	0.0584* (0.0309)	0.1008** (0.0436)	0.0030 (0.0466)	0.0580* (0.0319)	0.1036** (0.0447)	-0.0037 (0.0459)	0.0580* (0.0310)	0.1030** (0.0454)	-0.0008 (0.0438)
Reading score	0.0020** (0.0009)	0.0020* (0.0011)	0.0014 (0.0016)	0.0020** (0.0009)	0.0020* (0.0011)	0.0014 (0.0016)	0.0020** (0.0009)	0.0020* (0.0012)	0.0013 (0.0016)	0.0020** (0.0009)	0.0019* (0.0011)	0.0012 (0.0015)
Applied-problems score	0.0038*** (0.0012)	0.0044*** (0.0011)	0.0036* (0.0019)	0.0038*** (0.0012)	0.0044*** (0.0011)	0.0036* (0.0019)	0.0037*** (0.0013)	0.0046*** (0.0012)	0.0034* (0.0020)	0.0038*** (0.0012)	0.0044*** (0.0011)	0.0037* (0.0020)
State-mandated college exam	0.1357*** (0.0355)	0.0887** (0.0390)	0.1558*** (0.0498)	0.1355*** (0.0357)	0.0889** (0.0390)	0.1557*** (0.0496)	0.1345*** (0.0364)	0.1019*** (0.0356)	0.1480*** (0.0488)	0.1350*** (0.0360)	0.0918** (0.0369)	0.1566*** (0.0491)
Lives with single mother	-0.0469 (0.0334)	-0.0414 (0.0310)	-0.0100 (0.0434)	-0.0468 (0.0334)	-0.0416 (0.0313)	-0.0110 (0.0432)	-0.0469 (0.0337)	-0.0398 (0.0305)	-0.0134 (0.0430)	-0.0466 (0.0335)	-0.0428 (0.0305)	-0.0139 (0.0429)
Lives in other family arrangement	-0.0069 (0.0623)	-0.0246 (0.0655)	0.0672 (0.0854)	-0.0069 (0.0624)	-0.0236 (0.0656)	0.0663 (0.0850)	-0.0066 (0.0621)	-0.0301 (0.0638)	0.0523 (0.0882)	-0.0069 (0.0620)	-0.0329 (0.0661)	0.0598 (0.0863)
Number of household siblings	-0.0015 (0.0115)	0.0190* (0.0102)	-0.0112 (0.0192)	-0.0015 (0.0115)	0.0184* (0.0106)	-0.0116 (0.0190)	-0.0017 (0.0116)	0.0199** (0.0097)	-0.0130 (0.0193)	-0.0015 (0.0114)	0.0192* (0.0098)	-0.0111 (0.0196)
Household income (in \$1,000s)	0.0007* (0.0004)	0.0019*** (0.0006)	-0.0002 (0.0006)	0.0007* (0.0004)	0.0019*** (0.0006)	-0.0002 (0.0006)	0.0007* (0.0004)	0.0018 (0.0012)	-0.0002 (0.0006)	0.0007* (0.0004)	0.0017 (0.0013)	-0.0002 (0.0006)
Household income squared (in \$1,000s)	-0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)
Mother college	0.1119** (0.0457)	0.0995** (0.0456)	0.0827 (0.0613)	0.1122** (0.0456)	0.1001** (0.0455)	0.0834 (0.0614)	0.1127*** (0.0435)	0.1029** (0.0468)	0.0973 (0.0595)	0.1131*** (0.0433)	0.1040** (0.0478)	0.0919 (0.0604)
Fraction free/reduced-price lunch	-0.0737 (0.0554)	0.0725 (0.0475)	-0.1944** (0.0828)	-0.0740 (0.0556)	0.0747 (0.0489)	-0.1952** (0.0830)	-0.0740 (0.0561)	0.0725 (0.0514)	-0.1914** (0.0834)	-0.0747 (0.0558)	0.0761 (0.0508)	-0.1961** (0.0880)
Student-teacher ratio	-0.0015 (0.0020)	0.0007 (0.0025)	-0.0029 (0.0036)	-0.0016 (0.0020)	0.0007 (0.0025)	-0.0028 (0.0036)	-0.0016 (0.0020)	0.0008 (0.0027)	-0.0019 (0.0037)	-0.0016 (0.0020)	0.0010 (0.0028)	-0.0023 (0.0038)
Fraction white	-0.0067 (0.0460)	0.0199 (0.0482)	-0.0100 (0.0728)	-0.0069 (0.0461)	0.0190 (0.0478)	-0.0113 (0.0728)	-0.0074 (0.0471)	0.0261 (0.0509)	-0.0169 (0.0712)	-0.0082 (0.0461)	0.0265 (0.0502)	-0.0183 (0.0700)
Observations	817	440	377	817	440	377	817	440	377	817	440	377

Notes: Survey weights are used. Standard errors clustered on state are in parentheses. All regressions also include indicators for Census region, year effects, missing WJ-R score, missing mother's education, missing school, and a constant. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table A4. GPA Regressions (Endogenous Homework): Other Coefficient Estimates**

Variables	Total Homework			Homework as a Primary Activity			Homework as a Sole Activity			Any Homework		
	All (1)	Female (2)	Male (3)	All (4)	Female (5)	Male (6)	All (7)	Female (8)	Male (9)	All (10)	Female (11)	Male (12)
Homework time	0.0090 (0.2423)	0.1098 (0.3160)	-0.1273 (0.3655)	0.0065 (0.2532)	0.1113 (0.3251)	-0.1604 (0.3696)	0.2863 (0.7310)	0.2883 (0.9731)	0.7376 (0.8385)	0.3013 (5.1035)	13.2080* (6.8013)	2.2699 (6.6893)
Female	4.9824*** (0.9011)			4.9903*** (0.8807)			4.6304*** (1.0491)			4.9637*** (0.8636)		
Black/Hispanic	-2.7481** (1.3310)	-1.9995 (1.7902)	-2.5312 (1.9346)	-2.7488** (1.3267)	-2.0059 (1.8098)	-2.5918 (1.9124)	-2.8430** (1.3810)	-1.6780 (2.2049)	-3.3010 (2.0514)	-2.7678** (1.3137)	-1.7724 (1.9481)	-2.5598 (2.0512)
Reading score	0.0419 (0.0505)	0.0403 (0.0492)	0.0571 (0.0752)	0.0419 (0.0505)	0.0404 (0.0491)	0.0580 (0.0747)	0.0396 (0.0511)	0.0362 (0.0521)	0.0713 (0.0859)	0.0419 (0.0504)	0.0438 (0.0578)	0.0559 (0.0788)
Applied-problems score	0.1075** (0.0467)	0.1485** (0.0694)	0.0834 (0.0601)	0.1075** (0.0468)	0.1471** (0.0688)	0.0832 (0.0600)	0.1013** (0.0511)	0.1453** (0.0700)	0.0379 (0.0757)	0.1074** (0.0468)	0.1799** (0.0709)	0.0716 (0.0656)
State-mandated college exam	1.6567 (1.5142)	-0.1410 (2.5634)	2.6265 (2.3571)	1.6548 (1.5491)	-0.1316 (2.5574)	2.4668 (2.4691)	1.6881 (1.4285)	-0.2597 (2.5001)	3.2751* (1.8543)	1.6514 (1.4447)	-0.6221 (2.9531)	3.3220 (2.2467)
Lives with single mother	-3.8589** (1.8527)	-1.9520 (1.4033)	-5.6908 (3.5716)	-3.8576** (1.8434)	-1.9541 (1.3942)	-5.6418 (3.6034)	-3.9166** (1.8930)	-2.0992 (1.6572)	-5.6436* (3.2157)	-3.8700** (1.9543)	-3.3415** (1.6728)	-5.8025* (3.4533)
Lives in other family arrangement	-6.4056* (3.5448)	-6.7883* (4.0952)	-6.8997 (7.4354)	-6.4193* (3.5332)	-7.0437* (3.9997)	-6.9531 (7.2994)	-6.2296* (3.4859)	-6.5063 (4.6613)	-6.7431 (7.0409)	-6.3774* (3.3449)	-5.2995 (5.5985)	-6.0936 (7.0297)
Number of household siblings	0.6380 (0.4550)	0.6506 (0.5162)	1.0068 (0.7039)	0.6381 (0.4528)	0.6610 (0.5177)	1.0267 (0.7100)	0.5886 (0.5071)	0.5980 (0.5796)	0.6076 (0.7029)	0.6358 (0.4643)	0.4917 (0.5299)	0.9241 (0.6439)
Household income (in \$1,000s)	-0.0054 (0.0133)	-0.0067 (0.0163)	-0.0005 (0.0203)	-0.0053 (0.0132)	-0.0066 (0.0161)	-0.0007 (0.0202)	-0.0096 (0.0167)	-0.0096 (0.0238)	-0.0031 (0.0194)	-0.0055 (0.0135)	-0.0115 (0.0173)	-0.0028 (0.0209)
Household income squared (in \$1,000s)	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)
Mother college	4.5736*** (1.6002)	2.4410 (2.1861)	6.6915*** (1.6755)	4.5825*** (1.5917)	2.4270 (2.2215)	6.7073*** (1.6575)	4.5512*** (1.3964)	2.4874 (2.3165)	6.7444*** (1.7821)	4.5660*** (1.6119)	1.0146 (2.1951)	6.0099*** (1.9472)
Fraction free/reduced-price lunch	5.7008*** (1.7065)	3.7940 (2.7791)	8.4652** (3.9544)	5.6993*** (1.7106)	3.7537 (2.7841)	8.5665** (4.0065)	5.6060*** (1.7474)	3.5356 (2.7910)	8.5327** (3.8532)	5.7340*** (1.7237)	4.5324* (2.6642)	8.6868** (4.1850)
Student-teacher ratio	-0.1247 (0.1046)	0.0537 (0.2021)	-0.2620 (0.1604)	-0.1247 (0.1047)	0.0510 (0.1995)	-0.2636* (0.1582)	-0.1372 (0.0944)	0.0151 (0.1745)	-0.2431 (0.1610)	-0.1249 (0.1029)	0.0598 (0.1964)	-0.2640* (0.1597)
Fraction white	0.4457 (2.0713)	1.5442 (1.9509)	0.1186 (3.3224)	0.4431 (2.0585)	1.5811 (1.9496)	0.0521 (3.2902)	0.5333 (2.1815)	1.8001 (2.3156)	0.8877 (4.0282)	0.4872 (2.3262)	2.2305 (2.1528)	1.2813 (4.8058)
Observations	817	440	377	817	440	377	817	440	377	817	440	377

Notes: Survey weights are used. Standard errors clustered on state are in parentheses. All regressions also include indicators for Census region, year effects, missing WJ-R score, missing mother's education, missing school, and a constant. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table A5. College by Age 20 Regressions (Endogenous Homework): Other Marginal Effects**

Variables	Total Homework			Homework as a Primary Activity			Homework as a Sole Activity			Any Homework		
	All (1)	Female (2)	Male (3)	All (4)	Female (5)	Male (6)	All (7)	Female (8)	Male (9)	All (10)	Female (11)	Male (12)
Homework time	0.0013 (0.0044)	-0.0011 (0.0048)	0.0067 (0.0104)	0.0013 (0.0048)	-0.0005 (0.0048)	0.0063 (0.0107)	0.0061 (0.0114)	-0.0008 (0.0162)	0.0081 (0.0208)	0.0792 (0.1374)	-0.0069 (0.1339)	-0.0566 (0.2989)
Female	0.0290 (0.0281)			0.0294 (0.0277)			0.0247 (0.0284)			0.0219 (0.0325)		
Black/Hispanic	0.0594* (0.0327)	0.1020** (0.0457)	0.0018 (0.0446)	0.0595* (0.0329)	0.1030** (0.0463)	0.0017 (0.0447)	0.0579* (0.0334)	0.1080* (0.0595)	-0.0038 (0.0575)	0.0558* (0.0312)	0.1033** (0.0474)	0.0008 (0.0460)
Reading score	0.0020** (0.0009)	0.0019* (0.0011)	0.0014 (0.0015)	0.0020** (0.0009)	0.0019* (0.0011)	0.0014 (0.0015)	0.0020** (0.0009)	0.0019 (0.0013)	0.0013 (0.0015)	0.0019** (0.0009)	0.0019* (0.0011)	0.0014 (0.0017)
Applied-problems score	0.0038*** (0.0012)	0.0044*** (0.0011)	0.0037** (0.0018)	0.0038*** (0.0012)	0.0044*** (0.0011)	0.0037** (0.0018)	0.0037*** (0.0012)	0.0046*** (0.0011)	0.0034* (0.0018)	0.0038*** (0.0013)	0.0044*** (0.0012)	0.0040** (0.0017)
State-mandated college exam	0.1370*** (0.0362)	0.0888** (0.0387)	0.1538*** (0.0562)	0.1374*** (0.0368)	0.0895** (0.0388)	0.1526*** (0.0581)	0.1376*** (0.0355)	0.1017*** (0.0353)	0.1480*** (0.0510)	0.1407*** (0.0344)	0.0917** (0.0372)	0.1397** (0.0599)
Lives with single mother	-0.0477 (0.0333)	-0.0421 (0.0305)	-0.0094 (0.0433)	-0.0479 (0.0332)	-0.0430 (0.0308)	-0.0100 (0.0433)	-0.0484 (0.0339)	-0.0419 (0.0292)	-0.0134 (0.0454)	-0.0519 (0.0345)	-0.0434 (0.0303)	-0.0195 (0.0565)
Lives in other family arrangement	-0.0051 (0.0643)	-0.0212 (0.0682)	0.0654 (0.0987)	-0.0061 (0.0628)	-0.0226 (0.0656)	0.0640 (0.0971)	-0.0040 (0.0630)	-0.0245 (0.0743)	0.0523 (0.0864)	0.0039 (0.0623)	-0.0322 (0.0668)	0.0404 (0.1244)
Number of household siblings	-0.0016 (0.0114)	0.0189* (0.0103)	-0.0110 (0.0189)	-0.0015 (0.0114)	0.0183* (0.0105)	-0.0113 (0.0188)	-0.0029 (0.0120)	0.0192* (0.0103)	-0.0131 (0.0183)	-0.0022 (0.0118)	0.0191* (0.0110)	-0.0094 (0.0192)
Household income (in \$1,000s)	0.0007* (0.0004)	0.0019** (0.0009)	-0.0002 (0.0006)	0.0007* (0.0004)	0.0019 (0.0013)	-0.0002 (0.0006)	0.0007 (0.0004)	0.0017 (0.0012)	-0.0002 (0.0006)	0.0007 (0.0004)	0.0017 (0.0013)	-0.0002 (0.0008)
Household income squared (in \$1,000s)	-0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)
Mother college	0.1088*** (0.0392)	0.0949** (0.0473)	0.0843 (0.0528)	0.1090*** (0.0391)	0.0920* (0.0472)	0.0853 (0.0543)	0.1113*** (0.0417)	0.0988** (0.0480)	0.0973 (0.0639)	0.1031*** (0.0388)	0.1032** (0.0475)	0.1131 (0.0741)
Fraction free/reduced-price lunch	-0.0739 (0.0555)	0.0717 (0.0491)	-0.1936** (0.0799)	-0.0748 (0.0556)	0.0728 (0.0505)	-0.1937** (0.0802)	-0.0758 (0.0565)	0.0697 (0.0564)	-0.1914** (0.0840)	-0.0648 (0.0627)	0.0764 (0.0497)	-0.2101* (0.1184)
Student-teacher ratio	-0.0015 (0.0020)	0.0009 (0.0026)	-0.0029 (0.0037)	-0.0015 (0.0020)	0.0009 (0.0026)	-0.0028 (0.0037)	-0.0019 (0.0020)	0.0005 (0.0028)	-0.0019 (0.0037)	-0.0016 (0.0018)	0.0010 (0.0029)	-0.0025 (0.0045)
Fraction white	-0.0052 (0.0471)	0.0200 (0.0488)	-0.0122 (0.0674)	-0.0051 (0.0472)	0.0200 (0.0496)	-0.0142 (0.0669)	-0.0043 (0.0479)	0.0289 (0.0588)	-0.0169 (0.0636)	0.0082 (0.0519)	0.0268 (0.0527)	-0.0573 (0.1379)
Observations	817	440	377	817	440	377	817	440	377	817	440	377

Notes: Survey weights are used. Standard errors clustered on state are in parentheses. All regressions also include indicators for Census region, year effects, missing WJ-R score, missing mother's education, missing school, and a constant. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table A6. First-stage Homework Equations for GPA Specifications (Endogenous Homework)**

Variables	Total Homework			Homework as a Primary Activity			Homework as a Sole Activity			Any Homework		
	All (1)	Female (2)	Male (3)	All (4)	Female (5)	Male (6)	All (7)	Female (8)	Male (9)	All (10)	Female (11)	Male (12)
Friday diary	-4.7307*** (0.5836)	-5.5363*** (0.9715)	-2.7464*** (0.7025)	-4.3243*** (0.5658)	-5.0798*** (0.9668)	-2.4247*** (0.6588)	-2.3368*** (0.3621)	-2.6137*** (0.6377)	-1.6839*** (0.3238)	-0.2301*** (0.0437)	-0.1490* (0.0767)	-0.2045*** (0.0625)
Saturday diary	-1.5037** (0.6942)	-1.2794 (1.0690)	-1.7645** (0.7756)	-1.5620** (0.6645)	-1.5174 (1.0089)	-1.6444** (0.8101)	-0.7809* (0.4621)	-0.0690 (0.7215)	-1.4780** (0.6938)	-0.0922** (0.0382)	0.0134 (0.0400)	-0.1871*** (0.0388)
Spring interview	-0.9005 (0.9537)	-2.1233** (0.9319)	0.4119 (1.3407)	-0.8854 (0.8292)	-2.3040*** (0.8503)	0.6889 (1.2660)	-0.3003 (0.6995)	-0.2143 (0.9321)	-0.3686 (0.7267)	-0.0129 (0.0651)	-0.0376 (0.0541)	-0.0586 (0.0933)
Older than state minimum driving age	2.6077* (1.4769)	1.2640 (1.2844)	3.8884* (2.0073)	2.4946* (1.4414)	1.1179 (1.2343)	3.6280* (1.9308)	0.0822 (0.6990)	-0.3658 (1.1438)	0.1426 (0.7789)	-0.0015 (0.0602)	0.0111 (0.0662)	-0.0125 (0.0859)
Female	2.6425*** (0.6823)			2.3655*** (0.7267)			1.3191*** (0.4809)			0.1293*** (0.0405)		
Black/Hispanic	-0.0883 (1.2275)	-0.5079 (0.9851)	-0.7328 (2.1172)	-0.1813 (1.2254)	-0.3892 (1.0488)	-0.9467 (2.1085)	0.5656 (0.5790)	-1.4292 (1.0320)	1.6578*** (0.6123)	0.0685 (0.0586)	-0.0368 (0.0661)	0.1177 (0.0724)
Reading score	0.0234 (0.0196)	0.0142 (0.0319)	0.0080 (0.0265)	0.0254 (0.0183)	0.0142 (0.0281)	0.0194 (0.0260)	0.0098 (0.0140)	0.0181 (0.0159)	-0.0092 (0.0213)	0.0008 (0.0013)	-0.0007 (0.0014)	0.0017 (0.0024)
Applied- problems score	0.0079 (0.0324)	-0.0067 (0.0372)	0.0428 (0.0386)	0.0099 (0.0313)	0.0067 (0.0372)	0.0279 (0.0439)	0.0224 (0.0161)	0.0072 (0.0225)	0.0503** (0.0204)	0.0003 (0.0018)	-0.0030 (0.0022)	0.0029 (0.0026)
State-mandated college exam	-0.8378 (0.6217)	-0.1743 (0.7484)	-1.4338 (1.5690)	-1.1973** (0.5666)	-0.3190 (0.7609)	-1.9397 (1.5112)	-0.0542 (0.5428)	0.2821 (0.6066)	0.0069 (0.7709)	-0.0223 (0.0470)	0.0742 (0.0707)	-0.0692 (0.1100)
Lives with single mother	0.4551 (0.8278)	0.3466 (0.9420)	0.9180 (0.9380)	0.6044 (0.7043)	0.3744 (0.9052)	1.0050 (0.8116)	0.0399 (0.5206)	0.6014 (0.8185)	-0.2812 (0.9909)	0.0397 (0.0502)	0.0744 (0.0604)	-0.0696 (0.1026)
Lives in other family arrangement	-2.1229 (2.6172)	-2.5098 (3.4905)	-1.9415 (3.0073)	-0.9200 (2.4552)	-0.1212 (3.2752)	-2.3841 (2.9687)	-0.6572 (1.4135)	-2.1823 (2.5288)	0.6191 (1.0622)	-0.1221 (0.1291)	-0.1479 (0.1607)	-0.1779 (0.1558)
Number of household siblings	-0.1682 (0.3242)	-0.2090 (0.4680)	0.2223 (0.2841)	-0.2012 (0.3212)	-0.3014 (0.4969)	0.3436 (0.2731)	0.1206 (0.1768)	0.1180 (0.2483)	0.4114** (0.1741)	0.0000 (0.0119)	0.0130 (0.0145)	0.0051 (0.0286)
Household income (in \$1,000s)	0.0179** (0.0087)	0.0228* (0.0127)	0.0032 (0.0088)	0.0162* (0.0084)	0.0218* (0.0122)	0.0029 (0.0081)	0.0157*** (0.0055)	0.0188*** (0.0068)	0.0038 (0.0076)	0.0008 (0.0006)	0.0007 (0.0006)	-0.0020 (0.0016)
Household income squared (in \$1,000s)	-0.0000** (0.0000)	-0.0000** (0.0000)	-0.0000 (0.0000)	-0.0000** (0.0000)	-0.0000** (0.0000)	-0.0000 (0.0000)	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)
Mother college	2.7259*** (0.7994)	2.9238** (1.2098)	2.4003* (1.2758)	2.5555*** (0.8045)	2.9784*** (1.1550)	1.9563 (1.2924)	-0.0130 (0.7485)	0.9914 (1.2548)	-0.7830 (0.5886)	0.0923* (0.0549)	0.1220* (0.0654)	0.1172 (0.0786)
Fraction free/reduced-	-0.0647 (0.0000)	-0.1209 (0.0000)	1.0714 (0.0000)	0.3306 (0.0000)	0.2723 (0.0000)	1.6251 (0.0000)	0.1326 (0.0000)	0.8610 (0.0000)	-0.4555 (0.0000)	-0.1258* (0.0000)	-0.0635 (0.0000)	-0.2108* (0.0000)

price lunch	(1.3823)	(2.1734)	(1.7808)	(1.2531)	(1.8694)	(1.7671)	(1.1868)	(1.7996)	(1.1676)	(0.0704)	(0.0752)	(0.1126)
Student-teacher ratio	-0.0203	-0.1245	0.0646	-0.0280	-0.1008	0.0582	0.0461	0.0866	-0.0371	-0.0000	-0.0011	-0.0031
Fraction white	(0.0557)	(0.0764)	(0.0950)	(0.0507)	(0.0717)	(0.0812)	(0.0461)	(0.0929)	(0.0493)	(0.0048)	(0.0048)	(0.0077)
	-1.1398	-0.3297	-3.2190	-1.2767	-0.6478	-3.2664	-0.1652	-1.1193	-0.1944	-0.1569*	-0.0436	-0.2784**
	(1.1696)	(1.2678)	(2.5368)	(1.0875)	(1.3219)	(2.7453)	(0.7457)	(1.0200)	(0.8774)	(0.0821)	(0.0917)	(0.1165)
Observations	817	440	377	817	440	377	817	440	377	817	440	377

Notes: Survey weights are used. Standard errors clustered on state are in parentheses. All regressions also include indicators for Census region, year effects, missing WJ-R score, missing mother's education, missing school, and a constant. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table A7. First-stage Homework Equations for College by Age 20 Probit Specifications (Endogenous Homework)**

Variables	Total Homework			Homework as a Primary Activity			Homework as a Sole Activity			Any Homework		
	All (1)	Female (2)	Male (3)	All (4)	Female (5)	Male (6)	All (7)	Female (8)	Male (9)	All (10)	Female (11)	Male (12)
Friday diary	-4.7440*** (0.5881)	-5.5338*** (0.9688)	-2.7739*** (0.6995)	-4.3375*** (0.5735)	-5.0692*** (0.9615)	-2.6603*** (0.6668)	-2.3362*** (0.3536)	-2.6168*** (0.6352)	-1.7249*** (0.3307)	-0.2285*** (0.0470)	-0.2062*** (0.0585)	-0.1951** (0.0792)
Saturday diary	-1.5060** (0.6941)	-1.3427 (1.0393)	-1.8852** (0.8338)	-1.5644** (0.6648)	-1.5959* (0.9634)	-1.7469** (0.8540)	-0.7908* (0.4634)	-0.2131 (0.6503)	-1.4570* (0.7952)	-0.0927** (0.0375)	0.0007 (0.0588)	-0.1906*** (0.0366)
Spring interview	-0.9367 (0.8859)	-2.0571** (0.8246)	0.3902 (1.5737)	-0.9190 (0.7601)	-2.2478*** (0.7724)	0.6114 (1.4063)	-0.2257 (0.5579)	0.0166 (0.6468)	-0.3491 (0.8217)	-0.0196 (0.0641)	0.0111 (0.0761)	-0.0468 (0.1003)
Older than state minimum driving age	2.5547* (1.4345)	1.2543 (1.2374)	3.7119** (1.8463)	2.4433* (1.3949)	1.0741 (1.1805)	3.6873** (1.8263)	0.1161 (0.6403)	-0.3472 (1.3461)	0.2994 (0.5297)	-0.0075 (0.0572)	0.0027 (0.0880)	-0.0205 (0.0910)
Female	2.6402*** (0.6816)			2.3632*** (0.7271)			1.3203*** (0.4771)			0.1292*** (0.0404)		
Black/Hispanic	-0.0828 (1.2209)	-0.5021 (0.9839)	-0.6991 (2.1005)	-0.1761 (1.2168)	-0.3804 (1.0490)	-0.9103 (2.0966)	0.5603 (0.5788)	-1.4215 (1.0284)	1.6485*** (0.6259)	0.0664 (0.0588)	-0.0273 (0.0696)	0.1177 (0.0723)
Reading score	0.0233 (0.0196)	0.0145 (0.0320)	0.0083 (0.0264)	0.0253 (0.0182)	0.0145 (0.0281)	0.0162 (0.0258)	0.0101 (0.0135)	0.0189 (0.0158)	-0.0090 (0.0213)	0.0008 (0.0013)	-0.0002 (0.0015)	0.0017 (0.0024)
Applied-problems score	0.0078 (0.0324)	-0.0064 (0.0368)	0.0425 (0.0385)	0.0099 (0.0314)	0.0070 (0.0368)	0.0321 (0.0415)	0.0225 (0.0163)	0.0080 (0.0221)	0.0504** (0.0204)	0.0003 (0.0018)	-0.0028 (0.0025)	0.0030 (0.0026)
State-mandated college exam	-0.8496 (0.6242)	-0.1828 (0.7466)	-1.4706 (1.5868)	-1.2088** (0.5702)	-0.3339 (0.7544)	-1.8514 (1.6391)	-0.0463 (0.5378)	0.2671 (0.5857)	0.0569 (0.7385)	-0.0231 (0.0477)	0.0408 (0.0721)	-0.0718 (0.1082)
Lives with single mother	0.4572 (0.8271)	0.3346 (0.9370)	0.9379 (0.9489)	0.6063 (0.7031)	0.3611 (0.8978)	0.9625 (0.8316)	0.0342 (0.5164)	0.5695 (0.7941)	-0.2979 (1.0125)	0.0423 (0.0502)	0.0950 (0.0629)	-0.0708 (0.1022)
Lives in other family arrangement	-2.1257 (2.6192)	-2.5251 (3.4905)	-1.9032 (3.0107)	-0.9228 (2.4559)	-0.1378 (3.2689)	-1.7892 (3.1405)	-0.6571 (1.4163)	-2.2291 (2.5191)	0.6092 (1.0561)	-0.1265 (0.1288)	-0.1428 (0.1645)	-0.1743 (0.1502)
Number of household siblings	-0.1681 (0.3244)	-0.2099 (0.4666)	0.2202 (0.2850)	-0.2011 (0.3214)	-0.3022 (0.4957)	0.2780 (0.2740)	0.1203 (0.1762)	0.1158 (0.2477)	0.4100** (0.1749)	0.0014 (0.0126)	0.0096 (0.0151)	0.0051 (0.0266)
Household income (in \$1,000s)	0.0179** (0.0087)	0.0229* (0.0127)	0.0032 (0.0088)	0.0162* (0.0084)	0.0219* (0.0122)	0.0013 (0.0083)	0.0157*** (0.0055)	0.0189*** (0.0070)	0.0038 (0.0076)	0.0009 (0.0006)	0.0008 (0.0006)	-0.0022 (0.0017)
Household income squared (in \$1,000s)	-0.0000** (0.0000)	-0.0000** (0.0000)	-0.0000 (0.0000)	-0.0000** (0.0000)	-0.0000** (0.0000)	0.0000 (0.0000)	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)
Mother college	2.7272*** (0.7996)	2.9064** (1.2053)	2.3917* (1.2926)	2.5567*** (0.8039)	2.9594*** (1.1485)	1.9373 (1.3224)	-0.0183 (0.7395)	0.9444 (1.2500)	-0.7859 (0.5907)	0.0910* (0.0553)	0.1281* (0.0705)	0.1215 (0.0822)

Fraction free/reduced-price lunch	-0.0705	-0.1175	1.0410	0.3251	0.2770	1.5641	0.1418	0.8702	-0.4365	-0.1246*	-0.0718	-0.2119*
	(1.3766)	(2.1739)	(1.7932)	(1.2482)	(1.8686)	(1.7802)	(1.1862)	(1.8039)	(1.1767)	(0.0710)	(0.0833)	(0.1082)
Student-teacher ratio	-0.0203	-0.1249	0.0637	-0.0279	-0.1012	0.0424	0.0459	0.0851	-0.0365	-0.0001	-0.0003	-0.0030
	(0.0557)	(0.0765)	(0.0958)	(0.0507)	(0.0719)	(0.0894)	(0.0461)	(0.0932)	(0.0498)	(0.0047)	(0.0050)	(0.0077)
Fraction white	-1.1329	-0.3283	-3.1679	-1.2700	-0.6478	-3.0399	-0.1726	-1.1154	-0.2247	-0.1543*	-0.0558	-0.2876**
	(1.1659)	(1.2692)	(2.5018)	(1.0830)	(1.3225)	(2.6297)	(0.7581)	(1.0144)	(0.9167)	(0.0808)	(0.0964)	(0.1171)
Observations	817	440	377	817	440	377	817	440	377	817	440	377

Notes: Survey weights are used. Standard errors clustered on state are in parentheses. All regressions also include indicators for Census region, year effects, missing WJ-R score, missing mother's education, missing school, and a constant. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table A8. The Effects of Total Homework on Achievement with Controls for Endogeneity (LIML)  
(Homework is Modeled as a Tobit)**

	GPA			College Attendance by Age 20		
	All	Female	Male	All	Female	Male
	(N = 817)	(N = 440)	(N = 377)	(N = 817)	(N = 440)	(N = 377)
	(1)	(2)	(3)	(4)	(5)	(6)
<b><i>Panel A. Total Homework</i></b>						
Homework	0.0278 (0.1942)	0.2073 (0.2565)	-0.1762 (0.3119)	0.0019 (0.0028)	-0.0028 (0.0048)	0.0067 (0.0053)
$\rho$ , correlation coefficient	0.01111 (0.1189)	-0.1109 (0.1722)	0.1610 (0.1737)	-0.0811 (0.1519)	0.0470 (0.3092)	0.0265 (0.2335)
<b><i>Panel B. Homework as a Primary Activity</i></b>						
Homework	0.0173 (0.1898)	0.2278 (0.2521)	-0.2199 (0.3032)	0.0017 (0.0028)	-0.0028 (0.0048)	0.0067 (0.0057)
$\rho$ , correlation coefficient	0.0158 (0.1182)	-0.1140 (0.1685)	0.1731 (0.1695)	-0.0752 (0.1544)	0.0272 (0.2983)	0.0207 (0.2451)
<b><i>Panel C. Homework as a Sole Activity</i></b>						
Homework	0.1314 (0.1938)	0.1724 (0.3482)	0.3434 (0.3290)	0.0030 (0.0044)	-0.0042 (0.0084)	0.0010 (0.0064)
$\rho$ , correlation coefficient	-0.0194 (0.1014)	-0.1041 (0.1743)	0.0064 (0.1300)	-0.0922 (0.1775)	0.0374 (0.4123)	0.2114 (0.2192)

Note: Survey weights are used. Average marginal effects are presented for the probit models. Robust standard errors are in parentheses and are adjusted for clustering on state. Regressions include all control variables listed in Table 3, and Friday, Saturday, spring, and student older than minimum driving age as exclusion restrictions in the first-stage homework regressions. Significance levels: \*\*\* p<0.01; \*\* p<0.05; \* p<0.10.