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Revisiting the Time Trade-off Hypothesis: Work, Organized Activities, and Academics during College

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Abstract

How adolescents spend their time has long-term implications for their educational, health, and labor market outcomes, yet surprisingly little research has explored the time use of students across days and semesters. The current study used longitudinal daily diary data from a sample of college students attending a large public university in the Northeastern US ($n = 726$, $M_{\text{age}} = 18.4$) that was followed for 14 days within each of 7 semesters (for up to 98 diary days per student). The study had two primary aims. The first aim was to explore demographic correlates of employment time, organized activity time, and academic time. The second aim was to provide a rigorous test of the time trade-off hypothesis, which suggests that students will spend less time on academics when they spend more time on employment and extracurricular activities. The results demonstrated that time use varied by gender, parental education, and race/ethnicity. Furthermore, the results from multi-level models provided some support for the time trade-off hypothesis, although associations varied by the activity type and whether the day was a weekend. More time spent on employment was linked to less time spent on academics across days and semesters whereas organized activities were associated with less time on academics at the daily level only. The negative associations between employment and academics were most pronounced on weekdays. These results suggest that students may balance certain activities across days, whereas other activities may be in competition over longer time frames (i.e., semesters).

Introduction

Whether and how employment and extracurricular activities may impact adolescent and young adult students' adjustment has been of interest to scholars and policymakers for decades. On the one hand, a voluminous body of research highlights the social, cognitive, and practical skills that can be developed through participation in employment (Mortimer, 2003) and extracurricular activities (Eccles, Barber, Stone, & Hunt, 2003). On the other hand, time devoted to these activities may harm academic achievement by reducing the amount of time available for schoolwork (Coleman, 1961). Employment time and leisure time among college students have increased over the last 30 years (Babcock & Marks, 2010), making it increasingly important to identify who devotes time to employment and extracurricular activities, and to understand the processes through which these activities may impact academic outcomes.

Despite a large body of research exploring the correlates of time spent on employment, extracurricular activities, and academics, important gaps remain. Previous studies often have focused on only one time use domain (e.g., employment) without considering how students combine (or experience challenges combining) various activities. Furthermore, studies often use cross-sectional data or a few waves of data to understand the time use of adolescents (Wight, Price, Bianchi, & Hunt, 2009) and young adults (Mortenson, 2011). Yet, according to the time trade-off hypothesis (Safron, Schulenberg, & Bachman, 2001), activities are in competition for students' time. Thus, employment and extracurricular activities may reduce time spent on schoolwork. Detailed within-person longitudinal studies are therefore needed to test whether students spend less time on academics on days and semesters when they spend more time on employment and extracurricular activities.

To fill these gaps in the literature, the current study explored college students' time spent on employment, organized activities, and academics using longitudinal daily diary data that followed students for 7 semesters across their 1st through 4th year of college (with up to 14 daily web surveys per semester, for a maximum of 98 observation days per student). The research was guided by two primary goals. First, we sought to explore demographic predictors of time spent on employment, organized activities, and academics during college. Second, we aimed to test the time trade-off hypothesis which

predicts that these activities would be associated with less time spent on academics (across days and semesters). By providing information about how college students allocate their time, the current study advances theory and provides much-needed information to professionals working in higher education.

Time Use during College

Theories from various disciplines—from economics to human development—have influenced scholarly understanding of adolescent and young adult time use. Economic theories posit that time is a finite resource that individuals allocate rationally in order to maximize their well-being (Becker, 1965). At the same time, scholars have argued that time use should not only be studied by economists, but by developmentalists as well (Larson & Verma, 1999). Bronfenbrenner’s biocological framework (Bronfenbrenner & Morris, 2006) posits that repeated reciprocal interactions between individuals and their environments, or proximal processes, are the “primary engines of development” (Bronfenbrenner & Morris, 2006, p. 798). Engaging in everyday activities including employment, organized activities, and schoolwork represent important examples of these proximal processes. As others have noted, different activities afford unique structures, challenges, and opportunities to an adolescent. Thus, they develop particular skills and shape the emotional-motivational experiences of an adolescent (Larson & Verma, 1999). Although the amount of time devoted to various activities is only a proxy of the socialization experiences of an individual adolescent, a large body of research has linked adolescent time use to a number of important outcomes including risky behaviors (Barnes, Hoffman, Welte, Farrell, & Dintcheff, 2007), academic success (Fredricks & Eccles, 2006), and labor market wages (Gleason, 1993).

Understanding how individuals allocate their time may be particularly important during the late adolescent years when many enroll in college. In contrast to high school, when the great majority of students reside with their parents and attend mandatory schooling, during college parental and other adult supervision declines. Students exert more independent decision-making and have more control over their day-to-day lives as they age and transition into adulthood (Greene, Wheatley, & Aldava, 1992). Furthermore, the college environment is unique. During college, class attendance is discretionary, clubs and organizations vie for members, and employment becomes an important strategy to offset tuition and

living expenses. Students must learn to navigate the demands of this new environment in order to maximize their present and future well-being.

The current study focuses on college students' time use in three domains: paid employment, organized activities (i.e., clubs or organizations), and academics (including classes, homework, and studying). These are referred to as "productive" activities because time spent on each domain has a goal or purpose and students may develop important social, emotional, physical, or cognitive skills through participation. These qualities separate productive activities from health maintenance activities (such as sleep) and unstructured leisure (such as hanging out with friends), which are typically not categorized as productive although they may be important for well-being (Wight et al., 2009).

Working for pay is one common activity that demands students' time. Given the rising tuition and living expenses facing undergraduates in the US (U.S. Department of Education, 2013), many students work while attending university. In 2011, 72% of US undergraduate students were employed (Davis, 2012) and estimates from 2009 suggest that students average about 2.4 hours a day on employment (Mortenson, 2011). However, some students work more than others. Although female and male college students spend similar amounts of time on employment, research has shown that older students work more minutes per week than younger students (Mortenson, 2011), perhaps in response to changing expectations regarding financial independence, increased ability to find work, debt accumulation, or financial stress (National Survey of Student Engagement, 2012). Employment is much less prevalent among high school students (Davis, 2012) and thus the transition to college marks an important time period in which students learn to manage work and schooling demands.

Like work, many students pursue extracurricular activities in order to maximize their well-being. National estimates suggest that undergraduate students spend 3.9 hours a day on sports and leisure during the school year (Mortenson, 2011). In line with the theory that "getting involved" maximizes learning and development in college (Astin, 1984), students are often encouraged to explore new interests or join school clubs or organizations. In the current study, we focus on time spent participating in school organizations or clubs. Many universities have a large number of campus organizations and participation

in these organizations is often seen as an important part of the college experience. Organized activities are structured (i.e., there is an overarching purpose for the organization) and they are social (i.e., many members participate) thus these activities may have unique scheduling and time demands. As with employment, certain groups are less likely to engage in these activities than others. Previous research demonstrates that students from less advantaged socioeconomic backgrounds spend less time on extracurricular activities than students from more advantaged backgrounds (Walpole, 2003). Additionally, older and more advanced students devote less time to co-curricular activities (e.g., organizations) than younger students (Mortenson, 2011) and freshmen (National Survey of Student Engagement, 2013).

Although activities such as employment and organized activities may vie for the attention of college students, academics remain a primary obligation. Scholars repeatedly have expressed concerns that contemporary college students do not spend enough time on academics (Arum & Roska, 2011) and thus are not building skills needed for adult life and the contemporary labor market. Time use estimates suggest that college students average 3.9 hours a day on educational activities during the schoolyear, and survey data suggest that college students spend about 14-15 hours a week preparing for class (National Survey of Student Engagement, 2013). However, time spent on schoolwork varies across students. Women study and devote more time to class preparation than men (Mortenson, 2011) and seniors average more time on academics than first-year students (National Survey of Student Engagement, 2013). Race and ethnicity have also been linked to time use among college students. For instance, Mortenson (2011) found that Asian college students in the US spent the most time on educational activities, substantially more than other racial/ethnic groups. In sum, the college years are a time when many students work for pay and participate in organizations in addition to their school obligations, making it important to understand how students balance these various time demands.

The Time Trade-off Hypothesis: Do Employment or Organized Activities Reduce Academic Time?

The *time trade-off perspective* or the *zero-sum hypothesis* posits that because time is finite, students may be forced to choose between multiple desirable and/or necessary activities on a given day (Safron et al., 2001). This perspective argues that spending more time on a particular domain by necessity

will come at the cost of time spent on another activity. If the “crowded out” activity would have been productive and beneficial, then this trade-off will be detrimental.

In particular, it may be problematic if time spent on academics gets “crowded out” by other obligations. Attending class and engaging in schoolwork are primary obligations for full-time college students. Indeed, among high school students, homework time has been linked to college enrollment (Zill, 1995). Furthermore, among college students, class attendance predicts grade point average (Crede, Roch, & Kieszczyńska, 2010), and study time predicts grade point average and academic contentionsness (Brint & Cantwell, 2010). Thus, it is important to understand if, and when, students sacrifice academic time as a result of employment or extracurricular demands.

It is possible, of course, that nonacademic activities and schoolwork may not be in competition with one another. As scholars such as Mortimer (2003) have argued, adolescents and young adults may be able to juggle multiple tasks, including academics, employment, and extracurriculars. Furthermore, substantial leisure time has been documented among high school (Wight et al., 2009) and college students (Mortenson, 2011). Thus, students may sacrifice activities such as unstructured leisure with friends or media use instead of sacrificing academic time. Given that unstructured hanging out is not particularly conducive to building skills or developing positive social networks, balancing time in this way would not be expected to be detrimental to adjustment.

Empirical research testing the time trade-off hypothesis is mixed. For instance, research using the nationally representative Monitoring the Future study demonstrated that middle and high school students who worked longer hours spent less time studying than students who worked less (Safron et al., 2001). Likewise, using the National Longitudinal Survey of Youth – 97, Kalenkoski and Pabilonia (2012) found that employment hours were negatively associated with time spent on homework for high school students (Kalenkoski & Pabilonia, 2012). The negative association between employment hours and homework may result from “crowd out.” In line with this possibility, college students in one study reported that employment interfered with their study time and caused them to miss class (Curtis & Shani, 2002). Yet, a number of studies have shown that much of the association between employment and academics is

spurious. For instance, Warren and colleagues (2000) found that background characteristics including, but not limited to gender, socioeconomic status, and prior academic achievement, fully explained the association between work hours and poor academic achievement among a national sample of high school students. In addition, Staff and colleagues (2010) used work preferences as a proxy for unobserved selection factors and found that the mere desire to work full-time was associated with poor academic success (Staff, Schulenberg, & Bachman, 2010). These studies suggest that both work hours and study hours may be influenced by background characteristics (including academic motivation, academic aspirations, school attachment, and academic ability) highlighting the importance of controlling for these factors either by design or through the use of controls in statistical models.

Compared to employment, less research has examined associations between extracurricular activities and student study time. A large body of literature has explored linkages between extracurricular activities and academic achievement among high school students (e.g., Broh, 2002) and college students (e.g., Baker, 2008). However, few studies have explored time spent on academics. Marsh (1992) used a national sample of high school students and found that total extracurricular activity participation was positively related to the amount of time that students spent on homework. However, other studies have not found a significant correlation between the amount of time students spent on extracurricular activities and time spent on studying or homework (e.g., Barnes et al., 2007). Yet, these studies used a broad definition of extracurricular activities. Organized activities, such as intramural sports or student government often have set schedules or meetings, and thus may be harder to balance with academic time than individual extracurricular activities (e.g., playing a musical instrument). However, it is possible that students can be highly involved in academics as well as organized activities and employment. Studies using a person-oriented approach have demonstrated the existence of a group of “highly involved” students at both the high school (Shanahan & Flaherty, 2001) and college level (Brint & Cantwell, 2010). These students engage in activities across multiple domains, including school, employment, and extracurricular activities.

A Daily Diary Approach to Testing the Time Trade-off Hypothesis

The aforementioned studies linking work and extracurriculars to academic time provide preliminary tests of the time trade-off hypothesis. However, they do not explore short-term fluctuations in time use. Examining short-term fluctuations is necessary in order to understand the time trade-off *process*. This process of trading off or combining activities may occur over days or longer periods (e.g., weeks or semesters). Indeed, commonly used strategies for measuring time use (e.g., 2-day time diaries and survey questions that ask about long periods of time) are not ideal for understanding this time trade-off process. For instance, two-day time diaries ask respondents to detail their primary activities (divided into 15 minute blocks of time) during two 24-hour periods; however, they do not sample enough days to accurately capture the average time use of an individual. Survey questions that ask about long periods of time (e.g., activities in the last month or year) are useful for capturing the average time use of an individual, but they are prone to recall bias and they are not designed to examine daily time use or fluctuations in time use. On the other hand, the daily diary method is a hybrid strategy to measuring time use. With daily diaries, respondents answer survey questions about their time spent on certain activities *on a particular day*. When repeated, they can be aggregated to capture average time use (i.e., daily time use can be added together to create weekly or semester-level indicators of time use). Thus, repeated daily diaries can shed light on daily fluctuations in time use as well as the typical time use of an individual.

A few recent studies employing a daily diary approach provide initial support for the time trade-off hypothesis at the daily level. For instance, research has demonstrated that on days when college students study more than average they sleep less than average (Galambos, Dalton, & Maggs, 2009). This daily covariation between studying and sleep also has been documented among high school students (Gillen-O'Neel, Huynh, & Fuligni, 2013), suggesting that some students sacrifice sleep for schoolwork. These findings provide support for the time trade-off hypothesis at the daily level. It is possible that this same time trade-off process might be present at the semester level as well. For instance, in semesters that students work longer hours than usual, they might spend less time on academics because they have less available time for studying. Alternatively, it is possible that students might trade-off activities on a particular day, but successfully balance activities across days. In other words, if a student works long

hours on a particular day, she may compensate by studying long hours the following day, and thus these activities may not actually be associated across a week or semester. Research examining the time use of high school students supports this possibility. Witkow (2009) compared high and low-achieving students and found that high achieving students spent more time on schoolwork and less time with friends on weekdays. However, these high-achieving students compensated by spending more time on weekends with friends when academic demands were reduced (Witkow, 2009). This study highlights the fact that trade-offs between activities may demonstrate different patterns at the daily and semester levels. Furthermore, this study suggests the possibility that the time trade-off process might be different on weekdays (when students are expected to attend class and have more academic demands) than on weekends when they have more discretionary time.

From a developmental perspective, it is crucial to understand the extent to which students restrict educational activities in response to nonacademic demands across days and semesters. Investing time in education provides clear pathways for adolescents to build human capital or skills and competencies that can be leveraged in the labor market (Becker, 1964). If students reduce time on education in response to nonacademic activities, then they may be missing important opportunities to learn and build skills necessary for labor market success. However, if students are not “crunched” for time, then academic and nonacademic activities may not compete for students’ attention. In that case, by balancing activities, students may benefit from the skills that can be developed through educational experiences as well as out-of-class experiences. By using intensive longitudinal data, the current study teases apart different time scales in order to understand how students combine activities during college, and when (if ever) they are most apt to trade-off academic time.

Current Study

The purpose of the current study was to provide a detailed understanding of college students’ time use by exploring demographic correlates of employment, organized activities, and academics as well as testing the time trade-off hypothesis. We used daily data from a sample of traditional-aged college students attending a large 4-year university in the Northeastern US. The sample was followed for seven

semesters from their first year (beginning in Fall 2007) through their senior year in college (Fall 2010). Based on previous research, we advanced a number of hypotheses. First, we hypothesized that demographic characteristics would shape the amount of time that students devoted to employment, organized activities, and academics. Based on previous research, we hypothesized that older students would spend more time on employment (*Hypothesis 1a*). We also expected that younger students and those who had more educated parents would spend more time on organized activities (*Hypothesis 1b*). Furthermore, we hypothesized that female students, older students, and Asian American non-Hispanic (NH) students would spend more time on academics (*Hypothesis 1c*). Next, we explored the time trade-off perspective. Drawing on theory and research, we hypothesized that employment would be associated negatively with academics at both the daily and semester levels (*Hypothesis 2a*). However, we hypothesized that organized activities would be associated negatively with academics at the daily level, but not at the semester level (*Hypothesis 2b*). And finally, in light of the increased academic demands that college students face on weekdays compared to weekends, we expected that the time trade-off process would be different during these times of the week. More specifically, we expected that the strength of the time trade-off associations (i.e., hypotheses 2a and 2b) would be stronger on weekdays when academic demands are more intense than on weekends (*Hypothesis 2c*).

Method

Participants

Data for the current study came from the University Life Study, a longitudinal study that focused primarily on the alcohol use and sexual behaviors of students attending a large university in the Northeastern US (Patrick, Maggs, & Lefkowitz, 2014). The university from which the sample was drawn was a large land-grant university with a predominantly European American, non-Hispanic (80%) student population.

Information from the university registrar was used to identify students who were beginning their first year of college in the fall of 2007. A stratified random sampling procedure with replacement was used. The participant pool was stratified by race and gender with the goal of attaining similar

representation across the university's four largest racial/ethnic groups. To be eligible to participate in the study, first-year students had to live within 25 miles of the university, be 21 years of age or younger through the end of data collection in Semester 1, and be a U.S. citizen or permanent resident. Students were initially informed about the study via an informational letter that included a \$5 cash pre-incentive. A few days later, an email with an active hyperlink was sent to the students. Of selected participants, about 66% initially consented (via electronic signature) to participate in the study (Patrick, Maggs, & Osgood, 2010).

A measurement burst design (Sliwinski, 2008) was used, such that each semester students completed a longer survey as well as a burst of 14 daily diaries. This measurement burst design has long been promoted by scholars in human development, as it is ideally suited to capture within-person fluctuations, developmental change (within-person change over time), as well as individual differences between people (Nesselroade, 2001). In Semester 1, students ($n_{\text{baseline}} = 744$) completed a web-based semester survey and then 14 consecutive daily surveys. These students were followed longitudinally and this process was repeated for seven semesters. In the daily diaries (which took about 5-8 minutes each day), students reported on their activities on the prior day. The daily survey link was sent to students at about 4 am when most would be asleep. Thus, students reported on their previous day with the instructions that a "day" was from the time they woke up to the time they went to sleep. However, if they did not respond to the survey on the day when the link was sent, they could report the following day as well (i.e., up to two days after the diary day). Because the goal of the daily surveys was to capture typical college student life, they were timed to avoid final exam week and major student holidays (e.g., Thanksgiving and Spring Break). At Semester 1, students received \$20 for completing the semester survey and \$3 for each daily survey, with an \$8 bonus if they completed all 14 daily diaries. Payment increased slightly during the course of the study to maximize retention (Howard, Patrick, & Maggs, 2014).

Retention was good as 84% of the students who participated at Semester 1 were retained at Semester 7. The participants were followed longitudinally regardless of whether or not they stayed

enrolled at the university. Importantly, at Semester 7, over 86% of the students in the initial sample remained enrolled at the same institution and nearly all of the participants (> 96%) were enrolled in classes at either the sampled university or another university.

The current analytic sample excluded students missing information on demographic variables of interest and those with no information on daily employment, organized activities, and academic time, yielding a final sample of 726 students. These students completed an average of about 12.8 out of 14 daily diaries each semester. About half were female, and during their first semester students averaged about 18 years of age ($M = 18.44$, $sd = .429$). As a result of the sampling design, the analytic sample was more racially/ethnically diverse than the university from which it was drawn. For instance, 25.62% of the sample was Hispanic American, 15.84% was African American non-Hispanic (NH), 22.73% was Asian American NH, 27.27% was European American NH, and 8.54% was Multi-racial NH. A majority of students (71.63%) had a parent who had graduated from a four-year college. There was also missing data due to a planned skip pattern at the daily level. Because of conditional branching in the questionnaire designed to reduce respondent burden, students received the questions about organized activities only if they did not report engaging in oral or penetrative sex on that day. In general, students reported on their organized activity participation on about 97% of days, because sexual behaviors at the daily level were relatively uncommon. All time trade-off models (hypotheses 2a-2c), are limited to students ($n = 723$) who had daily data for employment, organized activities, and academics ($n = 38,463$ weekdays and 15,383 weekdays).

Measures

Academic time. In the daily diary, students chose an interval that best captured the amount of time they spent on academics on a given day. Academic time included going to class, studying, or doing other schoolwork. There were 10 time use intervals from which students chose: 0 minutes, < 30 minutes, 30-60 minutes, 1-2 hours, 2-3 hours, 3-4 hours, 4-6 hours, 6-8 hours, 8-10 hours, 10+ hours). For each day, students were assigned a score indicating the amount of hours at the midpoint of the response category (e.g., 1-2 hours was recoded to 1.5 hours). Days that students marked the highest category (2.36% of

days) were coded as 10 hours.

Employment time. Daily employment time was measured with a question that queried students about how much time they spent working for pay on a given day. Students chose from the same 10 response categories used to capture academic time. Responses were coded as with academic time, with the highest category of 10+ hours occurring on 0.27% of days.

Organized activity time. Students were queried daily about their involvement in 15 organized activities (e.g., a fraternity/sorority, cultural/ethnic organization, intramural athletics, military organization, honor society, religious organization, arts/music/media organization). For each activity, students chose the category that best captured the amount of time that they spent on the activity on a particular day. As with employment and academic time, 10 time use intervals were used and were coded at their midpoint. These activities were then summed to create a measure of total organized activity time on each day. The highest category was coded 16 hours (0.5% of days), to reflect the fact the multi-tasking is likely and because students sleep about 8 hours on average (Bureau of Labor Statistics, 2012a).

Age. Age was measured using a continuous variable of the student's age in months at the first semester survey.

Gender. Gender was dichotomized (1 = male, 0 = female).

Parental education. Parental educational background was measured with a dichotomous variable coded 1 if one or both of the students' parents graduated from college and coded 0 if neither parent graduated from college.

Race/Ethnicity. To obtain information about race and ethnicity, students were asked two questions developed by the National Institutes of Health. First, they were asked to identify their race (American Indian, Asian, Black or African American, Native Hawaiian/Pacific Islander, White or Other). Students were instructed to check more than one race if applicable. Subsequently, they were asked to identify whether they were Hispanic or Latino. These responses were coded into 5 mutually exclusive categories. All students who indicated Hispanic ethnicity were coded as "Hispanic" regardless of their responses to the question about race. Among those not reporting Hispanic ethnicity, students who

reported multiple races were coded as “multi-racial,” and Asians and Pacific Islanders were grouped together. Thus, the 5 categories used in the current study were Hispanic, African American NH, Asian American/Pacific Islander NH, European American NH, and Multi-racial NH. European American NH was chosen as the reference category for analysis because it is the largest racial/ethnic group in the US and at the university from which the sample was drawn.

Semester. Models include a control for the semester in school which ranged from 1 through 7. This variable was centered at Semester 4.

Analytical Plan

First, bivariate associations between productive activities and demographic characteristics were explored using t-tests for dichotomous predictors (i.e., gender, and parental education), ANOVAs with a Bonferroni correction for race/ethnicity, and correlations for the continuous predictor of age. These analyses were based on individual-level averages of data from all available days (i.e., all data points were collapsed to the person level). Next, in order to explore both within- and between-person variation in time use during college, multi-level models were used (Raudenbush & Bryk, 2002). Multi-level models were used because the data were nested (days [Level 1] nested within semesters [Level 2] nested within individuals [Level 3]) and unbalanced (i.e., many individuals had missing data on some days; they did not fill out all 98 possible daily diaries). Multi-level models account for the nestedness of the data and can handle missing data at Level 1 and thus the analyses used all available data (Raudenbush & Bryk, 2002). The models exploring predictors of time use included demographic indicators (i.e., age, gender, parental education and race/ethnicity), a linear time trend (i.e., the semester in school), and a quadratic time trend if statistically significant. A random slope for the linear time trend was tested based on the hypothesis that there would be individual differences in time allocation across college. The significance of random effects was determined by comparing the difference in the deviance statistic (or $-2 \cdot \log$ likelihood) which is chi-square distributed.

The second aim was to test the time trade-off hypothesis by exploring whether students' academic time varied depending on the amount of time they devoted to employment or organized activities.

Significant coefficients would indicate, for example, that when students spent more time on employment, they spent less (or more) time on academics. Indicators of employment and organized activities were included at all three levels in order to test the time trade-off hypothesis across days, semesters, and people. Daily coefficients tested, for example, whether students spent less time on academics on days they were employed more hours, compared to days that they were employed fewer hours. Semester coefficients tested whether students spent less time on academics in semesters when they were employed more hours, compared to semesters that they were employed fewer hours. Person-level coefficients tested whether people who averaged longer hours on employment (across all semesters) spent less time on academics than people who averaged fewer hours on employment. All of the models were calculated separately for weekdays (i.e., Monday – Friday) and weekend days (i.e., Saturday and Sunday) and we used the formula proposed by Clogg et al. (1995) to test whether these coefficients differed (Paternoster, Brame, Mazerolle, & Piquero, 1998). The equations used to explore whether students traded off academic time for other activities appears below. These equations correspond to the results in Table 2, Model 3.

$$(1) \quad \text{Academic Time}_{dij} = \pi_{0ij} + \pi_{1ij}(\text{Work Time}_{dij}) + \pi_{2ij}(\text{Organized Activity Time}_{dij}) + e_{dij}$$

$$(2) \quad \pi_{0ij} = \beta_{00j} + \beta_{01j}(\text{Semester Work Time}_{ij}) + \beta_{02j}(\text{Semester Organized Activity Time}_{ij}) + \beta_{03j}(\text{Semester}_{ij}) + \beta_{04j}(\text{Quadratic Semester}_{ij}) + r_{0ij}$$

$$(3) \quad \pi_{1ij} = \beta_{10j}$$

$$(4) \quad \pi_{2ij} = \beta_{20j}$$

$$(5) \quad \beta_{00j} = \gamma_{000} + \gamma_{001}(\text{Person-Mean Work Time}_j) + \gamma_{002}(\text{Person-Mean Organized Activity Time}_j) + \gamma_{003}(\text{Age}_j) + \gamma_{004}(\text{Gender}_j) + \gamma_{005}(\text{Parent Education}_j) + \gamma_{006}(\text{Hispanic American}_j) + \gamma_{007}(\text{African American NH}_j) + \gamma_{008}(\text{Asian American NH}_j) + \gamma_{009}(\text{Multi-racial American NH}_j) + u_{00j}$$

$$(6) \quad \beta_{01j} = \gamma_{010}$$

$$(7) \quad \beta_{02j} = \gamma_{020}$$

$$(8) \quad \beta_{03j} = \gamma_{030} + u_{03j}$$

$$(9) \quad \beta_{04j} = \gamma_{040}$$

Importantly, the amounts of time that an individual spent on employment and organized activities

were centered within individuals and within semesters. Thus, the amount of time spent on academics on a given day was modeled as a function of an individual's average academic time that semester (π_{0ij}) and the extent to which the amount of time that she spent on paid employment (π_{1ij}) and organized activities (π_{2ij}) on that day deviated from her average that semester. At the semester level, time spent on organized activities and employment were centered on the individual's mean across all occasions. This equation demonstrates that an individual's average academic time in a given semester was modeled as a function of her average academic time (across all occasions) (β_{00j}), the extent to which her time spent on paid employment (β_{01j}) and organized activities (β_{02j}) in that semester deviated from her average across all occasions, as well as a linear (β_{03j}) and quadratic (β_{04j}) indicator of her semester in college. In addition, an individual's average time spent on academics across all semesters (β_{00i}) was a function of her average time spent on work (γ_{001}) and on organized activities (γ_{002}) across all semesters as well as stable demographic characteristics (Level 3). A random intercept (u_{00j}) allowed the intercept to vary across people and a random coefficient for the linear time trend (u_{03j}) allowed the association between semester in school and academic time to vary across students.

Results

Descriptive Results

On average, students in the current sample spent 31 minutes on employment, 2 hours on organized activities, and slightly less than 3 hours (2 hours and 52 minutes) on academics per day. The results demonstrated that females spent more time on employment ($M = 37$ minutes) than males ($M = 25$ minutes), $t(724) = 4.08$, $p < .001$) and students whose parents did not attend college spent more time on employment ($M = 45$ minutes) than students who had one or more parent with a college degree ($M = 26$ minutes), $t(724) = 6.16$, $p < .001$. Differences were also documented by race/ethnicity, $F(4, 721) = 5.73$, $p < .001$). Follow-up tests demonstrated that African American NH students averaged more time on employment per day (46 minutes) than European American NH students (27 minutes), $p < .001$, Hispanic American students (31 minutes), $p < .05$, and Asian American NH students (25 minutes), $p < .001$.

Between-person differences in age were not associated with time spent on employment.

In terms of organized activity time, students with at least one parent with a college degree spent more time on organized activities ($M = 2$ hours and 10 minutes) than students whose parents had less than a college degree ($M = 1$ hour and 40 minutes), $t(724) = -3.57, p < .001$. Gender and race/ethnicity did not significantly predict the amount of time spent on organized activities.

There were also significant between-person associations with time spent on academics. Female students spent more time on schoolwork ($M = 3$ hours and 11 minutes) than male students ($M = 2$ hours and 32 minutes), $t(724) = 6.64, p < .001$. Racial groups also differed on their time devoted to academics, $F(4, 721) = 5.44, p < .001$. Follow-up tests showed that Asian American NH students studied more ($M = 3$ hours and 11 minutes) than Hispanic American students (2 hours and 43 minutes), $p < .01$ and African American NH students ($M = 2$ hours and 31 minutes), $p < .001$. Furthermore, European American NH students ($M = 2$ hours and 58 minutes) studied more than African American NH students, $p < .05$. Mean differences in academic time were not found for age or parental education.

Multi-level Models Examining Demographic Predictors of Productive Time Use

Next, we explored demographic predictors of productive time use using a multivariate multi-level approach that controlled for other demographic variables as well as changes across semesters.

Demographic predictors of time use were similar regardless of whether the day was a weekday or weekend; Table 1 presents combined models including a control for whether the day was a weekday or not. The first column of Table 1 presents associations between demographic factors and employment time. Even when controlling for other relevant demographic covariates, female students worked more on average than male students and students who had a parent with a bachelor's degree spent less time on employment than students whose parents had less education. In addition, African American NH students spent more time on employment than European American NH students, independent of other demographic factors such as parental education. In contrast to expectations (i.e., *Hypothesis 1a*) between-person differences in age were not a significant predictor of employment time. The results focusing on demographic predictors of organized activity time are presented in column 2 of Table 1. Although we had

expected age and parental education to predict organized activity time (*Hypothesis 1b*), only parental education was associated significantly. Students who had one or more parents who graduated from college spent more time on organized activities than students whose parents had less education, controlling for other demographic variables. Finally, Table 1, Column 3 presents demographic correlates of academics (corresponding to *Hypothesis 1c*). Female students spent more time on academics than male students and Asian American NH students spent more time on academics than European American NH students. European American NH students, in turn, spent more time on academics than African American NH students. Neither parental education nor age was associated with time spent on academics.

Testing the Time Trade-off Hypothesis: Linking Employment and Organized Activities to Academic Time

Table 2 presents the results from analyses that examined how employment time and time spent on organized activities related to academic time across days, semesters, and people. Beginning with Model 1, on days and in semesters when students spent more time on employment, they spent less time on academics, supporting Hypothesis 2a. These associations were documented for both weekdays and weekends. However, in line with Hypothesis 2c, the association was stronger for weekdays than weekends at both the daily ($z = -9.56, p < .001$) and semester ($z = 4.17, p < .001$) levels. On weekdays, spending an hour more than average on employment on a given day was associated with spending 10 minutes less (-.16 hours) on academics whereas spending an hour more than average on employment on weekends was only associated with a 2 minute decrease in academic time. At the person level, students who averaged more time on employment on weekends averaged less time on academics.

Model 2 presents associations between organized activity time and academic time. These results supported Hypothesis 2b and demonstrated that on days when students spent more time on organized activities, they spent less time on academics. However, in contrast to predictions (Hypothesis 2c), this association was similar for both weekdays and weekends ($z = -.85, n.s.$). In addition, organized activity time did not predict the amount of time spent on academics at the semester level. That is, the extent to which students spent more or less time on organized activities in a given semester was not related to the

amount of time that they devoted to academics in that semester. There was a non-significant trend suggesting that people who averaged more time on organized activities also averaged more academic time.

Model 3 presents a combined model in which both employment and organized activities predict academic time. The substantive results are quite similar to the information presented in Models 1 and 2. On days when students spent more time on employment and organized activities, they spent less time on academics. Likewise, on semesters when they spent more time than average on employment, they spent less time on academics. However, it is worth mentioning that the strength of the coefficients at the daily level differed for the two activities on weekdays. On weekdays, but not weekends, the association between employment and academics was stronger than the association between organized activities and academics ($B = -.16$ vs. $-.05$, $z = -10.7$, $p < .001$).

Discussion

The amount of time that college students devote to employment and leisure has increased over the past 40 years (Babcock & Marks, 2010), highlighting the importance of exploring time spent on these domains. Although a large body of research has examined adolescent and young adult time use, much of it has been cross-sectional, and thus producing static snapshots of time use. The current study explored the correlates of time spent on productive activities using repeated daily surveys across semesters, thus providing a dynamic picture of how time use is allocated within persons across multiple days and semesters among a sample of contemporary college students. Our study documented several key student demographic characteristics associated with employment, organized activities, and academic time. In addition, we explored the circumstances under which students traded off academic time for nonacademic activities. The results provided evidence for the time trade-off hypothesis, but were conditional on the day of the week and the type of activity. The strongest (inverse) association with academics was documented for employment on weekdays.

Demographic Correlates of Time Use

The first aim of the study was to understand how students from different demographic groups allocated their time. Despite the single university sample, which might be expected to minimize group differences, our results point to the importance of background factors in shaping everyday time use. First, the results demonstrated marked differences by gender. On an average day, female students spent 38 more minutes per day on academics than male students, meaning that over the course of a week, female students spent about 4.5 more hours on schoolwork than male students. These results correspond to a large body of research demonstrating that female students study more than male students during high school (Wight et al., 2009) and college (Mortenson, 2011). Interestingly, our results also demonstrated that females spent more time on employment than males. In general, students in the current sample worked substantially less than students nationally (Mortenson, 2011), and thus the gender difference in employment time (of 12 minutes per day) was smaller than the gender difference in schoolwork. However, the discrepancy in employment hours is in line with national estimates suggesting that young females were more likely to be employed than young males during the years of the study (Bureau of Labor Statistics, 2012b).

There were also clear differences by parental education. Students with a college-educated parent spent less time in paid employment and more time in organized activities than students without a college-educated parent. Previous research has demonstrated clear differences in daily activities by socioeconomic status (Wight et al., 2009). Although we do not know the reason for the discrepant time use, it may be that time devoted to organized activities results from particular socialization experiences during childhood and adolescence. Ethnographic research by Lareau (2003) suggests that intensive involvement in organized activities is a hallmark of growing up in higher socioeconomic families in the US. The college students in our sample who had more educated parents may have internalized these preferences and chosen to spend a substantial amount of their time on organized activities. Another possibility is that the time use disparities arose from differential access or financial constraints between the two groups. Students whose parents did not attend college may have had less information about how to navigate college or to get involved in clubs or organizations. Furthermore, students whose parents had

less education worked substantially more than students who had a parent who graduated from college. Devoting more time to employment may be a response to greater financial need and less financial support from parents among this less advantaged group.

As with parental education, race/ethnicity also mattered. Asian American NH students spent the most time on academics and African American NH students spent the least time on academics in the current sample. Previous research demonstrates that Asian American college students spend more time on educational activities than any other racial/ethnic group (Mortenson, 2011), perhaps due to the high educational expectations among Asian American families and youth in the US (Goyette & Xie, 1999). At the same time, African American students spent the most time on employment. Again, we can only speculate about the reasons for these racial/ethnic differences. One possibility is that African American NH families are more disadvantaged in terms of socioeconomic status. Unlisted results from our sample showed that parental education was lowest among African American NH students. Given that African American families in the US have lower incomes and less financial resources than European American families (Bureau of Labor Statistics, 2008), it is possible that the documented racial/ethnic differences in time use are actually due to differences in income or wealth. We did not collect information about parental income or assets, therefore, we could not isolate the effect of financial resources from race/ethnicity or parental education in the current study. Nonetheless, these results linking race/ethnicity to everyday time use suggest that the daily experience of college may differ dramatically for students belonging to different racial/ethnic groups.

Taken together, these results demonstrate diverse patterns in time allocation and suggest that certain demographic groups may experience additional time demands (e.g., employment). Although between-person differences in age were not associated with employment, organized activities, or academics, this is likely due to the restricted range in the current sample: Only traditional-aged students who were first-time, first-year students and under 21 during their 1st semester of college were eligible to participate in the current study, leading to a standard deviation at semester 1 of only 5 months. Had the

sample included a broader age range, including those with spouses and children, it is possible that differences in time use would have been more apparent.

Support for the Time Trade-off Hypothesis

Another goal of the present study was to test the time trade-off hypothesis, or the idea that increasing time in one productive activity would necessarily result in less time available for other productive activities. Importantly, by disentangling between-person associations from within-person associations across days and semesters, our approach reduces concerns related to between-person selection effects and thus our study provides a more rigorous test of the time trade-off process. The results supported the time trade-off hypothesis with regard to employment: on days when students spent more time than average on employment, they spent less time on academics. Similarly, during semesters when students spent more time than average on employment, they spent less time than average on academics. Negative associations were documented on weekdays and weekends. These consistent findings across days of the week and multiple time frames suggest that students may trade off academic time when they devote more time to employment. Our results across days and semesters are in line with previous work demonstrating that adolescents who are employed for longer hours spend less time on academics than students who work fewer hours (Kalenkoski & Pabilonia, 2012; Safron et al., 2001)

These results raise questions about how adolescents and young adult students should spend their time, and the harm or the benefit that may result when students trade off academic time for employment. On the one hand, test scores and grades may depend on class attendance (Crede et al., 2010) and study time (Diseth, Pallesen, Brunborg, & Larsen, 2010), suggesting that these educational activities matter for success in college. On the other hand, in the current study students were not trading off an hour of academic time for an hour of work time. Rather, when students spent an hour more than average on employment on weekdays, they spent 10 minutes less than average on academics. One interpretation is that this may be a reasonable trade-off. Many students work out of necessity to support their living and educational expenses and employment fulfills the need for a paycheck. Furthermore, adolescent employment can help to build skills, expand social networks, and establish a relevant work history

(Mortimer, 2003) and college student employment has been linked to positive outcomes such as labor market earnings (Gleason, 1993). Thus, the trade-off of work for academics may or may not be detrimental. Of course, time use is only an indicator of the socialization experiences afforded by a particular activity (Larson & Verma, 1999). In order to make definitive statements about whether a particular trade-off is truly beneficial or detrimental, researchers need to know the amount of time spent on an activity as well as the skills and relationships that are being developed by the activity. These are likely to differ greatly by work setting. For example, a work-study position in a medical research lab may provide academically-relevant skills and learning that a service industry fast-food position does not.

For organized activities, our results provided less support for the time trade-off perspective. Organized activities and academics were related negatively at the daily level, on both weekdays and weekends. As with employment, on days when students spent more time on organized activities, they spent less time on academics. However, there was no significant association between organized activity time and academic time across semesters. The lack of a semester-level association suggests that the negative association at the daily level may not represent “crowd out” *per se*, but rather that students may balance their organized activities and academics across days. That is, students may compensate by spending more time on organized activities *on other days* when they are devoting less time to academics. This finding corresponds to prior research among high school students demonstrating that high achieving students can successfully balance time studying and time with friends by spending more time with friends on the weekend (Witkow, 2009) when they have fewer academic obligations. In the current sample, higher involvement in organized activities in a given semester was not related to academic time in that semester providing some evidence that students can balance academics with involvement in clubs and organizations during college. This null finding may be considered good news for the field of higher education and proponents of “student involvement” (Astin, 1984) who have long argued that productive activities both inside and outside the classroom facilitate student learning and development during college (Kuh, 1995)

The different patterns documented between organized activities and employment may result from unique characteristics of each activity. Students may have more control over their organized activity time (meetings, rehearsals, etc.) than they do over their employment schedules. Thus, employment may interfere with other important activities (such as academics), but organized activities may not. Of course, the current data cannot determine whether employment actually reduces time spent on academics or whether the direction of causality is reversed – that is, that students increase their time in paid employment during semesters with easier academic demands. Nonetheless, previous research has demonstrated that some employed students feel as though work interferes with their schoolwork (National Survey of Student Engagement, 2012). Future studies could explore which students are most likely to reduce their academic time in response to pressure from nonacademic activities. In particular, it may be that students who are more motivated academically protect their academic time, and thus fluctuations in employment are not associated with fluctuations in academic time for this group of students. In contrast, students who are less motivated academically might be more inclined to trade off academic time. Furthermore, qualitative research exploring student perceptions of the time trade-off, including which activities are perceived to be most detrimental (or beneficial) for academic time would be interesting. Because the current data lack information about academic motivations and time use perceptions, these are fruitful questions for future research.

Another important finding was that, for employment, the degree of trade-off with academic time depended on the day of the week. As predicted, associations were stronger for weekdays than weekends. This difference may have occurred because students have many more academic obligations during the week than on the weekend, and thus employment during the week may be more likely to interfere with studying or class attendance. Although we expected that associations between organized activities and academics would also depend on day of the week, that hypothesis was not supported. Organized activities were associated with slightly less time on academics on both weekdays and weekends. Perhaps (as discussed above), the nature of organized activities is responsible for this finding. Regardless of the day of the week, students can schedule meetings or practices on days that they have more time. Another

possibility is that when students spend more time on organized activities, they may trade off other activities that were not explored in the current analyses. For instance, it is possible that students are sacrificing sleep when they spend more time on organized activities, a finding that might be more likely on weekdays than weekends. Previous research has demonstrated that students sleep less on days that they study more (Galambos et al., 2009), and thus future research could explore whether other activities (e.g., sleep, exercise) are associated with time spent on employment and organized activities.

Importantly, all results from the current study should be interpreted with the particular university context in mind. The current sample of students all attended a large 4-year land grant university in the Northeast of the US. The student body is predominantly European-American NH and many students are relatively advantaged, as indicated by the high proportion of students who had at least one parent who graduated from college. Furthermore, the 6-year graduation rate (85%) is higher than the national average. Although this school may be similar in many respects to other large public universities, it certainly does not capture the diversity of higher educational institutions in the US. In particular, students attending community colleges or commuter universities likely face unique time use demands and therefore may manage their time differently than students in the current sample. Furthermore, we sampled only traditional-aged college students. Thus, the unique experiences and challenges of nontraditional students cannot be explored in the current study. Given the unique college context, the extent to which the results generalize to other student populations is unknown.

Limitations

In addition to the unique sample, other limitations are worth noting. Daily time use was assessed in categories (e.g., 1-2 hours) rather than minutes, reducing precision. Most daily diary studies that examine time use allow students to report the exact amount of time that they spent on an activity (e.g., Gillen-O'Neel et al., 2013). However, national surveys of adolescents, including Add Health (Harris et al., 2013) and Monitoring the Future (Johnston, Bachman, & O'Malley, 2013) often collect activity data in categories demonstrating that, although not ideal, this measurement strategy is common.

Furthermore, our aim was to understand the everyday life of college students, and thus the 14-day diaries were scheduled to avoid conflicting with breaks or final exam week. However, time use (and the presence or absence of the time trade-off) may be vastly different during those breaks or exam periods, which are topics that merit additional research in their own right.

Conclusion

Time use is an important indicator of the socialization experiences of an adolescent (Larsen & Verma, 1999) that predicts diverse outcomes including risky behaviors, academic achievement and labor market success. The transition from high school to college gives adolescents more control over how to spend their time, making it a particularly important period in which to study time use. Recognizing this, the current study explored time spent on employment, organized activities, and academics among a sample of students attending a college in the Northeast. We contributed to the literature by using a measurement burst design (Sliwinski, 2008), which is rarely used in the time use literature, but has been long advocated by developmental scholars. Rather than just providing a snapshot of time use like other studies (Wight et al., 2009), this design provided a nuanced understanding of the daily activities of college students across 7 semesters. The results highlighted how gender and family background characteristics shaped time spent on employment, organized activities, and academics. Furthermore, our study made an important theoretical contribution to the study of adolescence by testing the time trade-off hypothesis (Safron et al., 2001). Our results documenting the association between academics and employment provided compelling support for the time trade-off hypothesis. Yet, the time trade-off was not universal, as evidenced by the results for organized activities. These findings paint a complex picture of how and when students trade off academics for nonacademic activities and point to the importance of understanding how students combine activities across multiple time scales (e.g., days and semesters). Given that the college years are a time of increased autonomy in which students begin establishing adult behavior patterns, it is important that students learn to navigate various time demands in order to maximize their wellbeing. Discovering how to balance work and leisure demands and goals are important life skills that will benefit students as they move through adulthood.

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Table 1. Multi-level Models Predicting Employment, Organized Activities, and Academics

	Employment			Organized Activities		Academics	
	B	(se)		B	(se)	B	(se)
<i>Fixed Effects</i>							
Age	0.08	(0.05)	+	-0.08	(0.15)	0.01	(0.11)
Male	-0.12	(0.04)	**	0.06	(0.12)	-0.68	(0.09) ***
Parent Education	-0.26	(0.04)	***	0.46	(0.14) ***	0.13	(0.10)
Race/Ethnicity							
European American NH (reference)	--			--		--	
African American NH	0.26	(0.07)	***	-0.11	(0.20)	-0.39	(0.15) **
Hispanic American	-0.03	(0.05)		-0.22	(0.17)	-0.19	(0.12)
Asian American NH	0.01	(0.06)		-0.22	(0.17)	0.32	(0.13) *
Multi-racial American NH	0.07	(0.08)		0.17	(0.24)	-0.18	(0.18)
Constant	-0.69	(0.88)		3.28	(2.71)	3.57	(2.00) +
<i>Random Effects</i>							
Variance Semesters slope	0.02	(0.00)		0.09	(0.01)	0.04	(0.00)
Level 3 Variance	0.35	(0.03)		2.37	(0.14)	1.44	(0.09)
Covariance (Semester, Intercept)	0.09	(0.01)		0.07	(0.03)	0.10	(0.01)
Level 2 Variance	0.44	(0.01)		1.29	(0.04)	0.53	(0.02)
Level 1 Variance	1.63	(0.01)		3.36	(0.02)	3.53	(0.02)
Deviance (-2*LL)	193453.05			229817.39		236486.22	

Notes: Models also control for whether the day was a weekday or weekend and semester in school. NH = non-Hispanic.

$N_{\text{employment}} = 726$ people, 4364 semesters, and 55888 days.

$N_{\text{organized activities}} = 726$ people, 4334 semesters, and 54351 days.

$N_{\text{academics}} = 726$ people, 4366 semesters, and 56030 days.

+ $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table 2. Multi-level Models Predicting Academic Time with Employment and Organized Activities

	Model 1				Model 2				Model 3			
	Weekday		Weekend		Weekday		Weekend		Weekday		Weekend	
	B	(se)	B	(se)	B	(se)	B	(se)	B	(se)	B	(se)
<i>Fixed Effects</i>												
Daily Employment	-0.16	(0.01) ***	-0.03	(0.01) *					-0.16	(0.01) ***	-0.03	(0.01) **
Semester Employment	-0.22	(0.02) ***	-0.08	(0.02) ***					-0.22	(0.02) ***	-0.08	(0.02) ***
Average Employment	-0.06	(0.08)	-0.17	(0.07) *					-0.04	(0.08)	-0.16	(0.07) *
Daily Organized Activities					-0.05	(0.01) ***	-0.04	(0.01) ***	-0.05	(0.01) ***	-0.04	(0.01) ***
Semester Organized Activities					0.01	(0.01)	0.00	(0.01)	0.00	(0.01)	0.00	(0.01)
Average Organized Activities					0.06	(0.03) +	0.03	(0.03)	0.06	(0.03) +	0.02	(0.03)
Constant	4.67	(2.27) *	-0.62	(1.79)	4.50	(2.28) *	-0.70	(1.80)	4.44	(2.26) *	-0.63	(1.79)
<i>Random Effects</i>												
Variance Semester Slope	0.05	(0.01)	0.02	(0.00)	0.05	(0.01)	0.02	(0.00)	0.05	(0.01)	0.02	(0.00)
Variance Level 3	1.79	(0.11)	0.93	(0.06)	1.82	(0.11)	0.95	(0.06)	1.78	(0.11)	0.93	(0.06)
Covariance (Semester, Intercept)	0.12	(0.02)	0.04	(0.01)	0.13	(0.02)	0.04	(0.01)	0.12	(0.02)	0.04	(0.01)
Level 2 Variance	0.70	(0.03)	0.35	(0.03)	0.73	(0.03)	0.35	(0.03)	0.70	(0.03)	0.34	(0.03)
Level 1 Variance	3.41	(0.03)	2.99	(0.04)	3.44	(0.03)	2.99	(0.04)	3.40	(0.03)	2.99	(0.04)
Deviance (-2*LL)	162841.34		63375.55		163243.65		63365.36		162758.65		63335.27	

Notes: N_{days} is 38463 for weekdays and 15383 for weekends.

Models control for age, gender, race/ethnicity, parental education and semester in school.

+ $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$