Demographic and Socioeconomic Differences in High School Students' Non-School Study Time

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Abstract

Differences by gender and socioeconomic status (SES) in human capital investments made outside of the traditional school day may contribute to recent trends in educational attainment, as students who fail to develop strong study habits and related character skills during high school may struggle in less-structured post-secondary settings. We investigate the plausibility of these explanations by documenting the presence of gender and SES gaps in secondary students' non-school study time and examine some possible explanations of such gaps using time-diary data from the 2003-2012 waves of the American Time Use Survey (ATUS). Significant gender gaps of about 15 minutes per day, which are even larger in low-income and single-parent households, are found in students' average non-school study time.

Keywords: Time Use; Gender Gap; Homework; Non-Cognitive Skills; Out-of-school time

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1. Introduction

Educational attainment, particularly postsecondary education, is an important determinant of long-run socioeconomic outcomes that facilitate upward socioeconomic mobility, including earnings, employment, and crime (e.g., Card, 1999; Checchi, 2006; Ellwood & Kane, 2000; Lochner, 2011). It is troubling, then, that differences by socioeconomic status (SES) in college attendance, persistence, and completion rates have grown over the past thirty years (Bailey & Dynarski, 2011; Bound & Turner, 2011). Meanwhile, the long-standing gender gap in educational attainment has closed and actually reversed during this time, as women now attend and complete college at higher rates than men (Bailey & Dynarski, 2011; Bound & Turner, 2011; DiPrete & Buchmann, 2006). Both trends have received attention from policymakers, educators, scholars, and pundits. However, the underlying causes of these phenomena remain unclear (Bound & Turner, 2011).

Understanding the causes of these emerging socioeconomic and demographic gaps in college completion is crucial for policymakers and educators seeking to devise policies that create equal educational opportunities for all students and facilitate upward socioeconomic mobility. Differences by SES and by gender in children's endowments of character skills, such as self control and persistence, may contribute to such gaps (Jacob, 2002; Lundberg, 2013). Others have speculated that higher levels of parental involvement in high-SES households may be one mechanism through which educational attainment is transmitted across generations (Checchi, 2006; Guryan, Hurst, & Kearney, 2008; Ramey & Ramey, 2010). Indeed, Buchmann and DiPrete (2006) find evidence that the closing and eventual reversal of the gender gap in educational attainment was at least partly driven by low-SES households. The time that children devote to academics outside of the traditional school day likely reflects both the character skills that influence college attendance, persistence, and completion (Jacob, 2002; Singh et al., 2002) and parents' attentiveness (Hoover-Dempsey et al., 2001; Xu & Corno, 1998).

Accordingly, the current study investigates the plausibility of the hypothesis that differences by SES and gender in educational attainment are influenced by underlying differences in students' study skills, as measured by secondary school students' non-school study time. Specifically, we use time diaries completed by secondary school students in the 2003 – 2012 waves of the nationally representative American Time Use Survey (ATUS) to test for SES and gender gaps in time spent on homework. Such gaps are identified by examining the practical and statistical significance of SES and gender indicators in time-use regressions. After documenting robust SES and gender gaps in non-school study time of about 15 minutes per day and examining how these gaps vary by SES and gender, we conclude our analysis by testing whether differences by gender in participation in extracurricular activities, work outside the household, and caring for household children can explain such gaps.

2. Theoretical Background & Literature Review

Corno (1993) argues that volition, the combination of conscientiousness and discipline, has too often been omitted from theoretical models of learning. This is similar to the more recent arguments in favor of devising policies and interventions that bolster students' character skills summarized by Heckman and Kautz (2013). Indeed, educational theorists have long believed that volition and volitional efficiency are critical determinants of educational success (Sockett, 1988; Snow, 1992). Homework is an academic activity that both requires *and* builds such character skills, as Corno (1993) argues that completion of homework requires educational volition and Alleman and Brophy (1991) suggest that teachers should use homework assignments to develop character skills such as natural curiosity and enthusiasm for learning. This view has led researchers such as Jacob (2002) to use time spent on homework as a proxy for non-cognitive skills.

Students may have both intrinsic and extrinsic reasons for working on homework, though empirical evidence suggests that only intrinsic motivation is significantly related to homework completion (Xu, 2005). Interest is another important predictor of secondary students' homework completion, which Xu (2008) notes can be derived from three sources: demographic and SES background, parental attitudes and involvement, and intellectual ability. Similarly, Cooper et al. (1998) show that parents' attitudes towards homework influence children's attitudes. There is likely heterogeneity in the benefits that students receive from completing homework, particularly by the type of home environments in which students complete assignments (Corno, 1996; Kalenkoski & Pabilonia, 2014). Of particular relevance to the current study, there are gender differences in both homework interest (Xu, 2008) and homework management skills (Xu, 2006) among secondary school students. These differences, as well as resulting differences in time spent on homework, likely result from both sociological and psychological factors, as girls in this age range are more self-reliant, more disciplined, and more ambitious in course taking than boys (Duckworth & Seligman, 2006; Xu, 2006). Female secondary school students also spend more time on homework and are more likely to complete and enjoy homework assignments than their male classmates (Xu, 2006).

A large empirical literature has investigated the relationship between time spent on homework and children's cognitive and non-cognitive development; see Cooper, Robinson, and Patall (2006) for a review. Xu and Corno (1998) found evidence that homework contributed to growth in children's character skills. Singh et al. (2002) used data from the National Education

Longitudinal Study of 1988 (NELS88) to examine the effects of attitudes and time spent on homework on math and science test scores, and found time spent on homework to have a larger effect. The authors found that both time spent on homework and the completion of homework assignments were correlated with students' motivation and attitude toward school, acting as mediating effects of these character skills on math and science achievement. Eren and Henderson (2008) use the same NELS88 data to estimate the effect of homework on high school students' test scores using both parametric and nonparametric regression, and find positive effects of homework on achievement that are largest amongst the highest- and lowest-performing students. Cooper et al. (1998) collected and analyzed survey data from 709 students from grades 2 through 12 and found that time spent on homework had larger effects on student achievement in secondary grades than in earlier grades. This is perhaps an instance of "skills begetting skills" in the sense that improving student behaviors at a young age increases the returns to subsequent educational investments (Heckman & Kautz, 2013). Similarly, Zimmerman and Kitsantas (2005) performed a more limited analysis of girls in a parochial school using survey data on student perceptions of self-efficacy, perceptions of responsibility, and time spent on homework. Again, the authors found mediating effects of these non-cognitive skills in the relationship between time spent on homework and academic achievement. Most relevant to the current study, Kalenkoski and Pabilonia (2014) use time diary data to show that time spent on homework has a positive impact on boys' high school grade point averages (GPAs), which are a measure of both cognitive and non-cognitive ability.

Several studies have also investigated the relationship between homework habits and educational attainment, many of which use NELS88 data. For example, Jacob (2002) used time spent on homework as a measure of non-cognitive skills and found that gender differences in non-cognitive skills and in the expected returns to education had the largest effects on students' decisions to enter and complete college. Similarly, Deke and Haimson (2005) found that work habits in secondary school, such as time spent on homework and classroom effort, were strong predictors of completing a bachelor's degree. The authors also found gender differences in the effects of non-cognitive skills on bachelor's degree completion: males benefitted more from improving teamwork and leadership skills, as measured by participation in extra-curricular activities, while females benefitted more from developing cognitive skills. Finally, Kalenkoski and Pabilonia (2014) use time diary data to show that high school boys' time spent on homework has a positive impact on the probability of attending college.

More generally, recent research has revealed the importance of non-cognitive skills in determining educational attainment and success in the labor market (Heckman & Kautz, 2013; Heckman, Stixrud, & Urzua, 2006). Interestingly, Heckman et al. (2006) also found that, conditional on schooling, males received a greater wage premium for non-cognitive skills than did females. Given that SES gaps in non-cognitive skills exist prior to kindergarten and grow over time (Duncan & Magnuson, 2011), these results reinforce the potential importance of gender and SES differences in non-cognitive skills in explaining the reversal of the gender gap and the persistence of the SES gap in college completion.

The current study connects the literatures on homework and non-cognitive skills and furthers our understanding of the extent to which SES and gender gaps in secondary students' time use outside of the traditional school day might contribute to the new gender gap in educational attainment and the relatively lower rates of college completion among first-generation and low-SES college students. Specifically, we use natioanlly representative time-use data from 24-hour retrospective time diaries to test the hypotheses that female and high-SES secondary students spend more time on homework, on average, than their male and less-advantaged counterparts. Given the established connection between time spent on homework, non-cognitive skills, and educational attainment, it is likely that observable differences by gender and SES in non-school study time contribute to corresponding gaps in educational attainment. We also probe the factors that might contribute to such gaps, such as household structure and students' participation in organized extracurricular activities, the labor market, and child care.

3. Data

The current study tests for differences by SES and gender in secondary students' time spent studying outside of the traditional school day. Because this non-school study time is arguably a socially desirable activity, traditional survey questions will likely yield upward-biased responses (Grimm, 2010). As a result, retrospective time diaries are the preferred instrument with which to accurately measure students' non-school study time (Juster & Stafford, 1991). Accordingly, we analyze secondary students' non-school study time in time diaries collected by the American Time Use Survey (ATUS).

The ATUS is nationally representative and has been consistently administered each year since 2003 by the U.S. Census Bureau's Bureau of Labor Statistics.[1] The ATUS collects a 24-hour retrospective time diary from one individual over age 15 per household from a subset of the Current Population Survey (CPS) sampling frame and links each diary to demographic, employment, education, and income data from the CPS for all members of the diary respondent's household. The analytic sample for the current study is restricted to the 5,909 respondents aged 15 to 19 who self-reported being enrolled in high school at the time of completing the time diary and for whom basic demographic variables are observed. Because weekends and certain demographic groups and months are oversampled by the ATUS, all subsequent analyses are weighted by person-day weights that account for unequal probabilities of selection across households, months, and days of the week. The person-day nature of the sampling weights reinforces the fact that time diaries such as the ATUS sample both individuals and calendar days. The weights also adjust for non-response based on observable characteristics.[2]

3.1 Dependent Variables

Time spent on homework, measured in minutes per day, is the dependent variable analyzed in the current study. The ATUS "Research/Homework" activity code includes non-school time spent doing required (assigned) homework and research, time spent doing homework and research for personal interest or fulfillment, waiting time associated with homework and research, and miscellaneous time associated with homework and research that is not elsewhere classified by the ATUS activity coding lexicon.[3] We do not decompose the broad measure of homework time or conduct analyses of specific subcategories both due to a lack of power and to avoid potential "multiple comparison" problems (Schochet, 2008).[4]

The panel A of Table 1 summarizes the homework time of students in the analytic sample both overall and by gender. Homework time is measured in minutes and measures the time spent on homework by the respondent on the diary day. The average respondent spent about 48 minutes on homework and the standard deviation of 83.5 indicates a substantial amount of variation in homework time across respondents. On average, females spent about 15 minutes more per day on homework than males, a statistically significant difference, and there is also more variation in female homework time than in male homework time. A statistically significant ten percentage point gender gap is also observed in homework participation, as 43% of girls did at least some homework on the diary day compared to only 33% of boys. We discuss the implications of this non-participation, or "pile up" at zero, in the methodology section. Conditional on the respondent completing some homework on the diary day, the overall average increases to 112 minutes, but the significant average difference of nearly 15 minutes between males and females remains. These descriptive statistics suggest that there are unconditional gender gaps in homework on both the extensive (i.e., participation) and intensive (i.e., time) margins.

3.2 Independent Variables

The independent variables of interest in the current study are gender and socioeconomic status (SES). We measure SES using categorical indicators of both fathers' and mothers' educational attainment and household income, as the existing literature on parents' and children's time use stresses the differences between college-educated and less educated parents (e.g., Gershenson, 2013; Guryan et al., 2008; Kalil, Ryan, & Corey, 2012; Ramey & Ramey, 2010) and household budget constraints likely govern secondary school students' non-work time use and ability to participate in organized extracurricular activities. Household income in the ATUS is top-coded at $150,000 and reported in coarse brackets, which prohibits using a continuous measure of household income or defining a precise poverty line in the empirical analysis. Specifically, household incomes are reported in $10,000 increments when below $60,000, and $25,000 increments when above $75,000. In all analyses, we combine households earning less than $20,000 in one ''low-income household'' category, as the U.S. census poverty line for a family of four ranged from $18,660 to $23,283 between 2003 and 2012.[5]

Panel B of table 1 summarizes the key independent variables. Roughly one quarter of respondents lived in a single-mother household, in which case father's educational attainment is unobserved. Slightly more than one quarter of parents hold a four-year college degree and about one fifth hold a high school diploma. These averages are generally similar for fathers and mothers and for male and female respondents. About 20% of respondents come from low-income households and another 20% have household incomes between $20,000 and $40,000. The wealthiest 20% of respondents have household income greater than $100,000. Like with parental education, average household incomes are similar for both males and females.

3.3 Control Variables

In addition to testing for "unadjusted" gender and SES gaps in secondary students' non-school study time, we also estimate "adjusted" gaps conditional on a rich set of observed household and student characteristics. This is done both to increase the precision of estimated gender and SES gaps in time use and to control for potentially confounding omitted variables. We summarize some of these controls in panel C of table 1 to provide an overview of the demographic composition of the analytic sample. The average respondent was about 16 years old. Whites and blacks comprise about 80% and 15% of the analytic sample, respectively, and about 20% of respondents were Hispanic. About 70% of respondents lived in a household containing two married parents and about 15% of respondents were employed (mostly part time). Like with the SES indicators discussed in the previous subsection, the demographic, household structure, and employment characteristics of male respondents are quite similar to those of females.

Panel D of table 1 reports the percentage of respondents who participated in each of three specific activities on the diary day, which might take away from time that would otherwise be spent on homework (Kalenkoski & Pabilonia, 2014): organized extracurricular activities (including sport and non-sport activities), childcare (of household children), and work for pay (outside of household).[6] Gender differences in participation in these activities might contribute to gender gaps in time spent on homework. Boys are twice as likely to participate in an organized activity on the diary day and this difference, which is strongly statistically significant, is largely driven by participation in school sports. Girls, meanwhile, are about two-thirds more likely to care for household children than boys and again this difference is strongly statistically significant. Male and female respondents were equally likely to work for pay on the diary day.

We also include a number of other controls that are commonly used in time-use regressions (e.g., ; Gershenson, 2013; Kalenkoski & Pabilonia, 2014). First, to account for possible cultural differences in time use, race and ethnicity indicators are included in the empirical model. Hispanic is coded as a non–mutually exclusive ethnicity in the ATUS. Second, differences in time-use patterns across geographic locales are captured by a metropolitan area indicator. Differences across geographic locales may result from differential access to parks, playgrounds, athletic fields, public libraries, performing arts centers, shopping centers, and so on. Similarly, attitudes toward parental involvement may vary across regions of the country for a number of reasons. Accordingly, we will consider specifications that control for either census region or state of residence. The latter may be particularly important in the current context, as Bound, Hershbein, and Long (2009) find the intensity of competition over college admissions to vary by state. Third, household characteristics such as household size, number of household children, presence of child under the age of 2, and parents' marital status are commonly included in time-use regressions, as such variables might jointly predict SES and time use (Sayer, Bianchi, & Robinson, 2004; Zick & Bryant, 1996). Similarly, age is one of the most important predictors of children's time use (Zick & Bryant, 1996), so respondent's age is included in the time-use regressions. Finally, the day of week, month, and year of the time diary are controlled for. Time-use patterns are likely to differ between weekdays and weekends, and even across weekdays (e.g., Fridays and Mondays may be structurally different from other weekdays). Similarly, time-use patterns may vary by month, as there may be fewer homework assignments and extracurricular activities at the start and end of the school year (i.e., September and May/June). Similarly, we condition on year fixed effects to control for changes in the national economy that may jointly predict household income and time use. The time diaries in the analytic sample are uniformly distributed across calendar years, months, and days of the week (after weighting).

4. Methodology

We test for gender and SES gaps in non-school study time by estimating linear time-use regressions of the form:

$$T_i = \alpha + \delta Male_i + \gamma SES_i + \beta X_i + u_i, \quad (1)$$

where *i* indexes respondents, *T* is non-school study time; *Male* is a gender indicator; *SES* is a vector of the categorical indicators of respondents' parents' educational attainment and household income described in the previous section; *X* is the vector of statistical controls described in the previous section; and *u* is an idiosyncratic error term. We estimate versions of equation (1) that restrict β to equal zero to see how conditioning on covariates changes estimated time-use gaps as well as versions of (1) that exclude the state fixed effects (FE) from the vector *X*. To formally test whether SES gaps vary by gender we estimate equation (1) separately by gender and conduct Chow tests for group differences (Wooldridge, 2013, p. 247). To further investigate the underlying causes of gender gaps in non-school study time, we also estimate versions of (1) that interact *Male* with certain elements of *X*.

The linear model shown in (1) is estimated by OLS with standard errors clustered at the state level to make statistical inference robust to arbitrary forms of heteroskedasticity, serial correlation within states over time, and spatial correlations in the error terms within states (Gershenson, 2013; Kalenkoski & Pabilonia, 2014). We take OLS estimates of linear time-use regressions as the preferred estimates despite the "pile-up" at zero documented in table 1, as Stewart (2013) shows that OLS estimates are more robust than Tobit estimates when the non-participation is caused by measurement error attributable to the fact that time diary surveys sample days as opposed to longer time frames. For example, even if a respondent reports performing zero homework on the diary day, it is likely that the respondent did perform some homework on another day during the week or month of the time diary. Another reason for preferring OLS estimates of linear models is that the linear model provides a straightforward interpretation of interaction effects, unlike the nonlinear Tobit model (Karaca-Mandic, Norton, & Dowd 2012).

Nonetheless, Tobit models that account for both the non-negative nature of time use and the "pile up" at zero, which take the right hand side of equation (1) as their linear index, are estimated as a sensitivity analysis.[7] As expected, estimated Tobit average partial effects (APE) that are directly comparable to OLS coefficients (Wooldridge, 2013, p. 600) are indeed qualitatively similar to the preferred OLS estimates (Foster & Kalenkoski, 2013). We also report APE on homework time conditional on T being greater than zero, which provide a more nuanced understanding of the gender and SES gaps in non-school study time (Wooldridge, 2013, p. 599).

5. Results

Table 2 presents the main OLS estimates of equation (1). Column 1 shows that on average, males spend about 15 fewer homework minutes per day than females. This gender gap is strongly statistically significant and remains so after conditioning on SES indicators, statistical controls, daily activities, and state fixed effects (FE) in columns 3 through 6, respectively. Column 2 shows that there are significant SES gaps in homework time that are primarily driven by the children of college educated parents and students in the wealthiest households. The parental-education gaps in non-school study time are robust to conditioning on gender, statistical controls, daily activities, and state FE in columns 3 through 6, respectively. Interestingly, however, conditioning on statistical controls and state FE causes the income gap in homework time to fall by nearly 50% and lose its statistical significance. The gender and parental education gaps in homework time documented in table 2 are arguably practically significant, as they amount to well over one hour of homework time per week.

Participating in organized extracurricular activities and in paid work outside the household on the diary day are both associated with significantly less time spent on homework. We investigate the ability of participation in these activities to explain gender gaps in non-school study time in subsequent analyses. However, there is no effect of participating in childcare on non-school study time, perhaps because childcare is sometimes a passive (i.e., secondary) activity during which children can simultaneously perform homework. The full set of statistical control coefficient estimates for column 6 of table 1 is reported in appendix table A.1.

Table 3 presents estimates of equation (1) separately by gender, to test whether the SES gaps in homework time vary by gender and to better understand the underlying causes of gender gaps in non-school study time. The estimates in table 3 show three striking differences by gender in the predictors of homework time. First, the income gradient in homework time seems to have been driven entirely by males: male students in the wealthiest households spend about 20 minutes more per day on homework than their counterparts in low-income households, and this difference remains statistically significant after conditioning on statistical controls and state FE. However, female students have no such income gradient. Second, the effect of parents' education on children's homework time is about 50 to 75% larger for female students. Together, these first two points indicate that while there are SES gaps in non-school study time for both genders, the male gap is driven by household income while the female gap is driven by parental education. Formal Chow tests show that the differences between the male and female models are all strongly statistically significant. Third, there are some differences by gender in the effect of participation in other daily activities on non-school student time. For example, the strong effect of participation in organized extracurricular activities is only present for males, as females who participate in such activities spend approximately the same amount of time on homework as females who do not participate in organized extracurricular activities.[8] Interestingly, the "work penalty" is about 50% greater for females, as the gap in homework time between females who worked outside the household for pay and those who did not is about 20 minutes, compared to an analogous gap of about 14 homework minutes for males. These results suggest that participation in extracurricular activities may explain some of the gender gap in non-school study time. We investigate this hypothesis further below.

The full set of estimated coefficients on the statistical controls in the male and female regressions estimated in columns 3 and 6 of table 2 are reported alongside the coefficients of the pooled model in appendix table A.1. The estimated coefficients are generally of the expected sign and consistent with previous literature. Some of the more interesting results are the large racial differences in homework time, which exist even after conditioning on SES and household composition. Specifically, relative to the omitted white category, Asian students spend 50 minutes more per day on homework while black students spend about 10 fewer minutes. The Asian gap is even larger among males while the black gap is larger among females. Interestingly, however, there are no significant differences by students' age. Finally, there are large differences in the distribution of homework time across days of the week and months of the year. Most homework occurs on Tuesdays and Wednesdays. About 10 to 15 fewer minutes occur on Sundays and Thursdays, while more than 40 fewer minutes occur on Fridays and Saturdays. However, there are no clear time trends in non-school study time between 2003 and 2012.

5.1 Sources of Gender Gaps in Non-School Study Time

Column 1 of table 4 reports an extension of the baseline specification reported in column 6 of table 2 that includes interactions between the male indicator and the indicators for extracurricular participation, engaging in childcare, and working on the time diary day in addition to the full set of statistical controls and state FE. The interaction terms provide a straightforward formal test of whether participation in any of these three activities explains the 15-minute gender gap observed in tables 1 and 2. The estimates reported in column 1 of table 4 suggest that they do not: the coefficient on the male indicator remains statistically significant and similar in magnitude to that in the baseline model that excludes the interaction terms and none of the interaction terms are statistically significant.

Columns 2 through 5 of table 4 present estimates of the same interaction specification on different subsamples to further investigate potential sources of the gender gap in non-school study time. The first result of note is that the gender gap is larger in low-SES and single-parent households. Specifically, males in low-income households (household income below $20,000) spend nearly seventeen fewer minutes on homework than females in similar households, while the gender gap is smaller than ten minutes and statistically indistinguishable from zero in high-income households (household income greater than $100,000) and households in which at least one parent holds a college degree. Similarly, the gender gap in single-parent households is more than 20 minutes and strongly statistically significant. This finding could be at least partly due to teenage males in low-income and single-parent households taking on relatively more responsibilities than teenage females, both within and outside the household. Interestingly, however, the interaction terms reported in table 4 provide no evidence that this is the case. Specifically, males who worked for pay outside the household on the diary day engage in neither more nor less study time than males who did not work on the diary day. Moreover, while none of the male-extracurricular interaction terms are statistically significant, the interaction terms are actually larger in magnitude in high-SES households, suggesting that the male-extracurricular "homework penalty" is actually larger in more advantaged households, though again these differences are not statistically significant. Similarly, males in low-income households who cared for household children on the diary day actually did significantly more homework than otherwise similar females. Together, the results reported in table 4 suggest that gender gaps in non-school study time are slightly larger in low-income and single-parent households, though these differences are not explained by differential rates of participation in extracurricular activities, household childcare, or work outside the household.

5.2 Sensitivity Analysis: Tobit Time-Use Regressions

Table 5 reports estimates of Tobit time-use regressions that account for the non-negative nature of time use and the "pile up at zero" in daily homework time observed in table 1. The Tobit models discussed in this section condition on the full set of baseline covariates included in the linear regression estimated in column 6 of table 2. Tobit regressions are estimated using the full sample as well separately by gender. Because Tobit coefficients represent relatively uninteresting partial effects on a "latent" time use variable that can be negative, two types of Average Partial Effects (APE) on expected time use are reported for each Tobit model (Wooldridge, 2013, pp. 599-600). The odd numbered columns of table 5 report APE on expected homework time, which are conditional on covariates and directly comparable to the OLS coefficients reported in column 6 of table 2 and columns 3 and 6 of table 3, respectively. The even numbered columns of table 5 report APE on expected homework time, conditional on covariates *and* on homework time being positive. The latter essentially reflect the differences by gender (and other covariates) in homework time (i.e., the intensive margin) that remain *after* conditioning on differences by gender (and other covariates) in homework participation (i.e., the extensive margin). For this reason, we subsequently refer to these APE as "conditional APE."

Generally, the "unconditional" APE reported in columns 1, 3, and 5 of table 5 are consistent with corresponding OLS estimates reported in tables 2 and 3. Most importantly, the Tobit estimate of the gender gap in average non-school study time reported in column 1 of table 5 is about 15 minutes and is strongly statistically significant. Similarly, the "unconditional" Tobit APE of parents' educational attainment and students' diary-day activities reported in column 1 of table 5 are similar in magnitude, sign, and statistical significance to their OLS counterparts reported in column 6 of table 2. The gender-specific "unconditional" Tobit APE estimates reported in columns 3 and 5 of table 5 are also similar in sign and magnitude to their OLS counterparts reported in columns 3 and 6 of table 3. Together, the “unconditional” APE reported in the odd-numbered columns of table 5 suggest that the main results reported in tables 2 and 3 are robust to the preferred choice of a linear functional form.

The “conditional” APE reported in the even-numbered columns of table 5 provide a more nuanced view of the gender gap in non-school study time by focusing on average differences in time use conditional on spending at least some time on homework. The “conditional” gender gap reported in column 2 of table 5 is about 12 minutes. Intuitively, it is slightly smaller than the “unconditional” gap of about 15 minutes because table 1 shows that males’ participation in homework is lower than females’, though the “conditional” gap remains strongly statistically significant. This means that the observed gender gap in non-school study time is not driven by non-participation, but rather by differences in both the intensive and extensive margins. Generally, the “conditional” APE in columns 2, 4, and 6 are slightly smaller, though similar in magnitude and statistical significance, to their counterparts in columns 1, 3, and 5, respectively. Again, this shows that there is substantial variation in daily non-school study time along the intensive margin.

6. Discussion and Conclusion

The current study uses time diary data from the American Time Use Survey (ATUS) to test for the presence of gender, SES, and gender-by-SES gaps in secondary students’ time spent studying outside of the traditional school day. We find evidence of a statistically significant 15-minute gender gap in daily homework time that is robust to the choice of time-use regression functional form and to conditioning on a variety of covariates. This gap is primarily driven by decisions made along the intensive margin, as a gender gap of about 12 minutes remains after conditioning on spending at least some time on homework. While the gender gap in non-school study time is slightly larger in low-income and single-parent households, we find no evidence that the gender gap is driven by students' participation in extracurricular activities, employment outside the home, or the care of household children.

Regarding other predictors of non-school study time, we find that the daughters of college-educated parents spend significantly more time doing homework than the sons of college-educated parents, while household income only predicts the homework time of males in the wealthiest households. Males spend nearly 15 fewer minutes on homework on days that they either participate in an organized extracurricular activity or work for pay outside of the household. Similarly, females who worked on the diary day performed about 20 fewer minutes of homework. Interestingly, participating in childcare on the diary day had no effect on non-school study time, perhaps because this was largely passive childcare during which the respondent also completed homework.

These results are consistent with the hypotheses that the SES gap and the reversal of the gender gap in college completion are at least partly attributable to corresponding SES and gender gaps in character skills that originate in childhood and persist into young adulthood (Bertrand & Pan, 2013; Duncan & Magnuson, 2011; Jacob, 2002; Lundberg, 2013). More generally, these results contribute to the general literature on the unequal distribution of character skills. Specifically, time spent on homework is unique in that it both indicates possession of character skills and contributes to the development of character skills. These reasons underscore the importance of identifying the causal factors that lead to the gender and SES gaps identified in the current study. While this descriptive analysis identifies the presence of SES and gender gaps in non-school study time, it is unable to identify the specific causes of such gaps.

Indeed, the nature of the ATUS data precludes such an analysis, though we do provide preliminary evidence that such gaps are not driven by participation in market work outside the household, participation in organized extracurricular activities, or caring for household children. As a result, qualitative research that investigates why females, and particularly the daughters of college-educated parents, spend significantly more time on homework than their male counterparts would likely prove fruitful.

Another direction for future research to consider is that the SES homework gap may be driven both by school and household characteristics that are unobserved in the ATUS data. Regarding the former, schools in low-income neighborhoods may assign fewer or less time-intensive homework assignments, or perhaps teachers in such schools are unable to develop a culture in which non-school study time is expected. Similarly, parental attitudes and rigid work schedules in low-SES households may contribute to an environment in which homework is not prioritized, rewarded, or enforced. More generally, students in low-SES households may lack the resources (e.g., quite space, desk, computer) to devote home time to homework or may have more pressing demands on their time (e.g., working, watching younger siblings). These are important questions that we leave to future research.

Notes

[1] See http://www.bls.gov/tus/ for further information on the ATUS.

[2] See Stewart (2013) for further discussion of time-diary surveys' sampling of specific household days rather than households. Abraham, Maitland, and Bianchi (2006) create more sophisticated weights that account for nonresponse in the ATUS using propensity score methods, but find no practically significant differences between analyses that do and do not account for nonresponse.

[3] These activities correspond to the 4 digit activity codes 0603 and 0602 in the ATUS Activity Coding Lexicon, which is available here: http://www.bls.gov/tus/lexiconnoex0312.pdf.

[4] The multiple comparisons problem occurs when multiple outcomes (dependent variables) are considered in an analysis, thereby increasing the likelihood of finding spurious statistically significant relationships. For example, using a single aggregate measure of time spent on homework instead of time spent in multiple types of homework is a straightforward way of structuring the data to eliminate the multiple comparisons problem (Schochet, 2008).

[5] Source: http://www.census.gov/hhes/www/poverty/data/threshld/.

[6] Participation in these three activities was coded using activity lexicon codes 0602 and 1301 for organized extracurricular activities; 0301, 0302, and 0303 for childcare, and 0501 for work.

[7] See Wooldridge (2013, pp. 596-604) for an overview of the one-limit Tobit model, estimation of the model, and computation of average partial effects. Solon (2010) provides a useful derivation of the Tobit model from a simple model of consumer demand.

[8] Of course, it could be that conditional on participating in extracurricular activities, males spend more time in such activities, though this question falls outside the scope of the current study.

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Table 1: Analytic Sample Summary Statistics

	All	Males	Females
Respondent (R) is male	0.51	1	0
A. Homework on diary day			
Homework time (T; in minutes)	48.4	41.8***	55.3
	[83.5]	[76.9]	[89.5]
Did some homework (T > 0)	0.38	0.33***	0.43
Homework T | T > 0	112.2	105.2***	118.2
	[94.8]	[90.2]	[98.2]
B. Household (HH) Socioeconomic Status			
R's Father			
Father not in household	0.24	0.23***	0.26
No HS diploma	0.11	0.12*	0.10
HS diploma	0.20	0.20	0.21
Some college	0.19	0.19	0.18
College degree	0.27	0.27	0.26
R's Mother			
Mother not in household	0.08	0.08	0.08
No HS diploma	0.13	0.13	0.12
HS diploma	0.23	0.23	0.23
Some college	0.29	0.29	0.29
College degree	0.28	0.27	0.29
R's Household (HH) Income			
Less than $20k	0.21	0.23	0.20
$20k-$40k	0.19	0.18	0.19
$40k-60k	0.16	0.16	0.16
$60k-$75k	0.10	0.09	0.12
$75k-$100k	0.16	0.15	0.16
$100k-$150k	0.10	0.11	0.10
Greater than $150k	0.09	0.09	0.09
C. R's characteristics			
Age	16.1	16.1**	16.0
	[0.8]	[0.8]	[0.8]
White	0.78	0.78	0.78
Black	0.15	0.15	0.14
Native American	0.01	0.01	0.01
Asian	0.04	0.04	0.04
Other race	0.03	0.03	0.04
Hispanic ethnicity	0.21	0.22	0.20
Parents are married	0.72	0.73*	0.71
Young child present in HH	0.05	0.04	0.05
Employed	0.15	0.14**	0.17
D. R's activities on diary day			
Participated in extracurricular activity	0.32	0.41***	0.22
Engaged in childcare (inside HH)	0.08	0.06***	0.10
Worked for pay (outside of HH)	0.12	0.12	0.13
N	5,909	3,054	2,855

Notes: Means and standard deviations [SD] are weighted by ATUS weights that adjust for unequal probabilities of sample selection. SD are only reported for non-binary variables. Time is measured in daily minutes. The statistical significance of mean differences between male and female respondents is tested using *t* tests.
*** p<0.01, ** p<0.05, * p<0.1.

Table 2: Homework Time Use Regressions (All Students; OLS estimates)

	1	2	3	4	5	6
Male	-14.70	Omitted	-14.98	-15.49	-14.06	-14.46
	(2.17)***		(2.30)***	(2.27)***	(2.44)***	(2.42)***
R's Father						
Not in HH	Omitted					
No HS		0.16	1.41	0.80	1.10	2.50
		(3.72)	(3.82)	(8.25)	(8.44)	(8.26)
HS diploma		3.52	4.05	4.76	5.17	6.44
		(3.91)	(3.81)	(7.57)	(7.67)	(7.71)
Some college		6.35	7.37	6.93	6.92	7.00
		(3.60)*	(3.61)**	(8.18)	(8.22)	(8.22)
College degree		24.15	25.12	22.79	23.00	22.79
		(5.61)***	(5.54)***	(8.92)**	(9.07)**	(9.17)**
R's Mother						
Not in HH	Omitted					
No HS		1.82	1.53	-1.68	-1.35	-0.74
		(4.47)	(4.38)	(5.42)	(5.31)	(5.54)
HS diploma		-7.17	-7.39	-6.34	-5.90	-4.85
		(3.94)*	(3.86)*	(5.33)	(5.20)	(5.34)
Some college		-2.58	-2.94	-2.27	-1.66	-0.77
		(4.68)	(4.58)	(5.04)	(4.92)	(5.10)
College degree		17.36	16.80	14.20	14.51	15.58
		(5.49)***	(5.47)***	(5.18)***	(5.13)***	(5.09)***
HH Income						
< $20k	Omitted					
$20k-$40k		-3.58	-4.16	-4.33	-4.86	-4.90
		(2.88)	(2.89)	(2.42)*	(2.42)**	(2.40)**
$40k-60k		7.02	6.63	3.97	3.70	3.23
		(4.03)*	(4.14)	(3.96)	(3.82)	(3.75)
$60k-$75k		-1.23	-2.66	-4.73	-4.23	-4.87
		(5.17)	(5.10)	(5.53)	(5.39)	(5.46)
$75k-$100k		4.05	3.51	4.08	4.13	3.33
		(5.44)	(5.36)	(4.96)	(4.87)	(4.71)
$100k-$150k		1.55	1.42	-1.15	-1.27	-0.37
		(8.18)	(8.15)	(7.35)	(7.29)	(7.37)
> $150k		17.69	17.08	10.95	11.32	11.02
		(6.06)***	(5.89)***	(6.73)	(6.62)*	(6.84)
Other Activities	Omitted	Omitted	Omitted	Omitted		
Extra-curricular					-8.64	-9.05
					(2.63)***	(2.65)***
Child care					-0.34	0.08
					(3.10)	(3.05)
Employment					-18.30	-17.92
					(2.82)***	(2.95)***
Controls	No	No	No	Yes	Yes	Yes
State FE	No	No	No	No	No	Yes
Adjusted R^2	0.01	0.05	0.06	0.15	0.16	0.17

Notes: N = 5,909. Standard errors are clustered at the state level. All regressions are weighted by ATUS sampling weights that adjust for unequal probabilities of sample selection. The estimated coefficients on the control variables in column 6 are reported in column 1 of appendix table A.1. *** p<0.01, ** p<0.05, * p<0.1.

Table 3: Homework Time Use Regressions (By gender; OLS estimates)

	Males			Females		
	1	2	3	4	5	6
R's Father	Omitted			Omitted		
Not in household	9.45	0.53	1.58	-8.45	-0.41	0.90
No HS diploma	(5.78)	(11.46)	(11.50)	(5.32)	(14.18)	(14.74)
	6.26	-0.43	-0.38	1.87	9.06	11.67
HS diploma	(6.04)	(10.59)	(10.98)	(3.52)	(12.92)	(13.73)
	3.39	-3.63	-2.83	12.52	18.21	17.85
Some college	(5.47)	(11.38)	(11.29)	(3.88)***	(13.11)	(13.75)
	26.51	19.00	17.91	24.23	27.75	29.25
College degree	(8.78)***	(12.49)	(12.96)	(6.69)***	(15.45)*	(16.02)*
R's Mother						
Not in household	Omitted			Omitted		
No HS diploma	7.01	-1.55	-3.47	-4.23	-1.78	0.55
	(5.33)	(6.26)	(6.54)	(7.08)	(8.07)	(8.45)
HS diploma	-2.49	-6.10	-6.34	-12.49	-5.29	-2.37
	(5.02)	(7.95)	(7.93)	(6.56)*	(7.77)	(8.35)
Some college	2.99	-2.14	-3.85	-9.17	-2.41	0.94
	(4.87)	(6.34)	(6.27)	(7.09)	(7.03)	(7.64)
College degree	18.21	10.81	11.05	15.05	16.33	18.08
	(7.08)**	(7.90)	(7.92)	(8.45)*	(8.00)**	(8.58)**
Household Income						
Less than $20k	Omitted			Omitted		
$20k-$40k	-1.63	-4.21	-3.20	-6.57	-4.52	-6.40
	(3.52)	(3.34)	(3.26)	(4.92)	(4.65)	(4.91)
$40k-60k	6.87	3.50	3.11	5.97	3.14	2.84
	(7.24)	(6.14)	(6.40)	(7.36)	(6.42)	(6.56)
$60k-$75k	-2.84	-6.29	-6.34	-3.26	-2.25	-4.67
	(5.42)	(5.79)	(5.97)	(7.00)	(6.73)	(6.54)
$75k-$100k	3.45	1.79	1.75	2.99	6.76	4.86
	(5.81)	(4.21)	(4.16)	(8.20)	(8.26)	(8.28)
$100k-$150k	2.47	-3.15	-1.24	0.89	0.51	0.23
	(8.28)	(7.10)	(7.39)	(10.74)	(10.80)	(10.77)
More than $150k	28.01	18.74	19.29	5.08	3.12	1.04
	(8.20)***	(7.57)**	(7.95)**	(8.59)	(9.46)	(9.79)
Other Activities						
Extra-curricular		-12.42	-12.84		-2.91	-3.19
		(3.19)***	(3.28)***		(4.61)	(4.70)
Child care		2.04	2.50		-1.86	-0.86
		(6.97)	(6.86)		(5.67)	(5.65)
Employment		-14.32	-14.24		-22.46	-21.40
		(3.26)***	(3.54)***		(4.71)***	(4.77)***
Controls	No	Yes	Yes	No	Yes	Yes
State FE	No	No	Yes	No	No	Yes
Adjusted R^2	0.06	0.15	0.16	0.05	0.14	0.15
Chow test *p* value	< 0.001***	0.001***	0.08*			

Notes: N (Male) = 3,054. N (Female) = 2,855. Standard errors are clustered at the state level. All regressions are weighted by ATUS sampling weights that adjust for unequal probabilities of sample selection. The estimated coefficients on the controls in columns 3 & 6 are reported in columns 2 & 3 of appendix table A.1. Chow test *p* values are for F statistics of Chow tests of the equality of male and female coefficients.

*** p<0.01, ** p<0.05, * p<0.1.

Table 4: Heterogeneous Homework Time Use Regressions (OLS estimates)

Sample:	All	Low income	High income	College degree	Single parent
	1	2	3	4	5
Male	-13.04	-16.66	-5.76	-9.83	-20.53
	(3.68)***	(7.24)**	(8.76)	(8.12)	(5.46)***
Other Activities					
Extra-curricular (EC)	-4.73	1.14	-8.79	-5.45	4.51
	(4.54)	(8.68)	(10.89)	(7.36)	(8.18)
Child care	-0.37	-18.58	11.55	11.46	-7.43
	(5.39)	(8.92)**	(13.96)	(8.49)	(9.91)
Employment	-20.38	-21.05	-22.91	-31.31	-25.83
	(5.01)***	(8.65)**	(13.31)*	(7.79)***	(6.51)***
Interactions					
Male*EC	-7.07	-11.52	-16.83	-15.03	-10.83
	(5.03)	(10.67)	(10.90)	(9.31)	(8.41)
Male*Child care	0.68	28.32	-30.00	-7.64	8.36
	(11.01)	(12.52)**	(22.59)	(19.57)	(16.01)
Male*Employment	5.40	2.20	-0.30	11.21	3.28
	(6.25)	(11.49)	(16.68)	(9.64)	(8.41)
SES & control variables	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.15	0.15	0.21	0.16	0.18
N	5,909	1,286	990	2,266	1,713

Standard errors are clustered at the state level. All regressions are weighted by ATUS sampling weights that adjust for unequal probabilities of sample selection. Aside from the interaction terms these specifications are otherwise identical to that in column 6 of table 2. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Tobit Homework Time Use Regressions (Average Partial Effects (APE))

	All		Males		Females	
	APE	APE | T > 0	APE	APE | T > 0	APE	APE | T > 0
	1	2	3	4	5	6
Male respondent (R)	-14.58	-11.63	.	.	.	.
	(2.31)***	(1.83)***				
R's Father						
Not in household	Omitted					
No HS diploma	2.70	2.15	4.47	3.69	-1.99	-1.55
	(9.53)	(7.60)	(13.71)	(11.33)	(15.79)	(12.28)
HS diploma	3.26	2.60	-0.83	-0.69	7.03	5.47
	(7.93)	(6.33)	(12.91)	(10.67)	(14.21)	(11.06)
Some college	6.13	4.89	1.03	0.85	12.67	9.85
	(8.18)	(6.52)	(12.78)	(10.56)	(13.28)	(10.34)
College degree	16.94	13.52	12.54	10.36	23.20	18.04
	(8.61)**	(6.87)**	(12.94)	(10.69)	(16.11)	(12.54)
R's Mother						
Not in household	Omitted					
No HS diploma	-2.59	-2.07	-8.54	-7.06	3.80	2.96
	(6.92)	(5.52)	(8.47)	(7.00)	(10.49)	(8.17)
HS diploma	-6.39	-5.10	-7.67	-6.34	-5.02	-3.91
	(7.20)	(5.74)	(9.65)	(7.97)	(10.52)	(8.17)
Some college	-1.14	-0.91	-4.62	-3.82	-0.09	-0.07
	(6.33)	(5.05)	(8.02)	(6.63)	(9.15)	(7.11)
College degree	11.63	9.28	8.73	7.22	12.07	9.39
	(6.05)*	(4.83)*	(8.42)	(6.97)	(9.73)	(7.59)
Household Income						
Less than $20k	Omitted					
$20k-$40k	-3.64	-2.91	-4.92	-4.06	-2.11	-1.64
	(3.25)	(2.59)	(4.68)	(3.86)	(6.25)	(4.86)
$40k-60k	1.55	1.24	-0.56	-0.46	5.75	4.47
	(3.05)	(2.44)	(4.63)	(3.83)	(6.47)	(5.03)
$60k-$75k	-3.67	-2.93	-7.14	-5.90	1.18	0.92
	(5.03)	(4.01)	(4.64)	(3.83)	(7.59)	(5.90)
$75k-$100k	2.42	1.93	0.36	0.30	6.35	4.94
	(4.31)	(3.44)	(3.26)	(2.70)	(8.16)	(6.35)
$100k-$150k	-1.63	-1.30	-2.39	-1.97	-0.24	-0.19
	(5.48)	(4.37)	(4.72)	(3.90)	(9.22)	(7.17)
More than $150k	7.05	5.62	8.77	7.25	3.81	2.96
	(5.83)	(4.64)	(5.12)*	(4.23)*	(10.14)	(7.89)
Other Activities						
Extra-curricular	-7.12	-5.68	-9.35	-7.73	-1.26	-0.98
	(2.33)***	(1.86)***	(3.04)***	(2.53)***	(4.13)	(3.21)
Child care	1.23	0.98	2.64	2.18	1.05	0.82
	(3.36)	(2.68)	(5.33)	(4.41)	(5.71)	(4.44)
Employment	-18.00	-14.36	-13.41	-11.08	-23.94	-18.62
	(3.08)***	(2.48)***	(3.83)***	(3.18)***	(5.63)***	(4.42)***
Controls	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-1.40E+11		-6.51E+10		-7.40E+10	
Pseudo R^2	0.04		0.04		0.04	
N	5,909		3,054		2,855	

Notes: Standard errors are clustered at the state level and were computed using the delta method. The unconditional APE reported in columns 1, 3, and 5 are directly comparable to OLS coefficients. All regressions are weighted by ATUS sampling weights that adjust for unequal probabilities of sample selection. The linear index of these Tobit models is identical to the linear regression model estimated in column 6 of table 2. *** p<0.01, ** p<0.05, * p<0.1.

Appendix Table A.1: Baseline OLS Coefficient Estimates

	All	Males	Females
	1	2	3
White	Omitted		
Black	-12.13	-7.40	-17.45
	(2.49)***	(2.73)***	(4.41)***
Native American	-5.24	-19.62	13.42
	(13.58)	(4.97)***	(25.02)
Asian	53.87	53.82	53.07
	(9.06)***	(18.33)***	(12.78)***
Other race	-10.60	-25.25	1.49
	(4.24)**	(5.74)***	(7.17)
Hispanic	-0.16	4.95	-6.98
	(4.17)	(5.49)	(5.15)
Metro	12.94	12.30	14.92
	(2.20)***	(3.40)***	(3.11)***
R employed	-8.17	-5.80	-10.34
	(2.97)***	(3.54)	(5.05)**
Parents Married	0.12	9.64	-10.42
	(7.60)	(10.45)	(14.50)
R age	-0.84	-2.35	0.45
	(1.19)	(1.50)	(1.71)
HH size	-1.78	-2.92	0.43
	(1.59)	(2.05)	(1.71)
HH Children	1.77	1.99	0.55
	(1.54)	(1.93)	(2.01)
Young child	-3.61	-8.69	-0.31
	(7.93)	(8.34)	(10.83)
Diary date			
Sunday	-11.09	-9.14	-11.92
	(4.63)**	(4.86)*	(7.92)
Monday	-9.76	-10.44	-7.52
	(4.65)**	(5.21)*	(10.33)
Tuesday	-4.89	-1.98	-8.73
	(6.17)	(6.94)	(9.37)
Wednesday	Omitted		
Thursday	-15.13	-5.95	-24.56
	(4.78)***	(5.36)	(7.74)***
Friday	-46.66	-37.88	-54.30
	(4.76)***	(5.85)***	(7.24)***
Saturday	-39.75	-33.81	-44.59
	(4.54)***	(4.40)***	(7.73)***
January	-2.60	-9.70	7.05
	(4.83)	(7.78)	(6.23)
February	1.59	-5.38	8.68
	(6.24)	(8.41)	(6.49)
March	-2.83	-10.42	5.48
	(4.15)	(5.85)*	(7.70)
April	-12.50	-18.76	-3.60
	(5.34)**	(8.94)**	(6.50)
May	-1.52	-2.19	0.10
	(5.82)	(9.50)	(9.49)
June	-27.24	-30.07	-25.05
	(5.33)***	(7.64)***	(9.42)**
July	-42.98	-40.21	-44.17
	(5.82)***	(10.08)***	(5.62)***

Table A.1, continued	All	Males	Females
August	-25.06	-20.43	-25.69
	(7.56)***	(8.72)**	(10.39)**
September	Omitted		
October	6.31	2.90	10.83
	(5.17)	(9.35)	(7.24)
November	-2.29	-8.67	4.59
	(5.46)	(8.43)	(10.54)
December	-0.50	-6.42	7.29
	(6.26)	(10.04)	(8.16)
2003	Omitted		
2004	0.69	1.01	1.60
	(4.15)	(5.48)	(6.75)
2005	-0.79	-1.24	1.76
	(4.02)	(4.95)	(6.13)
2006	0.53	2.75	-0.86
	(3.37)	(4.50)	(5.25)
2007	4.29	9.14	0.67
	(3.55)	(5.79)	(4.38)
2008	1.90	2.98	1.22
	(4.29)	(4.57)	(6.00)
2009	5.53	-0.99	12.27
	(4.40)	(4.85)	(7.70)
2010	11.47	3.89	20.48
	(5.55)**	(6.01)	(7.96)**
2011	0.10	5.61	-5.28
	(4.77)	(5.57)	(6.40)
2012	12.38	18.30	7.47
	(6.59)*	(9.68)*	(7.17)

Notes: Standard errors are clustered at the state level. All regressions are weighted by ATUS sampling weights that adjust for unequal probabilities of sample selection. Coefficients reported in each column correspond to the regressions estimated in column 6 of table 2 and columns 3 and 6 of table 3, respectively, which include state fixed effects. *** p<0.01, ** p<0.05, * p<0.1.