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Over-Scheduled or at Loose Ends?

The Shifting Balance of Adolescent Time Use

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Subject: Adolescents
Key Words: adolescent time use, adolescent wages, leisure

ABSTRACT

Little is known about the time use of American youth. In this study, time diary data from 1977-78 and 2003-05 are used to investigate time use in middle adolescence with the goals of ascertaining (1) changes in time use, (2) how socioeconomic and familial factors influence adolescent time allocation, and (3) the extent to which the mix of leisure undertaken by today's adolescents reflect a choice set that favors positive developmental experiences. The results suggest that over the past few decades, adolescents have substantially reduced their paid employment time while simultaneously increasing the time they spend in leisure. Adolescents' declining real wage rates appear to have contributed to this shift. In 2003-05, adolescents averaged over six hours per day in leisure activities with approximately two-thirds of their leisure time spent in passive activities and less than one-third spent in leisure pursuits that have a high probability of promoting personal growth.

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Abstract

Little is known about the time use of American youth. In this study, time diary data from 1977-78 and 2003-05 are used to investigate time use in middle adolescence with the goals of ascertaining (1) changes in time use, (2) how socioeconomic and familial factors influence adolescent time allocation, and (3) the extent to which the mix of leisure undertaken by today's adolescents reflect a choice set that favors positive developmental experiences. The results suggest that over the past few decades, adolescents have substantially reduced their paid employment time while simultaneously increasing the time they spend in leisure. Adolescents' declining real wage rates appear to have contributed to this shift. In 2003-05, adolescents averaged over six hours per day in leisure activities with approximately two-thirds of their leisure time spent in passive activities and less than one-third spent in leisure pursuits that have a high probability of promoting personal growth.

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Adolescence is a period where choices about time use can provide important developmental experiences that in turn affect an individual's ease of transition into adult roles. Experiences that promote challenge, concentration, and motivation are seen as developmentally enriching while those that involve repetitive activities with little challenge are seen as less developmentally advantageous (Larson, 2001). Despite its potential importance, we know little about the overall patterns of American youth's time allocation choices and the factors that may influence them. In this paper, time diary data on youth aged 15-17 gathered in 1977-78 and 2003-05 are used to create portraits of time use in middle adolescence with a focus on answering three questions. First, what does American adolescents' time use look like and to what extent has it changed over the past quarter century? Second, what roles do socio-economic factors (e.g., adolescent wage rates, household income, parents' education levels) play in adolescent time allocation and have these relationships changed over time? Finally, to what extent does the mix of leisure undertaken by today's adolescents reflect a choice set that favors positive developmental experiences?

THE LITERATAURE

Researchers focusing on American adolescents' time use lament the paucity of time spent doing homework (Campbell, Hombo, and Mazzeo, 2000; Zill, Nord, and Loomis, 1995). Others raise concerns about the level of adolescents' physical activity (Gordon-Larsen, McMurray, and Popkin, 2000; Gordon-Larsen, Nelson, and Popkin, 2004), the excessive amounts of time spent watching tv and playing computer games (Krosnick, Anand, and Hartl, 2003; Pate, Heath, Dowda, and Trost, 1996; Page and Hammermeister, 1996), and/or the gender stereotyping of

housework (Lawrence, Tasker, and Morton, 1983; Bryant and Zick, 2006). Typically, such studies focus on one or two selected types of time use (Herz and Kosanovich, 2000; Tepper, 2001; Zick and Allen, 1996; Zill, Nord, and Loomis, 1995). To date, investigations of the full range of American adolescents' time have been confined to cross-sectional, descriptive studies[1] (Robinson and Godbey, 1997; Raley, 2006).

Absent from the literature is a full accounting of time use in adolescence, how it has shifted across time, and any examination of the role that economic factors may be playing in

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[1]Multivariate analyses that make use of nationally representative data on a full range of activities in other countries have been undertaken in recent years. See Zuzanek and Mannell (2005) for a collection of such work. Zill Nord and Loomis (1995) examine changes over time in American adolescents' time use but only for a selected subset of activities.

such shifts. Yet, there have been dramatic shifts in the employment environment faced by adolescents. Analyses of the 1978-1998 Current Population Surveys by Herz and Kosanovich (2000) reveal that approximately 44% of youth age 15-17 were employed in the summer of 1978 but this figure dropped to 35% by the summer of 1998. At the same time, the average hours worked per week by employed youth during the summer dropped from 27 to 24. Employment rates during the school year declined from 30% to 25% over this same period but hours worked per week during the school year held steady at about 17 hours per week. If paid employment consists primarily of repetitive, unchallenging tasks, then this employment decline may be a good thing from a developmental standpoint (Larson, 2001). But, if more time in employment squeezes out repetitive, unchallenging types of leisure, such as television viewing (Schoenhals, Tienda, and Schneider, 1998), then this shift away from paid employment may be reason for concern.

To what extent are adolescents' choices about paid employment time affected by wage rates and family income? If wage rates and family income are associated with adolescent paid employment time, are they also associated with time spent in school work, housework, organized activities, and leisure? And, have these relationships changed over the past quarter century?

METHODS

The Framework

Adolescents make decisions about how to allocate their time among a variety of activities. School work, housework, paid employment, organizationally-based activities, personal care, and leisure all compete for an adolescents' attention. For instance, on a Saturday

morning, a youth may decide between attending a civic club meeting (organizational activity), linking up with friends at the mall (leisure), babysitting for a neighbor (paid employment), mowing the lawn (housework), doing homework (school work), or sleeping in until noon (personal care). While these are broad categories of time, they capture some of the choices that adolescents are making with respect to activities that are more or less likely to be developmentally enriching. On a continuum that measures the developmental potential of an activity, school work and organizational activities are typically viewed as having more of these attributes. In contrast, paid employment and housework more likely provide varied levels of challenge, concentration, and motivation. Finally, leisure and personal care typically consist of activities that would rank low on the developmental potential continuum.[2]

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[2] Certainly there are leisure pursuits – such as playing a musical instrument or reading a good book – that require concentration, motivate, and challenge youth. The topology used here

simply reflects the fact that adolescent leisure time is less likely to involve these

developmentally enriching activities than are some other broad categories of time use.

The multivariate analyses that follow are grounded in the economic model of time allocation developed by Becker (1965, 1991). Within the limits parents impose on their children, teens are viewed as allocating their resources of time and income among various activities so as to maximize their welfare subject to resource constraints. From this constrained maximization exercise, demand functions can be written for the times of an individual in each of the activities. These demand functions represent the time spent by an adolescent in a particular activity (e.g., leisure) as a function of the price of that individual's time (e.g., his/her wage rate), the prices of goods and services used in the activities (e.g., the price of a movie ticket), the family's income, the determinants of the underlying technology pertinent to each activity (e.g., ownership of a car), and the individual's preferences (e.g., the value s/he places on spending time at the movies relative to spending time doing homework). As such, demand equations are predicated on the assumption that individuals allocate their time and money resources so as to gain the greatest satisfaction possible given the limitations in their immediate family environment (e.g.,family size) and the larger environment (e.g., prices, wages).

Parental influence on teen choice operates either through their preferences (e.g., emphasizing the importance of completing homework in a timely fashion) or through the imposition of constraints (e.g., refusing to purchase a second car so that the adolescent with a driver license is not dependent on his/her parents for transportation). Thus, in this application, the standard model is expanded to include salient characteristics of the parents, such as their education levels, that may exert an influence on the youth's time allocation.

The Data

Data from two unique time diary studies are used to provide insights into time use in middle adolescence.[3] The first is a 1977-78 time diary survey entitled, *Family Time Use: An Eleven-State Urban/Rural Comparison* Survey (FTUS). The eleven states included in the 1977-78 survey are California, Connecticut, Louisiana, New York, North Carolina, Oklahoma, Oregon, Texas, Utah, Virginia, and Wisconsin. All families in this survey were two-parent, two-child families. These families were classified by age of youngest child (less than one year, one year, two to five years, six to eleven years, and twelve to seventeen years) and equal numbers of families were sampled in each category. Interviews and time diaries were gathered over all seven days of the week and all four seasons of the year to insure balanced seasonal and day of the week representation (Sinclair and Lewis, 2002; Walker, 1983).

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[3] Time diaries are generally considered to be more valid and reliable measures of time use (Bianchi, Robinson, and Milkie, 2006; Robinson, 1985) than are recall questions of the type used by Tepper (2001) and Zill, Nord, and Loomis (1995).

Two 24-hour time diaries were gathered on all family members age 6 and older in the FTUS. One of these diaries was recorded using retrospective questions about time use over the preceding 24 hours. The other diary was gathered using prospective recording of time over the subsequent 24 hours. The current analysis uses only the retrospective diaries in order to maintain consistency with the second time diary survey. In addition, there are 61 families in this data set where both siblings are age 15-17. In those cases, one randomly selected sibling has been dropped from the data set so as to eliminate the need to control for family-specific effects in the estimation. This leaves a total of 471 adolescents age 15-17 who are included in the current analyses.

The second time diary data set is the 2003-2005 merged files of *The American Time Use Survey* (ATUS) (U.S. Bureau of Labor Statistics, 2006). The ATUS is the first annual American time-diary survey conducted by the U.S. Bureau of Labor Statistics. Each year a sample is drawn from those households that have completed the final interview for the Current Population Survey. The ATUS respondent is randomly selected from among each household's members who are age 15 or older. Respondents are asked a series of questions that focus on household composition, employment status, etcetera. They are also asked to complete one 24-hour time diary using retrospective recording methods (similar to those used in the FTUS). Half of the respondents complete a diary for a weekday and half of the respondents complete a diary for a weekend day. To make the ATUS sample comparable to the FTUS sample, the ATUS sample is initially restricted to respondents, age 15-17 living in two-parent, two-child households in the analyses that are used to make direct comparisons to the FTUS. The two-parent, two-child sample size is 562 adolescents. In subsequent analyses, restrictions on the mother's marital

status and the respondent's number of siblings are relaxed. For these analyses, the sample size is 2,517.

Measurement of the Variables

The FTUS diaries include 19 categories of time use. The ATUS diaries are much more detailed with over 400 diary activity codes. Harmonization of the two types of diaries is done by recoding all activities in both data sets to six common domains: personal care (e.g., sleeping, dressing, bathing, eating), housework (including unpaid care of other children), paid work, school work (time spent in school and doing homework outside of school), organizationally-related time (e.g., scouts, church), and all residual leisure (e.g., television viewing, computer time unrelated to homework, hanging out with friends, talking on the phone, playing sports, reading for pleasure). Time spent in each of these six activities is recorded in minutes over the course of the diary day.

Measures of family income are limited in both data sets as the surveys asked about family income in very broad categories. These categories are re-coded to their midpoints with the imputation method suggested by Miller (1966) used for the open-ended category. In those cases where family income is missing, a mean imputation strategy is used. Total family income in the FTUS is then adjusted to 2004 dollars using the Social Security Average Wage Index (2006).

Hourly wage information is limited to those respondents who were working for pay at the time of the surveys. This creates a problem as wage information is missing for all individuals who were not employed. The solution used here is one developed by Heckman (1979). The Heckman approach produces unbiased estimates of market wages for all respondents using a

two-step estimation procedure. This procedure involves first estimating a labor force participation equation, generating a selection bias correction factor based on the labor force participation estimates, and including this factor in the estimation of a wage equation that makes use of only those respondents who are employed. Heckman (1979) demonstrates that the resulting parameter estimates are unbiased and can be used to generate predicted wage rates for both employed and nonemployed individuals.

Data from respondents age 16-18 in the 1978 and 2005 March Supplements to the Current Population Survey (CPS) are used to estimate the labor force participation equations and the associated wage equations that correct for sample selection bias.[4] CPS data are used rather than the FTUS and ATUS data because its larger sample sizes improve statistical efficiency and because the CPS contains potentially important variables for the labor force participation equation that are not available in the FTUS and ATUS data sets (e.g., nonwage income, home ownership). The parameter estimates for the CPS equations appear in Appendix Table A1. After using these parameter estimates to generate predicted wage rates for all respondents in the

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[4] In the CPS, respondents report on their wage rates and typically weekly work hours for the preceding year. Thus, respondents who were 16-18 at the time of the survey are reporting on their employment and wages when they were 15-17.

FTUS and ATUS samples, the predicted wages in the FTUS sample are then adjusted to 2004

dollars using the Social Security Average Wage Index (2006).

Parental influences on adolescent time use are captured by two measures: mother's

education level[5] and mother's employment status. Highly educated parents (as proxied by the

mother's education level) are hypothesized to be more likely than less educated parents to instill

preferences and/or impose constraints that encourage adolescents to spend more time in

developmentally enriching activities. Since virtually all fathers in the FTUS and ATUS samples

of two-parent, two-child families are employed, mother's employment status is used as a

measure of potential parental supervision. It is posited that when the mother is not employed,

there will be greater parental supervision and consequently more youth time devoted to

potentially enriching activities, compared to those families where the mother is employed.

Three measures of structural factors are included in the multivariate model. The first is a

dummy variable that measures whether or not the diary day was a weekend day.[6] Typically,

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[5] In both surveys, mother's and father's education level are highly correlated precluding

the possibility of including both as independent variables in the estimating equations.

[6]The 2003-05 data allow for the identification of weekday holidays but the 1977-78 data

does not. Comparisons of the multivariate results for 2003-05 using a coding scheme that groups

holidays with weekend days with the simpler version that separates weekdays from weekend

days revealed no substantive differences in the findings. Thus, to insure comparability with the

1977-78 measure, the results presented here use the weekend/weekday dummy for the 2003-05

weekend days present relatively more opportunities to engage in leisure-related and organizationally-related activities. In contrast, weekdays typically involve a greater commitment to school-related activities. The second dummy variable captures whether or not the diary came from a summer day. Seasonal variations in weather have clear implications for time use that are controlled for by including this variable among the regressors. Finally, gender of the respondent is controlled for with a dummy variable.

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estimates.

Adolescent time use preferences may also be impacted by family structure, the presence or absence of siblings, ages of siblings, and the adolescent's age. These potential influences are held constant in the first set of multivariate analyses by means of the sample selection criteria that are imposed on the ATUS and FTUS data sets to insure respondent comparability.[7] In addition, it may be that time use preferences vary by race/ethnicity. Unfortunately, race/ethnicity data were not gathered as part of the FTUS and therefore, no race/ethnicity

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[7] Recall that ATUS respondents must be age 15 or older but can reside in any household type. In contrast, the FTUS sampling frame was restricted to two-parent, two-child families where both children were under the age of 18. Thus, to insure comparability across the two time diary surveys, 15-17 year-olds who reside in two-parent, two-child households are selected from the ATUS to be included in the current analyses. Correspondingly, since the ATUS only surveys individuals age 15 and older, adolescents under the age of 15 are excluded from the FTUS sample used in the current analyses.

variables could be included in the comparative analyses. Subsequently, analyses done with an expanded ATUS sample include controls for parental marital status, number of siblings, and race/ethnicity. The results of these multivariate analyses provide some insights about the extent to which the trend analysis is affected by the imposition of the two-parent, two-child sample restriction.

THE RESULTS

Descriptive Findings

Table 1 presents weighted descriptive statistics on the FTUS and ATUS samples' socio-economic and structural characteristics. Recall that both of these samples contain only two-parent, two-child families. Not suprisingly, the samples are quite similar with three exceptions. First, the teens' mean predicted real wage rate is approximately two dollars per hour lower in 2003-05 than it is in 1977-78. Second, median family income in real terms is substantially lower in 2003-05 compared to 1977-78. Finally, the mothers' labor force participation rates are markedly higher in the 2003-05 sample compared to the 1977-78 sample. These wage rate and labor force participation figures for two-parent, two-child families are consistent with more general historical trends. In contrast, the U.S. Census Bureau's (2007) figures on income trends for all family types, show upward gains in median family income over this historical period. The family income trends depicted in Table 1 may reflect a real income decline for this particular family type (i.e., two-parent, two-child families), sampling differences across the two surveys, and/or the measurement error inherent in the broad income categories that were used to gather the family income data.

[Table 1 Here]

Tables 2 contains the weighted mean minutes per day, the percent spending any time, and the non-zero mean time for the six activity categories by gender in each survey. The relative time allocation is similar for girls and boys in 1977-78. Girls and boys age 15-17 typically spend about eleven hours per day in personal care activities. They also average a little more than five hours in leisure pursuits, followed by slightly less than four hours in school work (averaged across weekdays, weekends, and all four seasons). Housework, paid employment, and participation in organizationally-based activities consume the remaining time. T-tests (not shown in Table 1) reveal that the only statistically significant difference in boys and girls time use in 1977-78 occurs with respect to paid employment time with boys spending about 30 minutes more per day in paid employment than girls.

[Insert Table 2 Here]

By 2003-05, time use patterns of adolescents age 15-17 living in two-parent, two-child families have shifted. Both girls and boys are spending less time in paid work and more time in leisure activities compared to their 1977-78 counterparts. Girls' paid work time dropped by slightly more than half an hour per day while their leisure time rose by almost an hour per day. Similarly, boys' paid work time declined by over an hour and their housework time dropped by 16 minutes per day while their leisure time increased by an hour and a half.

The decline in paid employment time is primarily attributable to a drop in the labor force participation rate rather than a decline in the average time spent in market work for those teens who are employed. In the 1977-78 sample, 41% of the boys and 32% of the girls report spending some time in paid employment. In the 2003-05 sample, these percentages drop to 18%

and 22% respectively. At the same time, among those adolescent girls who reported doing any paid work, the mean time declined by only 16 minutes per day. And, in the case of adolescent boys who reported doing any paid work, the mean time actually increased by 29 minutes per day.

The finding that adolescents' labor force participation rates have declined over the last quarter century is not new. Herz and Kosanovich (2000) described this phenomenon in great detail. But, what the figures in Table 1 reveal is that adolescents' exodus from the labor market has been coupled with a substantial increase in their leisure time. That is, the reduction in paid employment time has *not* translated into increases in time spent in school, housework, organization activities, or personal care time. Rather, it has been channeled almost exclusively into leisure.

Multivariate Findings

To gain a better understanding of the role that socioeconomic forces may be playing in this time allocation shift, a system of time use equations is estimated for the FTUS and ATUS samples. Independent variables in the system estimations include the adolescent's predicted wage rate, the family's annual income, the mother's education level, and the mother's employment status. In addition, three dummy variables are included. The first measures whether or not the diary day came from a weekend day. The second measures whether or not the diary day is a summer day. Finally, boys and girls are grouped together in the estimation and a dummy variable is included to capture gender effects.[8]

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[8]Ideally, separate estimation would be done by gender. Preliminary estimates of gender-specific systems were found to be unstable, however, because of the relatively large number of

Estimation of each system is done using a simultaneous tobit routine in SAS to allow for the possible correlation of the error terms across equations and the censoring that occurs in four of the six time allocation categories (housework, paid work, school work, and organizational-related time). The parameter estimates are presented in Tables 3 and 4. Marginal effects are included for those coefficients that reach conventional levels of statistical significance.

[Insert Tables 3 and 4 Here]

Turn first to the estimated marginal effects for the adolescent's wage rate. Table 3 reveals that in 1977-78, a one dollar increase in an adolescent's wage rate, on average, was associated with a 14-minute per day increase in paid employment time and a 26-minute per day increase in leisure time, while simultaneously it was associated with a 17-minute per day decline

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parameters that had to be estimated with these relatively small samples. This fact coupled with t-tests (not reported in Table 1) that show few statistically significant gender differences in time allocation led to the adoption of a more parsimonious specification.

in school work time, *ceteris paribus*. In 2003-05, a one dollar increase in an adolescent's hourly wage rate translates into a 15-minute per day increase in paid employment time and a 16-minute increase in organization-related time, while simultaneously leading to a 33-minute per day decline in leisure, *ceteris paribus*. The estimated wage rate effects on paid employment time for both 1977-78 and 2003-05 are consistent with economic theory. As an individual's wage rate rises, the opportunity costs of spending time in other activities rises, and this leads the individual to spend more time in paid employment, holding family income and other factors constant (i.e., what economists call the substitution effect).

Next focus on the marginal effects associated with the mother's employment status. In 1977-78, the mother's employment status appears to have exerted considerable influence on adolescent time use. Adolescents with employed mothers, on average, spent significantly less time in school work and organization-related activities and they spent significantly more time in paid employment compared to otherwise similar adolescents whose mothers were not employed. By 2003-05, the mother's employment status appears to have little effect on adolescent time use with the exception of school work time. Adolescents in two-parent, two-child households with employed mothers, on average, spend 30 fewer minutes per day on school-related activities than do adolescents whose mothers are not employed, *ceteris paribus*. It could be argued that non-employed mothers have a supervision advantage over employed mothers because they have more opportunity to orchestrate their children's time use (e.g., driving children to scout meetings, helping children get started with homework). The current results suggest that while such employment effects may have existed for the mothers of adolescents in 1977-78, this supervision difference had largely waned by 2003-05.

Few statistically significant gender differences in time allocation exist in the 1977-78

system – the one exception being housework where, on average, girls spend 14 more minutes per

day than boys. But, by 2003-05, boys are spending significantly less time in housework (30

minutes less), paid work (17 minutes less), and organizationally-related activities (12 minutes

less) compared to otherwise similar girls. In addition, the boys in 2003-05 are averaging 80

minutes more per day in leisure activities relative to girls, holding other factors constant. These

gender differences portend a possible increase in the gender stereotyping of housework over time

and they signify that boys more than girls are shifting their time to more unstructured leisure

activities.

The estimated effects of the structural factors captured by weekend vs. weekday and

summer vs. other seasons are as expected. Adolescents spend significantly more time in

personal care, organizational-related activities, leisure activities, and housework on the

weekends relative to weekdays. Not surprisingly, they also spend less time doing school work

on the weekends compared to weekdays. Similarly, during the summer, adolescents spend

significantly less time in school-related activities and more time in leisure activities, *ceteris*

paribus. All of these structural effects hold for both samples. But, interestingly, while Table 3

shows that in 1977-78, adolescents were significantly more likely to spend time in paid

employment during the summer compared to other seasons, this effect is not present in the 2003-

05 estimates presented in Table 4. This result is consistent with Herz and Kosanovich (2000)

who document a delcine in adolescent summer employment between 1977 and 1998.

Finally, it is noteworthy that we observe virtually no effect of mother's education or total

family income in the multivariate analyses. The absence of income effects may in part be a

function of the measurement error that is inherent in the use of broad categorical measures of the type available in both of these data sets. The absence of any parental education effect is a bit more puzzling. To the extent that the mother's education captures parental preferences for adolescent time use, the absence of any statistically significant relationships may reflect the fact that parental influence on adolescent time use has faded by middle adolescence.

Relaxing the Two-Parent, Two-Child Restriction in the ATUS.

Between 1977-78 and 2003-05, the U.S. household types became more heterogeneous and fertility rates declined. While two-parent, two-child families were a common family type in 1977-78, in 2005, only 9% of all married couple families had two minor children present in the home (U.S. Census Bureau, 2006). At the same time, the United States became a more racially and ethnically diverse country. At the time of the 1980 Census, 83.1% of the population was white but by the 2000 Census, this number had declined to 75.1%. Over this period, the Hispanic population also grew from 6.4% to 12.5% (Hobbs and Stoops, 2002). How much did this socio-demographic change affect adolescent time use?

To assess how sensitive the results in Table 4 are to the two-parent, two-child restriction, the tobit system is re-estimated using all ATUS respondents age 15-17 who were living with

both parents or with a mother only at the time of the 2003-05 surveys.[9] Descriptive socio-economic information on the larger ATUS sample parallels the descriptive information on the two-parent, two-child ATUS sample with the exception that, relative to the latter sample, the median household income is $5,000 less, the mothers on average have about .5 years less formal education, and their labor force participation rate is 9% lower. Tests for mean differences in time use between the two ATUS samples reveal no statistically significant differences with two exceptions. Teenagers who are not in two-parent, two-child households average 19 minutes per day less in leisure activities and 14 minutes per day more in school work compared to the two-parent, two-child sample.

Table 5 contains the parameter estimates for the adolescent time use system using the larger sample from the 2003-05 ATUS merged files. These simultaneous tobits include additional regressors that control for variation in household structure (i.e., mother single vs. married), number of siblings (i.e., a dummy variable for no siblings and a dummy variable for two or more siblings vs. only one sibling), and race/ethnicity (i.e., a series of dummy variables that measure Black non-Hispanic, Hispanic, Asian, and "Other," with White non-Hispanic as the omitted group).[10]

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[9] Adolescent respondents living with fathers only are excluded from the analysis because their numbers are quite small and because the inclusion of such households would have complicated the estimation of the maternal education and maternal labor force participation effects.

[10] As another point of comparison, Appendix Table A2 contains the parameter estimates

[Table 5 Here]

The estimates presented in Table 5 reveal that number of siblings has no effect on adolescent time allocation, *ceteris paribus*. This finding is interesting given that economists often argue that parents who choose to have fewer children are opting to invest in "quality" over quantity. If there is such a quality-quantity trade-off, one might expect to observe only-children or children with just one sibling spending more time in developmentally enriching activities (e.g., participating more frequently in organized activities) than do adolescents with multiple siblings.

Adolescents living with single mothers do spend significantly less time in school work and organized activities than otherwise similar adolescents in two-parent households. Black youth spend more time in organizational activities but less time in housework than whites. Conversely, Hispanic and Asian youth spend less time in paid employment and more time in personal care than whites.

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for the system using the larger sample but excluding the additional regressors. That is, the regressors are identical to those in Table 4. Only the sample size has changed.

Next compare the estimates of the effects of the substantive variables of interest in Table 4 with those in Table 5. All of the statistically significant effects noted in Table 4 remain statistically significant in Table 5 with the exception of one, the mother's employment effect on time spent in school work. When the sample is expanded and the additional controls are added, this effect disappears. This null finding reinforces the earlier conclusion that parental supervision effects on adolescent time use may wane by age 15. It is also noteworthy that none of the statistically significant variables identified in Table 4 change signs in Table 5 nor do the magnitude of the statistically significant marginal effects change substantially. This provides a modest confirmation of the generalizability of the earlier trend analyses.

The larger sample size does lead to an increase in the number of coefficients that are identified as being statistically significant. For instance, while an increase in the adolescent's wage continues to be associated with increases in paid work and organizational time, and a decrease in leisure time, it is now also associated with an increase in school work time and a decrease in personal care time, *ceteris paribus*. In addition, the mother's education now has very small, but statistically significant effects on organizational time, and personal care time. Respondents whose diaries came from a summer day spend small additional amounts of time in paid work and housework and marginally less time in organized activities, all other things equal. Finally, in the larger sample, boys spend significantly less time in school work than do otherwise similar girls.

A Closer Look at Leisure Time

The multivariate analyses done earlier assumes that leisure time is less likely to be

developmentally enriching time than other broad categories of time use. The 2003-05 ATUS

data provide a rare opportunity to take a closer look at the validity of this assumption.

Accordingly, 2003-05 leisure time for the larger, more inclusive ATUS sample is broken down

into those detailed activities that have a higher probability of providing developmentally

enriching experiences and those detailed activities that have a lower probability of challenging,

motivating, and promoting concentration. Definitions of these detailed time-use categories along

with the accompanying descriptive statistics appear in Table 6. Activities included in what is

labeled as the "challenge" category include such things as reading for pleasure, working on

hobbies and playing music. Time spent participating in sports, exercise, and recreational

activities may also be challenging but it is treated as a separate category because it is more likely

to be a mixture of some stimulating activities and others that are not. Likewise, time spent

playing games and engaging in other lesiure-related activities using a computer (excluding

school-related computer work) could be a mixture of more and less challenging activities so it

too is treated as a separate category. Lastly, passive leisure is defined to include time spent

watching tv or videos, going to movies, socializing with friends, etc.

[Insert Table 6 Here]

The figures in Table 6 reveal that, compared to boys, girls spend significantly less time

on the computer (-32 minutes) and engaging in physical activities (-34 minutes) but significantly

more time participating in those leisure activities that are most likely to be challenging (+8

minutes). These differences are the result of both differences in participation rates and

differences in the typical amount of time spent in the leisure activity given participation. Girls

and boys show no statistically significant difference in their passive leisure time.

For males two-thirds of all leisure time is typically spent in passive activities while for females the proportion is slightly higher at three-fourths. From a developmental standpoint, what may be more concerning is the fact that 36% of girls and 24% of boys report that all of their leisure time is spent in passive activities. Moreover, the mean time spent in passive leisure for those adolescent girls and boys who do not engage in any other type of leisure activity on the diary day is relatively higher. Boys and girls who report spending all of their leisure time in passive activities average approximately four and one-half hours per day in passive leisure while those who engage in a mixture of leisure activities average about four hours per day in passive leisure.

To take a closer look at how socio-economic factors affect the mix of adolescent leisure in 2003-05, a system of simultaneous tobit equations is estimated using the larger ATUS sample. The parameter estimates for this system appear in Table 7. Several things are noteworthy in this table. First, increases in adolescent wage rates are associated with small, but statistically significant declines in time spent in physical activities and computer activities, *ceteris paribus*. Again, these estimated wage effects are consistent with the prediction made by economists that an increase in the wage rate will cause individuals to substitute out of leisure pursuits and into market work, holding income and other factors constant. Second, the estimates reveal that the mix of leisure is significantly different when one compares boys to otherwise similar girls. Boys spend much more time in physical activities and computer-related activities and moderately less time in challenging activities than do otherwise similar girls. Third, the employment status of the mother is associated with the adolescent's mix of leisure activities. Youth with employed mothers spend significantly more time in passive leisure and physical activities and significantly

less time in computer-related leisure compared to similar youth whose mothers are not employed. Finally, there are sizable race/ethnicity effects with respect to time spent in physical activities. Hispanic, Asian, and Other youth spend significantly less time in physical activities compared to white youth, holding other factors constant.

[Table 7 Here]

DISCUSSION AND CONCLUSIONS

Time use in middle adolescence has changed in some notable ways over the past quarter century in two-parent, two-child families. Today, adolescents are spending significantly less time in paid employment compared to their similarly aged counterparts in the later part of the 1970s. The time that has been "freed up" by doing less paid work is being allocated almost exclusively to leisure. Girls are averaging about an hour more of leisure time per day in 2003-05 compared to girls in 1977-78. For boys, the leisure gain over this historical period has been even larger at about 90 minutes per day. No substantial changes were found in the time adolescents are spending in activities that have a high probability of being developmentally enriching (i.e., school-related activities, organizationally-related activities).

The multivariate analyses comparing 1977-78 to 2003-05 reveal that some of the shift in adolescent time use has likely been precipitated by the decline in adolescents' real wage rates over this historical period. Herz and Kosanovich (2000) report that the median hourly earnings of employed adolescents age 15-17 declined in real terms by $.64/hr between 1979 and 1998 (measured in 1998 constant dollars). Similar calculations done by the author using the 1978 and 2005 CPS surveys show that over this longer time frame median real wages for teens age 15-17

declined in real terms by $1.84/hr (measured in 2004 constant dollars). Thus, while the estimated relationship between the hourly wage rate and paid employment time is positive and statistically significant in both years, since adolescents' real wages fell during this period, one should expect to see time spent in paid employment decline.

Is the decline in paid employment time good or bad for youth? The answer to that question depends on what is being given up by reducing paid employment time and what is being gained. Paid employment can involve repetitive tasks but it may also involve creative problem-solving tasks. Unfortunately, the FTUS and ATUS time-use categories are not detailed enough to draw any conclusions about the composition of paid employment time. Nevertheless, we know that the reduction in paid employment has a potential economic impact on youth and it affects their overall mix of time use. In particular, the current analyses suggests that in recent years adolescents have shifted time from paid employment to leisure activities. This finding is consistent with the work of Schoenhals, Tienda, and Schneider (1998) who report that a decrease in adolescents' paid employment time has little impact on selected activities that might promote challenge and creativity (e.g., time spent doing homework, time spent reading) but it is associated with a significant increase in time spent watching television.

Wage rate effects on adolescent leisure time also shifted over the historical period studied. In 1977-78, an increase in adolescent wage rates was associated with an increased demand for leisure time. By 2003-05, this relationship had been reversed. The reversal in the wage rate effects on leisure over this period may be a function of changes in the composition of leisure time. Certainly, adolescents' computer time has increased dramatically and this may have contributed to the sign change.

In 2003-05, wage rates also significantly influenced the composition of adolescent leisure time. Although the effect on absolute minutes in specific leisure categories is small, it is larger when viewed in relative terms. Falling wage rates have probably been an important contributing factor to the growth in time youth spend in these activities in recent years.

Interestingly, the current analyses also reveal a growing disparity in the time allocation patterns of adolescent girls and boys. In two-parent, two-child households , boys did less housework than girls in 1977-78, *ceteris paribus*, but otherwise their time allocation patterns were quite similar. By 2003-05, compared to otherwise similar girls, boys are spending less time in housework, paid work, school work and organizationally-related activities and they are spending more time in leisure. Disaggregation of adolescent leisure in 2003-05, reveals that boys are spending significantly more time interacting with computers and participating in sports and exercise, and significantly less time participating in those leisure activities that have the highest probability of conferring developmentally enriching experiences. Unfortunately, the data are not sufficiently nuanced to uncover the reason for these apparently diverging time use paths.

Regardless of gender, passive leisure activities dominate both girls' and boys' leisure time – accounting for 75% of girls leisure and 64% of boys leisure. While everyone needs "down time," the fact that the these respondents averaged over four hours per day in passive leisure may be cause for concern. Passive leisure activities that are least likely to promote the type of optimal developmental experiences described by Larsen (2001). In addition, they are also sedentary pursuits that can tip the scales (literally and figuratively) toward the unhealthy

end of the energy balance continuum.[11]

Conclusions drawn from the trend analysis portion of this study must be tempered with the recognition that not all adolescents age 15-17 have one sibling present and live in two-parent families. It is quite possible that the time use patterns of youth in 1977-78 who were in different household types (e.g., single-parent households) had different time use patterns. Nevertheless, multivariate analyses done with the larger ATUS sample reveal that all but one of the statistically significant associations found in the two-parent, two-child sample continue to hold when adolescents with single mothers and/or other than one sibling are added to the 2003-05

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[11] Other research has found that few adolescents engage in physical activity for an hour or more per day on most days as recommended by the Surgeon General (Centers for Disease Control, 2006). In the current analyses, only 21% of the girls and 42% of the boys report spending any time in sports and exercise on the diary day, although among those who do participate in physical activity as part of their leisure time, the average time devoted to these activities is over two hours.

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It is also important to acknowledge that the time use categories used in these time diary surveys were not designed with the explicit purpose of measuring the developmental attributes of time use. Thus, one cannot distinguish time spent reading a comic book from time spent reading *War and Peace*. Likewise, time spent in a political debate with friends cannot be distinguished from time spent idly gossiping. At best, the time diary lexicons allow one to distinguish those types of time that are more likely to be developmentally enriching from those types of time that are less likely to be developmentally enriching.

With the above caveats in mind, the current analyses nonetheless reveal that over the past quarter century, adolescent girls and boys in two-parent, two-child households have substantially reduced their paid employment while simultaneously increasing the time they spend in leisure activities. Adolescent boys have also redirected some time from housework to leisure. Adolescents' declining real wage rates appear to be an important factor that has contributed to these time use trends. In 2003-05, youth age 15-17 in single and married mother households with various numbers of siblings averaged over six hours per day in leisure with over two-thirds of their leisure typically being spent in passive activities and less than one-third being spent in leisure pursuits that have a high probability of promoting personal growth. Clearly, this is not the picture of an over-scheduled adolescent. Determining whether or not the current mix of adolescents' leisure and non-leisure activities is optimal from a developmental standpoint is beyond the scope of the current study but it is a question that merits future investigation.

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Table 1. Weighted Descriptive Statistics for the 1977-78 Family Time Use and 2003-05

American Time Use Surveys[a]

	1977-78 FTUS (N=471)	**2003-05 ATUS (N=562)**
gender (1=male)	0.53	0.55
predicted wage (2004 $/hr)	7.49	5.34
median annual family income (2004 $1000)	82.01	67.50
mother's education (yrs)	12.79	13.43
mother's employment status (1=employed)	0.56	0.77
weekend diary day (1=yes)	0.28	0.31
summer diary day (1=yes)	0.28	0.28

[a] The weights correct for a range of sampling factors. Most importantly, the 2003-05 weights

correct for the fact that 50% of the ATUS sample provided a weekday diary while the other 50%

of the sample provided a weekend diary.

Table 2. Weighted Minutes per Day Spent by Adolescents Age 15-17 in Various Activities, 1977-78 and 2003-05.[a]

	1977-78 FTUS (N=471)			2003-05 ATUS (N=562)			T-Test[b]
Girls	**Mean**	**% Non-Zero**	**Non-Zero Mean**	**Mean**	**% Non Zero**	**Non-Zero Mean**	
Personal Care	682	99%	691	668	100%	668	0.25
Housework	88	81%	108	93	74%	127	-0.55
Paid Work	85	32%	268	51	22%	252	2.54**
School Work	230	56%	409	212	51%	356	0.85
Organization	45	21%	216	37	21%	166	0.75
Leisure	310	94%	331	368	100%	368	-2.85**
Boys							
Personal Care	659	99%	664	667	100%	667	-0.62
Housework	75	73%	104	59	63%	105	1.78*
Paid Work	122	41%	297	55	18%	326	4.30**
School Work	227	54%	421	213	47%	382	0.67
Organization	25	14%	177	20	17%	140	0.75

Leisure	334	95%	350	425	100%	425	-4.67**

*p<.10   **p<.05

[a] The weights correct for a range of sampling factors. Most importantly, the 2003-05 weights correct for the fact that 50% of the ATUS sample provided a weekday diary while the other 50% of the sample provided a weekend diary.

[b] Calculated using the difference of means tests where the standard deviations of the two populations are assumed to be different from one another.

Table 3. Parameter Estimates of the Simultaneous Tobits System: FTUS 1977-78 Sample of Two-Parent, Two-Child Households (N=471) (t-ratios in parentheses)

	Paid Work		Housework		School Work		Organized Time		Leisure Time		Personal Care	
	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]
Intercept	-166 (-1.19)		18.8 (0.25)		399 (3.11)**		73.9 (0.42)		81.1 (0.68)		710 (8.41)**	
Wage ($/hr)	26.6 (1.85)*	14	1.62 (0.21)		-24.5 (-1.82)*	-17	-18.6 (-1.00)		29.0 (2.38)**	26	-14.1 (-1.58)	
Income ($1000's)	-0.25 (-0.86)		-0.03 (-0.25)		0.32 (1.24)		0.05 (0.15)		0.08 (0.33)		-0.15 (-0.85)	
Mother's Educ. (yrs)	-6.39 (-0.92)		2.77 (3.29)		9.76 (1.53)		-10.8 (-1.24)		-4.35 (-0.72)		5.71 (1.32)	
Mother's Emp. (1=employed)	57.7 (2.16)**	29	5.81 (0.50)		-54.3 (-2.25)**	-37	-55.6 (-1.80)*	-11	5.33 (0.24)		-1.55 (-0.09)	
Weekend Diary (1=yes)	-6.78 (-0.23)		22.4 (1.74)*		-217 (-8.19)**	-145	133.7 (4.22)**	25	61.0 (2.47)**	59	58.3 (3.28)**	53

Summer Diary (1=yes)	97.1 (3.41)**	46	15.0 (1.15)		-432 (-14.09)**	-295	10.4 (0.26)		148 (5.99)**	138	9.69 (0.54)	
Gender (1= boy)	35.2 (1.31)		-20.4 (-1.69)**	-14	-17.2 (-0.69)		-34.5 (-1.10)		16.4 (0.71)		-15.8 (-0.94)	
Sigma	256 (23.5)**		120 (27.4)**		241 (24.8)**		230 (11.6)**		236 (29.99)		171 (29.3)**	

[a] Marginal effects calculated at the mean values for the independent variables.

Table 4. Parameter Estimates of the Simultaneous Tobits System: ATUS 2003-05 Sample of Two-Parent, Two-Child Households (N=562) (t-ratios

in parentheses)

	Paid Work		Housework		School Work		Organized Time		Leisure Time		Personal Care	
	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]
Intercept	-386 (-1.94)*		68.2 (0.88)		243 (1.75)*		-738 (-4.32)**		445 (4.22)**		722 (9.82)**	
Wage ($/hr)	56.4 (1.73)*	15	9.87 (0.76)		-9.69 (-0.41)		78.8 (2.90)**	16	-33.6 (-1.89)*	-33	-10.4 (-0.82)	
Income ($1000's)	-0.17 (-0.41)		-0.05 (-0.30)		0.02 (0.09)		0.17 (.53)		-0.30 (-1.37)		0.19 (1.22)	
Mother's Educ. (yrs)	-7.51 (-1.12)		-3.88 (-1.45)		12.4 (2.77)**	7	4.75 (0.87)		4.10 (1.16)		-2.84 (-1.16)	
Mother's Emp. (1=employed)	46.3 (1.16)		-13.7 (-0.90)		-45.2 (-1.76)*	-30	20.0 (0.62)		22.1 (1.09)		-9.53 (-0.67)	
Weekend Diary (1=yes)	-4.69 (-0.12)		62.1 (5.00)**	42	-339 (-15.9)**	-201	105.5 (3.70)**	27	79.1 (4.55)**	82	87.9 (7.60)**	87

Summer Diary (1=yes)	51.9 (1.45)		-0.26 (-0.02)		-217 (-8.65)**	-128	3.59 (0.11)		48.2 (2.42)**	41	38.8 (2.96)**	39
Gender (1= boy)	-61.9 (-1.84)*	-17	-45.6 (-3.52)**	-30	-24.9 (-1.13)		-62.3 (-2.26)**	-12	82.1 (4.81)**	80	-11.3 (-0.93)	
Sigma	292 (17.9)**		140 (28.01)**		232 (26.67)**		221 (13.34)**		193 (34.17)**		135 (33.38)**	

[a] Marginal effects calculated at the mean values for the independent variables.

Table 5. Parameter Estimates of the Simultaneous Tobits System: Full ATUS 2003-05 Data (N=2,517) (t-ratios in parentheses)

	Paid Work		Housework		School Work		Organized Time		Leisure Time		Personal Care	
	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]
Intercept	-581.74 (-6.13)**		124.70 (3.22)**		134.00 (2.08)**		-553.19 (-6.11)**		432.53 (8.39)**		807 (20.74)**	
Wage ($/hr)	82.73 (5.17)**	23	-9.36 (-1.45)		18.93 (1.75)*	13	32.34 (2.24)**	5	-19.80 (-2.29)**	-19	-22.66 (-3.39)**	-18
Income ($1000's)	-0.08 (-0.27)		0.12 (1.41)		0.18 (1.26)		-0.42 (-2.03)**	-1	-0.04 (-0.34)		-0.06 (-0.75)	
Mother's Educ. (yrs)	-2.33 (-0.61)		-1.14 (-0.88)		9.74 (4.57)**	7	12.36 (4.02)**	2	-2.60 (-1.54)		-2.71 (-2.24)**	-3
Mother's Emp. (1=employed)	28.84 (1.61)		-1.69 (-0.23)		-17.54 (-1.46)		-6.85 (-0.43)		9.05 (0.99)		-18.59 (-2.76)**	-19
Weekend Diary (1=yes)	-19.18 (-1.27)		46.86 (8.19)**	31	-357.05 (34.53)**	-246	104.83 (7.32)**	18	105.61 (13.51)**	102	86.05 (14.73)**	87

Summer Diary (1=yes)	55.51 (3.11)**	16	24.75 (3.57)**	16	-249.35 (-18.16)*	-172	-47.25 (-2.90)**	-8	79.94 (8.94)**	77	23.43 (3.48)**	24
Gender (1= boy)	-42.35 (-2.61)**	-10	-49.63 (-8.31)**	-33	-59.70 (-5.65)**	-41	-31.39 (-2.17)**	-5	71.44 (8.37)**	69	-3.20 (-0.51)	
Mother Single (1=yes)	-1.08 (-0.02)		-12.74 (-1.56)		-30.79 (-2.17)**	-21	-27.66 (-1.93)*	-11	16.25 (1.13)*		2.24 (0.26)	
No siblings (1=yes)[b]	-15.71 (-0.72)		-6.05 (-0.73)		-20.47 (-1.38)		-13.52 (-0.64)		7.87 (0.67)		10.94 (1.26)	
More than one sibling (1=yes)[b]	9.00 (0.50)		10.57 (1.58)*		6.69 (0.54)		28.51 (1.61)		-20.29 (-2.17**)	-20	-5.42 (-0.77)	
Black Non-Hispanic (1=yes)[b]	27.28 (0.96)**	15	-21.65 (-1.88)*	-14	6.57 (0.34)		68.47 (2.40)**	12	-11.66 (-0.78)*		-12.33 (-1.06)	
Hispanic (1=yes)[b]	-144.83 (-4.73)**	-34	12.37 (1.38)		-16.08 (-0.98)		1.84 (0.05)		-9.82 (-0.77)		30.64 (3.40)**	29
Asian (1=yes)[b]	-141.06 (-1.95)*		-11.27 (-0.56)		12.65 (0.35)		1.28 (0.02)		-32.60 (-1.18)		55.74 (2.61)**	BLANK
Other (1=yes)[b]	-106.01 (-1.57)		45.16 (2.14)**		28.47 (0.75)		-82.49 (-1.16)		-35.16 (-1.22)		32.19 (1.47)	

Sigma	289.84		137.87		233.28		243.25		193.59		144.71	
	(34.00)**		(59.53)**		(54.40)**		(27.04)		(71.10)**		(69.09)**	

[a] Marginal effects calculated at the mean values for the independent variables.

[b] The omitted group in this sequence of dummy variables are those respondents who had one sibling.

[c] The omitted group in this sequence of dummy variables are those respondents who are White non-Hispanic.

Table 6. Minutes per Day Spent by Adolescents Age 15-17 in Leisure Activities, 2003-05 .

	Girls (N=1225)			Boys (N=1292)			T-Test[a]
Girls	**Mean**	**% Non-Zero**	**Non-Zero Mean**	**Mean**	**% Non Zero**	**Non-Zero Mean**	
Challenging Activities[b]	33	34%	98	25	25%	99	3.12**
Physical Activities[c]	26	21%	125	60	42%	143	-9.78**
Computer Activities[d]	29	26%	113	61	43%	141	8.67**
Passive Activities[e]	255	98%	258	260	97%	267	0.94

**p<.05

[a] Calculated using the difference of means tests where the standard deviations of the two populations are assumed to be different from one another.

[b] Challenging activities consist of reading for pleasure, writing for pleasure, working on hobbies, listening to or playing music, attending performing arts events or museums, visiting historic sites, and thinking.

[c] Physical activities consists of time spent playing sports, exercising, and participating in recreational activities.

[d] Computer activities is defined as playing computer games and using the computer for other leisure activities. This category excludes the use of the computer for the purposes of working on school assignments.

[e] Passive leisure is defined to be watching tv or videos, going to the movies, attending sporting events, talking on the telephone with friends, socializing with friends, relaxing, attending parties, using drugs or tobacco, and travel related to all leisure.

Table 7. Parameter Estimates of the Simultaneous Tobits Leisure System: Full ATUS 2003-05 Data (N=2,517)

(t-ratios in parentheses)

	Challenging Activities		Physical Activities		Computer Activities		Passive Activities	
	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]
Intercept	-5.17 (-0.03)		-0.10 (-0.01)		-24.64 (-0.42)		324.83 (6.57)**	
Wage ($/hr)	-19.41 (-0.73)		-30.47 (-5.35)**	-10	-39.83 (-3.95)**	-14	-7.99 (-0.90)	
Income ($1000's)	0.13 (0.82)		0.15 (0.89)		0.18 (1.32)		-0.15 (-1.50)	
Mother's Educ. (yrs)	0.57 (0.23)		-2.05 (-1.04)		8.46 (4.20)**	3	-4.89 (-3.46)**	-5
Mother's Emp. (1=employed)	4.47 (0.42)		24.24 (1.94)*	8	-35.16 (-3.35)**	-13	17.24 (2.15)**	16
Weekend Diary (1=yes)	13.99 (1.46)		5.57 (0.55)		28.13 (3.06)**	10	72.82 (10.27)**	67
Summer Diary (1=yes)	43.54 (4.05)**	12	66.58 (5.79)**	22	25.72 (2.41)**	9	35.94 (4.48)**	33
Gender (1= boy)	-22.94 (-2.23)**	-6	114.84 (10.92)**	38	107.35 (10.71)**	39	2.82 (0.39)	
Mother Single	-4.08		8.82		39.90	14	-5.32	

(1=yes)	(-0.31)		(0.66)		(3.40)**		(-0.58)	
No siblings (1=yes)[b]	-7.96 (-0.48)		-19.44 (-1.29)		12.32 (0.88)		10.15 (0.99)	
More than one sibling (1=yes)[b]	-5.31 (-0.48)		4.10 (0.34)		-18.80 (-1.55)		-7.15 (-0.87)	
Black Non-Hispanic (1=yes)[b]	-50.84 (-1.36)		-37.53 (-2.18)		-40.51 (-2.42)**	-15	9.338 (0.73)	
Hispanic (1=yes)[b]	-27.87 (-1.95)*	-8	-30.69 (-1.68)*	-10	-12.86 (-0.88)		14.46 (1.32)	
Asian (1=yes)[b]	-67.04 (-1.61)		-136.01 (-3.08)**	-45	67.34 (2.17)**	24	-20.75 (-0.83)	
Other (1=yes)[b]	-1.83 (-0.06)		-113.10 (-2.72)**	-37	15.08 (0.47)		-15.83 (-0.63)	
Sigma	181.13 (26.05)**		208.22 (33.87)**		191.87 (36.41)**		172.69 (59.24)**	

[a] Marginal effects calculated at the mean values for the independent variables.

[b] The omitted group in this sequence of dummy variables are those respondents who had one sibling.

[c] The omitted group in this sequence of dummy variables are those respondents who are White, non-Hispanic.

Appendix

Table A1. Parameter Estimates of the Labor Force Participation (LFP) Probit and Wage

Equations Using Data from the 1978 and 2005 Current Population Surveys[a]

	1978 CPS[e]		2005 CPS	
	LFP	ln(Wage)	LFP	ln(Wage)
constant	-0.29 (-4.58)**	0.58 (8.80)**	-0.72 (-12.9)**	1.62 (5.20)**
gender (1=male)	0.25 (8.79)**	0.09 (4.45)**	-0.44 (-1.70)*	0.06 (2.53)**
race (1=black)	-0.66 (-15.4)**	-0.40 (-0.86)	-0.53 (-13.44)**	-0.15 (-1.41)
Age 17 (1=yes)[b]	0.45 (13.22)**	0.12 (3.90)**	0.51 (16.09)**	0.07 (0.79)
Age 18 (1=yes)[b]	0.89 (24.97)**	0.27 (6.73)**	0.83 (25.48)**	0.18 (1.32)
Rural (1=yes)	0.23 (6.48)**	-0.89 (-4.29)**	0.22 (7.02)**	-0.54 (-1.37)
Northeast (1=yes)[c]	-0.31 (-6.96)**	-0.01 (-0.30)	0.25 (6.23)**	0.014 (0.26)

Northcentral (1=yes)[c]	-0.20 (-4.58)**	-0.03 (-0.90)	-0.007 (-0.20)**	-0.09 (-1.52)
South (1=yes)[c]	0.05 (1.54)	0.009 (0.29)	0.18 (5.33)**	-0.05 (-1.60)
Family Owns Home (1=yes)	-0.008 (-2.58)**	---	0.22 (7.02)**	---
Family's Nonlabor Income	0.003 (0.33)	---	0.001 (1.48)	---
Family Size	-0.01 (-0.33)	---	-0.63 (-6.67)**	---
Rho[d]		-0.011 (-0.12)		0.18 (0.59)

[a] The 1978 and 2005 CPS questions ask about wage rates and labor force participation for the years 1977 and 2004, respectively. Sub-samples used in the analysis were restricted to individuals who were age 16-18 at the time of the survey (i.e., age 15-17 for the year they were reporting on). The 1978 sample size was 8,715. The 2005 sample size was 10,481.

[b] The omitted category in this sequence of dummy variables contains those individuals who were age 16 at the time of the survey (15 for the year they were reporting on).

[c] The omitted category in this sequence of dummy variables contains those individuals who resided in the western United States.

[d] Rho is the correction estimate generated in PROC QLIM in SAS. The fact that it is not statistically significant in either equation suggestions that sample selection is not a serious issue for these two samples.

[e] The FTUS data do not contain information on the respondent's race/ethnicity. Therefore, when using the 1978 CPS wage equations to forecast the FTUS respondents' wage rates, all respondents are classified as non-black (i.e., the omitted group).

Table A2. Parameter Estimates of the Simultaneous Tobits System: Full ATUS 2003-05 Sample (N=2,517) Omitting Marital Status,

Number of Siblings, and Race/Ethnicity Covariates (t-ratios in parentheses)

	Paid Work		Housework		School Work		Organized Time		Leisure Time		Personal Care	
	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]	Coef.	Marginal Effect[a]
Intercept	-644.47 (-7.59)**		88.25 (2.51)**		113.80 (2.04)**		-506.27 (-6.59)**		472.83 (11.32)**		763 (23.61)**	
Wage ($/hr)	69.02 (4.87)**	17	-0.22 (-0.04)		17.79 (1.86)*	12	23.01 (1.80)*	4	-28.80 (-3.99)**	-28	-10.43 (-1.80)*	-10
Income ($1000's)	-0.08 (-0.38)		0.17 (2.27)**	0.11	0.28 (2.10)**	0.19	-0.24 (-1.32)		-0.06 (-0.59)		-0.07 (-0.90)	
Mother's Educ. (yrs)	5.59 (1.88)*	1	-2.04 (-1.93)*	-1	10.88 (5.70)**	7	12.32 (4.68)**	2	-2.72 (-1.86)*	-3	-3.93 (-3.61)**	-4
Mother's Emp. (1=employed)	32.31 (1.87)**	8	-3.76 (-0.56)		-24.05 (-2.11)**	-17	-19.00 (-1.22)		13.88 (1.56)		-17.78 (-2.69)**	-18
Weekend Diary (1=yes)	-18.72 (-1.23)		47.23 (8.28)**	31	-359.39 (-	-247	102.05 (7.18)**	17	102.24 (13.23)**	99	88.83 (15.22)**	89

					34.82)**							
Summer Diary (1=yes)	46.62 (2.71)**	12	26.72 (4.04)**	18	-248.09 (-19.72)**	-171	-40.62 (-2.45)**	-7	77.53 (8.76)**	75	25.82 (3.85)**	26
Gender (1= boy)	-35.70 (-2.27)**	-9	-53.26 (-8.94)**	-35	-59.13 (-5.65)**	-41	-24.54 (-1.71)*	-4	73.85 (9.26)**	72	-6.96 (-1.17)	
Sigma	294.94 (34.71)**		138.69 (61.02)**		234.02 (54.53)**		245.52 (27.42)**		194.00 (71.48)**		145.38 (70.71)**	

[a] Marginal effects were calculated at the mean values for the independent variables.