Published in final edited form as:
Ann Econ Stat. 2012 January 6; 105: 185–208.

Shaping Health Behavior across Generations: Evidence from Time Use data in the Panel Study of Income Dynamics and its Supplements

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Abstract

This paper examines ways that families use time to shape their children's health behaviors. Specifically, it explores ways that parents can prepare children to make health-enhancing choices as adults. It also analyzes ways that offspring manage their time during young adulthood, when they are old enough to make independent decisions about whether they will spend their time producing health, as the Grossman model argues that individuals can do (Grossman 2000). The empirical research uses time diary data from the Child Development Supplement CDS), data from the Panel Study of Income Dynamics (PSID) core and the PSID's Transition to Adulthood (TA) module. By examining the intergenerational transmission of healthy behaviors, it is possible to better understand decisions individuals make in adulthood.

Introduction

In this paper we explore children's time use and parental behaviors designed to shape decisions their offspring will make concerning health investments through time. How do parents shape the relative value of health related activity compared to other pursuits and the relative value of benefits in the future versus the present? Our work extends some of the themes already in the literature, such as work on possible inherent predispositions illustrated by the "gummy bear" experiments and apparent propensities to smoke persistently over the life course (Grafova and Stafford, 2009; Uhl, Et. al., 2007). While some behaviors seem to be partly biologically inherited, there is a learning margin and preferences themselves can be thought of as capital or state variables which can be built up via experience or diminished through time.

In the spirit of endogenous preference formation (Becker and Mulligan, 1997), parents provide lessons, the lessons may build as a preference capital and the behavior induced by the preferences needs to be beneficial. Our assumption is that some preference capital formation is at issue and that, generally, more educated parents have more financial and developmental resources and are likely to be better at non-market production, such as promoting the early learning of children. While there is evidence of myopic versus planned behavior as indicated by different activity regions of the brain, and there may be individual

Paper presented at the International Association of Time Use Researchers, Paris, July 7–10, 2010.

biological differences in this activity, here we assume there will be some payoffs to training, just as with human capital for the labor market.

In what follows we provide a review of the literature examining ways that parents can influence their children's behavior, along with a discussion of their motivation for doing such in the context of health. We begin with a summary of a selection of findings in the existing empirical literature on the correlation between parents' and children's physical activity levels. Section III subsequently presents an analysis of data from the Panel Study of Income Dynamics (PSID). This analysis emphasizes time diary data that were collected as part of the PSID's Child Development Supplement (CDS). We use these data to study children's time allocation patterns, with a specific emphasis on time spent in activities that involve exercising or other forms of exertion. Section IV presents related analyses that use data from the Transition to Adulthood (TA) Supplement to the PSID. Section V concludes.

II. Background

Why should parents care about their children's health? For altruistic parents, utility will be dependent partially upon the utility of their offspring. What factors are likely to influence their offspring's utility? As noted in the seminal work of Michael Grossman (1972a, 1972b, 2000), utility is partly dependent upon health because people experience disutility from being ill. Moreover, health also influences utility indirectly through an effect on earnings. There is a payoff in the labor market to having good health because the amount of time that an individual can work is determined partly by the individual's stock of health capital (Grossman 1972a, 1972b, 2000).[1] Accordingly, we can expect that promoting a child's health will increase the lifetime utility of that child, subsequently raising the utility of the parent.

Interdisciplinary Perspectives on Parents Influence on Children's Health Behaviors

As noted by Webley and Nyhus (2006), the psychology literature discusses four processes which allow parents to 'socialize' their children to behave in ways the parents deem appropriate. We briefly explain ways these mechanisms might be used by parents to promote their children's health, as our empirical analysis is premised on the assumption that some parents seek to encourage their children to be healthy. Webley and Nyhus (2006) argue that parents can shape their children's behavior by (a) modeling behavior for them, (b) by discussing appropriate behaviors and providing guidance, (c) by encouraging the formation of habits, and (d) by allowing children independence and encouraging them to take responsibility for making decisions and self control on their own (Shefrin and Thaler, 1981). The first three insights can be applied easily in the context of health. They can be used to motivate both a discussion of ways that parents might attempt to shape the' consumption choices of their offspring, and of ways parents might seek to influence the amount of time that children spend in health-enhancing activities. Because our empirical research focuses on the latter, our emphasis lies in explaining ways the three processes identified in Webley and Nyhus (2006) can be applied to time spent in health-generating activities. For example, parents may exercise in front of their children in order to model behavior for them. Alternatively, parents may participate alongside the children in sports or other active leisure activities.

[1]The model developed by Michael Grossman (1972a, 1972b, 2000) is a framework that is widely used within economics to study health. Grossman's model presents utility as a function of health and a consumption good. Health affects utility directly but also has implications for an individual's earnings as it determines the amount of healthy time that the individual has available to devote to the labor market.

Enrolling children in sporting activities while they are young also may provide a way for parents to help their offspring identify exercise activities that are fun, thereby allowing the children to derive direct utility from their chosen physical activity in addition to the indirect utility afforded by the effect of better health on lifetime earnings. Parents also may simply discuss the benefits of taking time to exercise. Each of the above provides an example of parents attempting to 'teach' their offspring about the behaviors that parents consider to be good. This education could then affect the child's stock of health capital once he or she becomes an adult by creating children who gravitate toward spending their free time to "produce" health themselves.

Much of the existing empirical literature about the relationship between parents' and children's physical activity emphasizes similar ways that parents may serve as socializing agents for their children (Anderssen, Wold, and Torsheim 2006; Kenyon and McPherson 1973). The ability to shape children's behavior early in life is particularly important if health behaviors are characterized by "tracking," as some researchers in the physical activity literature argue. Tracking implies that physical activity behaviors developed early in life tend to last (Anderssen, Wold and Torsheim 2006, Berenson et al 1989).[2] One reason they might last is because of Bayesian path dependence.

Consider a child with a diffuse Bayesian prior on the utility value (weight of) exercise or physical activity. As a series of active leisure experiences occurs *and is successful or enjoyed* throughout childhood, the now perceived enjoyment of exercise, which would have gained in preference precision, would have to be foregone if the individual were to engage in an alternative consumption experiment - for example, a period of inactivity such as trying a "couch potato" lifestyle.[3] The opportunity cost of exploring the relatively unknown activity may be perceived to be great. In this way there can be preference path dependence by the time the child has reached early adulthood. This creates a 'lock in' where preferences that exist initially dominate over the idea of experimenting with something new. In the health context both the perceived mean and perceived variance of the 'known' become the operative state variables.[4] This bolsters the realized utility of healthy exercise and such behavior then has a better chance of life long persistence.[5]

The Empirical Literature on Parental Support of Children's Physical Activity (CPA)—Physical activity is a central component of healthy behavior. The empirical literature on the role of early parental influences on physical activity exhibits divided opinion on the best type of heuristic model. Moreover, there is much variation in what the empirical studies show. As noted by Anderssen, Wold and Torsheim (2006), many cross-sectional studies have reported positive associations between children's own physical activity levels and their reports about how physically active their parents are. In other studies, the cross-generational connection for physical activity is shown to be weak and, in contrast to a Bayesian perspective, it is argued that a lifelong openness model better describes how individuals' physically activity behaviors are shaped than a model that relies heavily on socialization by parents (Lau, Quadrel and Hartman, 1990). The former implies a

[2]More specifically, Berenson et al (1989) argues that a time path of high or increased physical activity for a child -is induced by parental participation in physical activity.

[3]An example of such bifurcation of healthy and unhealthy behavior is the strong inverse relation between smoking cigarettes as a teen and physical activity.

[4]See Stafford (1979). "A Decision Theoretic Approach to the Evaluation of Training Programs," Technical Analysis Paper, Number 34, A.S.P.E.R., U.S. Department of Labor, in *Evaluating Manpower Training Programs*, p. 9–35, J.A.I. Press.

[5]Frank P. Stafford, "Bayesian Consumer Econometricians," comments presented at the International Seminar on Sociological Economics, Paris, France, September 1977. Published in *Sociological Economics*, Levy Garboua, ed., Paris, 1979. An example consistent with preference path dependence is David Atkin, "Trade Tastes and Nutrition in India," working paper, Department of Economics, Yale University, November 2009. Here the regional diets of children are argued to have a persistent habit formation effect.

minor role for long-term effects of parental socialization and a low likelihood of durable health preference capital because, it argues, youths' behavior changes over time as children move into new environments and new social networks, particularly during adolescence. As further noted by Anderssen, Wold and Torsheim (2006), these changes would have the effect of making physical activity habits less stable over time.

The methods and samples in the empirical literature are diverse. For example, the ages at which the childhood physical activity (CPA) is observed often differs across studies, the extent to which the data are cross-sectional or panel varies, and the parental activity measures are often the resident parents' or grandparents' physical activity per se – not whether it occurs in direct connection to a specific child (Kicklighter, et. al., 2007).[6] The samples are commonly very small, and for panel data the attrition rate is quite high. The physical activity measures found in the literature cover a wide range. One form used for both parents and children is global self-reports, questions such as "Are you physically active" or "How often do you exercise?" At another extreme, is the use of Actigraphs, electronic devices which capture real time movements and register a running cumulative total of activity.

Hofferth et al (2008) provide an example of an Actigraph study. The Actigraph approach requires the subjects to carry a recording device or monitor for a substantial portion of the day and often over a number of days.[7] Different activities often differ in the extent to which they have different levels of the intensity of activity, or METS – a scale of metabolic activity relating to a diverse range of activity and inactivity - and this is recorded well in the Actigraph approach.[8] In their validity study, Hofferth et.al. (2008) demonstrated a moderately high correlation between Actigraph records and time diary reports for a weekend day. We rely on time diary reports of the child on a randomly selected weekday and a randomly selected weekend day in our empirical work in Section III, thereby expanding on the methodological approach of Hofferth et al (2008).

The research of Anderssen, Wold and Torsheim (2006) illustrates the use of panel data in studies of CPA.[9] These authors analyzed a panel of 557 adolescents observed over an eight-year period (from age 13 to 21 years of age) from Norwegian schools. The central measure of physical activity for the child generation was the stylized time use measure: "Outside of school hours, how often do you do sports or exercise until you are out of breath or sweat?"[10] Parents were asked a similar question: "How often do you do sports or exercise?" The study used these data to examine parental physical activity at baseline age, at year 3, and at a year 6 follow-up, and its relationship to the offspring's behavior. Neither the results at the baseline nor the parental change for the frequency per week during the first 6 years of the study showed a significant relationship to the frequency of physical activity in the child generation. The same was true for the reported hours per week measures. The authors argue that these results may indicate that parents' physical activity habits are not transmitted to their children to the degree that is often believed. However, the authors also note that that

[6]For a summary of many studies of preschoolers from a descriptive perspective see Hinkley, et.al. (2008).

[7]The Actigraph approach has some similarities with an experiential sampling approach. For additional information about experiential sampling see Ono and Stafford (2003).

[8]One of the most accepted definitions of physical activity in the field is: voluntary habitual movements of skeletal muscles performed during leisure producing lack of breath or sweat (Andersen, et.al., 2006). In the Transition to Adulthood study this definition is used in self-report. Go to http://simba.isr.umich.edu/select search, then CDS/TA and then enter "sweating' in the search box.

[9]These authors conceptualize physical activity as any "voluntary habitual movements of skeletal muscles performed during leisure time producing lack of breath or sweat" (p. 515). This is similar to the definition offered by Wilcox and Ainsworth (2009), discussed in footnote 3 above.

[10]The measure showed a one-week test-retest Pearson's *r* of .78 for the reported frequencies of every day, 4–6 times a week; and .89 for the hours response categories of 7 hours per week or more, about 4–6 hours per week. The parental measure was weekly frequency of sports or exercise: 4 times per week or more often, 2–3 times per week, once a week, less than once a week, never.

there are problems with self-reports. Possibly self-report bias becomes accentuated if the respondents see physical activity as socially desirable activity to report (Hofferth 2006).

It is clear from economic theory that parents have an incentive to encourage their children to be healthy. Yet the existing empirical literature on children's physical activity presently offers no clear consensus about the intergenerational transmission of physical activity habits. Methods have been varied and sample sizes have been small. In what follows, we analyze the physical activity patterns of children, along with other dimensions of their use of time, using a large dataset that includes panel data and time diary data. Our analysis includes information about actual minutes or seconds spent engaged in different activities in addition to the types of categorical intensity measures discussed above. Our analysis also incorporates measures of direct parental involvement in children's physical activities, allowing us to determine whether parents' physical activity occurs in direct connection to the child, which is something that previous studies have not been able to analyze.

III. Empirical analysis: The Child Development Study and Children's Time Diaries

A central element in our analysis is use of the time diary data from the Child Development Supplement (CDS) of the Panel Study of Income Dynamics (PSID). The PSID is a nationally representative survey of U.S. families and the individuals residing in them that has collected data since 1968. In 1997, 3,563 children living in PSID families were sampled for the CDS. Up to two children under the age of 12 were included, and if a family had more than two children under twelve, two were selected at random. In our analysis, we use time diary data from the CDS along with qualitative measures of physical activity. The time diary data were collected as follows: Two diaries, one a random weekday the other a random weekend day, were obtained for each sampled child. In 2002/03 2,902 of these children were successfully included in a sub-panel and again two diaries were obtained. Also of importance is that extensive information was obtained from the child's caregivers, and the caregivers normally constituted the adults in the regular PSID data collections. From these measures the health behaviors of the parents can be obtained. The CDS continued to follow children over time and re-interviewed the CDS-II children in 2007/8, in the third wave of the CDS.[11]

Once CDS children reach age 18 and have left the CDS data collection they are eligible for inclusion in a special supplement, Transition to Adulthood (TA). From the TA data we can observe early life course outcomes, including educational outcomes, such as attending school beyond age 18 (beyond high school). The TA dataset also includes numerous health-related measures.[12] We use our data to explore the following questions: (1) How much time do American children spend engaged in physical activity? (2) Is there greater physical activity among children whose parents participated in physical activities with them on a daily basis early in the child's life? (3) Is having had a physically active parent when one was very young correlated with spending more time in activities that are physically demanding? (4) Is there persistence in being physically active from pre-teen to teen years, including young adulthood?

[11]Note that some of the children who were in the 2002/3 wave of the CDS (CDS-II) would have reached the age of 18 and graduated high school by 2007/8. These children are followed in the PSID's Transition to Adulthood supplement (discussed in the main text). The sample size for CDS-III is 1,506 children.

[12]For example, measures of obesity, and persistence in time use patterns based on global time use reports on sports activity

Measures[13]

Our child physical activity measures.[14]: Our primary interest lies in examining the actual amount of time that children spend in activities that can be construed as involving some level of physical exertion, particularly for children under the age of 18. Accordingly, our research is similar to the existing literature in that we are interested in knowing how physically active children are. In the CDS, time diary data are collected for activities that are considered to be passive ("passive leisure") and for uses of leisure time in which the children are physically active ("active leisure").[15] The active leisure category includes a variety of uses of time--ranging from participation on formal sports teams, taking karate or skating lessons (and similar classes), and time spent in leisure activities that are unstructured, such as neighborhood football games, "pickup" games at recess and other types of impromptu games that children might play, or even sledding for fun on a neighborhood hill on a snowy day or swimming at the local pool.[16]

In the aggregate CDS Time Diary data file, children's activities have been classified in a number of ways. There is a composite variable that measures time spent in passive leisure activities, such as watching television, reading or simply listening to the radio; and several broad measures of active leisure, with similar activities grouped together. For example, there is a variable titled "active leisure/exercise" that represents time spent in active leisure activities that are unstructured (the aforementioned "pickup" sporting games during recess or impromptu sports games played at home after school, such as when neighborhood children gather together to play soccer in someone's backyard). There is another variable title "games/practices--team" for time spent in practices and games by children who play on formal sports teams. There are also separate measures for (i) active leisure time devoted to classes and lessons, such as judo, ice skating or similarly physically active endeavors (ii) active leisure time devoted to games and practices for sports where people compete as individuals (such as running), (iii) leisure time devoted to walking, and (iv) leisure time devoted to other outdoor activities (such as camping or canoeing). In our analysis we add up time spent in all these categories to create a composite "active leisure" measure.[17]

Because children's weekdays often are structured differently from their weekends, the CDS asked respondents to report on their activities for one weekday and one weekend day. Accordingly, all data are available for a weekday and a weekend day (separately) for each variable. For example, the variable name for the weekday version of the active leisure/ exercise variable is WD073930 (for the 2007 Child Development Supplement). The weekend day version of the variable is WE073930. In most of our analyses we combine the weekend and weekday data to create a measure of the average daily amount of time spent in active leisure pastimes. That is, we sum up all active leisure categories of interest over the 24 hour day to create a composite active leisure measure and then average the weekday and weekend time (AL_1).

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[13]See Appendix for summary chart of variables used in our analysis.

[14]Note that physical activity and exercise are not synonyms. In the literature, the first term is used to describe any body movement produced by muscles that results in energy expenditure. Exercise, instead, is a type of physical activity; it is characterized as planned physical activity that is oriented specifically toward the goal of attaining physical fitness. Accordingly, the term "physical activity" can include a range of actions including yardwork and strenuous housework, in addition to activities like running or yoga (which are examples of exercise activities). See Wilcox and Ainsworth (2009) for further discussion.

[15]The former includes leisure activities where little exertion is required (such as watching television).

[16]For more details about all of the specific types of activities that are counted as active leisure, see the CDS Time Diary documentation.

[17]The Time Diary Aggregate File also includes a variable that aggregates time spent on "play and games". Because this variable includes time spent in activities such as playing board games or video games, we do not include it in our main measure of active leisure time, as our interest lies largely in activities that require some physical exertion. As a descriptive check, however, we create a second composite active leisure measure that does include this category, and report results for this variable when interesting. (Although we do illustrate the extent to which observed physical activity depends on its inclusion or exclusion.)

PCG physical activity measures: A researcher has three variables at his or her disposal to measure a primary caregiver's tendency to be physically active. The first is a variable associated with a question that was posed to PCGs in all three waves of the Child Development Supplement about how often the PCG and the child "played sports or did outdoor activities together" (PCG_SI_02 for 2002). This sports involvement of the PCG variable is a categorical response variable, with answers ranging from not in the past month (PCG_SI_02_0), up to every day (PCG_SI_02_4).[18] The advantage of this variable is that it allows one to determine whether the PCG was physically active alongside the child, which is one way that a PCG might expose her child to physical activity (or the idea that it is important and fun to be physically active). [19]

The second CDS variable that is available to a researcher comes from a CDS question posed to primary caregivers that asks how often the PCG exercises (PCG_EX_02).[20] This variable is also a categorical variable. Responses can range from (1) never in the past 12 months, or (2) one or two times in the past 12 months, up to (3) several times a week. The underlying question was not asked in the first wave of the CDS, but the variable is available in both the CDSII and the CDSIII. We use this information to create a (1-0) dummy variable that indicates whether the PCG exercises or not (PCG_EX_02).

The third variable used to assess a PCG's tendency to be physically active comes not from the CDS directly, but from the ability to link the CDS to the PSID core. As of 1999, the PSID has asked heads and wives about heavy physical activity.[21] Because the children from the CDS reside in households that are surveyed regularly in the PSID, it is possible to link the PSID data to the CDS children. We use these data to create a dummy variable that indicates whether or not a PCG, as a family head or wife routinely engages in heavy physical activity (PCG_HPA_01).

Transition to Adulthood-based Measures: Other outcome variables used in our analysis come from the TA supplement to the PSID. The Transition to Adulthood supplement collects data for individuals who were children in the second wave of the CDS (in 2002/03) who have reached the age of 18 and completed high school by 2007/2008. These individuals would be too "old" to be followed in CDS-III (in 2007/08), because the CDS focuses on dependent minors; however, it was decided that it would be useful to collect data on these "children" as they transitioned into young adulthood.[22] Our analysis of young adults takes advantage of both the intergenerational nature of the PSID and the longitudinal nature of the survey: We include analyses that combine data on young adults with data characterizing their parents (from the PSID core) and analyses that combine the young adult data with data about the young adults' childhood experiences (from the CDS).

The TA supplement includes self-reports of involvement in vigorous physical activity. Specifically, TA question H23a asks, "The next questions are about physical activities such as exercise, sports, or physically active hobbies that you may do in your leisure time. How

[18]See, for example, the variable Q21B31H from the CDSII which compiles PCG's responses to the following question: "In the past month, how often did you and CHILD play sports or do outdoor activities *together* (emphasis added)?" (Q21B31H). Not in the past month (1), 1 or 2 times in the past month, (2) About once a week (3), Several time a week (4) or every day (5)."

[19]The idea of direct involvement with the child appears consistent with the finding of an important role of family support (Wenthe, Janz, and Levy, 2009)

[20]Specifically, the question asks, "Please tell me how often you have participated in the following activities within the past 12 months -- Physical exercise, such as aerobics, running or lifting weights." See question J6E_P in the 2002 CDS for example.

[21]Specifically, the question asked (for both heads and wives) is, "How often do you [does she] participate in vigorous physical activity or sports--such as heavy housework, aerobics, running, swimming, or bicycling?" Respondents then report the frequency of their activity, such as 2 times a week or once every day, et cetera. For example, see variables ER19814 and ER19815 from the 2001 PSID.

[22]These offspring are roughly between age 18 to 24 in 2007.

often do you do vigorous activities for at least 10 minutes that cause heavy sweating or large increases in breathing or heart rate?"[23] The resultant variable is a categorical response variable (TA_AL_0, TA_AL_1, TA_AL_2, TA_AL_3) where TA_AL_3 is several times a week or more). We use this TA variable in an index from of 0 to 3 to make comparisons between the tendency to be physically active in the child generation and the tendency to be physically active in the parent generation (using parents' self-reports of whether they engage in heavy physical activity for the latter part).[24] Additionally, this variable can be used to explore the connection between being physically active as a young adult and having had a PCG who involved the individual in athletic or outdoor activities when the young adult was a child (using the aforementioned PCG measure that is based on the CDS question about whether the PCG participated in sports or outdoor activities with her child for the latter).

Empirical findings: Descriptive data on children's time use--cross sectional results—As shown in Table 1, analysis of cross-sectional data from the CDS reveals that, on average, U.S. children spend significantly more time engaged in passive leisure (PL), activities than active leisure activities. [25] For the former, children devote around 170 minutes--almost 3 hours--a day to such activities. By comparison, children spend much less time being physically active, on an average day. For example, in 2007, the average amount of time spent in sports and active leisure activities using the narrow definition used in Table 1 (AL_1) was about 45 minutes on a daily basis or, even using a more inclusive definition (AL_2) around 106 minutes.[26]

Examining other points in the distribution (Table 2), one sees that 50% of children spend fewer than 15 minutes engaged in active leisure activities on an average day [AL_1; with the AL_2 measure is 82 minutes]. At the 75th percentile, 67.5 minutes are spent in AL_1 activities and for AL_2 it is 162.5 minutes); at the 25th percentile 0 minutes are spent (AL_1 and 15 minutes for AL_2). Accordingly, there is wide variety the amount of time that is spent pursuing active leisure activities among different children.

Consistent with the existing literature (Sallis, Prochaska and Taylor 2000, for example), Table 3 shows that the CDS time diary data reveal large differences between the amount of time that boys and girls spend engaged in active leisure activities. Similarly, there are differences between white and non-white children, although inspecting the standard errors reveals that the mean differences for race are often not statistically significant.

While Tables 2 and 3 report a number of interesting differences among children based on the characteristics of the child, such as the gender gap found in other studies (Kerr et. al., 2008), we are more interested in differences that exist in time spent on active leisure activities for children whose primary caregiver tends to be physically active versus children who are raised by individuals who do not tend to be physically active or involved with the child in this life domain. Specifically, Table 4 sets out the relationship between weekly time in active leisure and the CDS variable that tracks the PCG's report of involvement in physical

[23]Respondents can answer, (i) Several times a week or more, (ii) about once a week, (iii) several times a month, (iv) about once a month, (v) less than once a month, or (v) never?

[24]As indicated above, heads and wives of PSID families are asked whether they participate in heavy physical activity. That makes for relatively good comparability between the questions that the young adults responded to and our measure of the prevalence of physical activity in the parent generation.

[25]As a statistical challenge, it is well-known that while time dairy data seem relatively unbiased they are subject to a great deal in inter-day variability even for quite routine activities during the weekdays (Ono and Stafford 2003; Kalton, 1985). For this reason we often rely on subgroup averages or examine a relation between an outcome and time use using the time diary data as the dependent variable in order to limit attenuation bias (Kendall and Stuart, and Ord, 1983).

[26]As noted in footnote 19, our descriptive statistics show how the broad measure of active leisure that includes the Time Diary aggregate variable about playing games compares to our preferred active leisure measure, which does not include the play-games category.

and sports activities with the child in 2002/2003 (PCG_SI_02).. The data analyzed for Table 4 are from a balanced a panel of children from both the 2002/03 and 2007/08 data waves. As of 2002 they were largely within the age range 5–12, and as of 2007/08 they were ages 10–18.

As shown in Table 4, as the PCG reported greater levels of frequency engaging in sports or other outdoor activities with the child (in 2002/2003), we observe greater mean minutes in active leisure on a daily basis, in the child generation, during that same time period.[27] The minutes rise from about 26.7 to about 50.5 minutes if we compare children if the PCGs never engaged in physical activities with the child and children whose PCGs did, almost a doubling across the PCG categories for 2002/03 using AL_1. This difference is statistically significant at the .01 level. There is also substantial variability within each subgroup – as indicated by the coefficients of variation. For the same children five years later--in CDSIII (2007/08)--there is still a difference between children in the highest PCG group and those in the lowest PCG group, although it is only marginally significant (p=.10). Children who had PCGs that participated in sports or physical activities with the child several times a week back in 2002/2003 spent almost an hour doing active leisure activity five years later; while children with PCGs who reported *never* engaging in physically active activities alongside their child spent only about 42 minutes in active leisure activities in 2007/2008.

Note that in Table 4, the persistent effect of parental sports involvement appears only for the higher levels of early involvement – suggesting that if parents go 'out of their way' to connect with the sports of pre-teens there may be a long-lasting effect.[28] To explore this further, we selected the CDSII children who were old enough to be included in the Transition to Adulthood ("TA") Module in 2007/08 (a balanced panel of CDS participants for whom the CDS PCG reported on sports involvement as in Table 4, but who were age 18 or older as of 2007) Their self-reports of time use were examined from a question on stylized time use.[29] Specifically, the TA youth were asked the following: "The next questions are about physical activities (exercise, sports, physically active hobbies...) that you may do in your leisure time. How often do you do vigorous physical activities for at least 10 minutes that cause heavy sweating or large increases in breathing or heart rate?"[30] A simple average of this score from the young adult in 2007/08 conditional on the PCG answers to the question about participating in physical activities jointly with the child in 2002/03 is shown in Table 5 (below).

The table shows that those cases where the PCG reported being involved in physical activities alongside her child more than once a week in 2002/03 are more likely to be where the children, now young adults in 2007/08, turn out to be active as young adults. Like Table 4, this, too, suggests a persistence of effect for higher levels of the more direct and active PCG involvement carrying over to the child's being physically active later in his life.[31]

[27]The average is the numerical average of the two days for which the time diary data were collected – one a randomly selected weekday and a randomly selected weekend day.

[28]Work with outcomes with the sports commitment has show that simply a nominal participation in sports, as distinct from active and regular participation, has little apparent relation to desirable outcomes (Eccles and Harris, 2005). One thought is that sports have an obvious demonstrable component, and in that way may be a good platform for early childhood 'lessons'.

[29]"How often do you do vigorous activities for at least 10 minutes that cause heavy sweating or large increases in breathing or heart rate?" 1= several times a week or more, 2 = about once a week, 3 = several time a month, 4=About once a month, 5=Less than once a month; 6=Never (TA070715). Note this excludes the CDS children who became families totally on their own since the response scales were different (TA070718).

[30]See question H23a and the associated TA variable TA070718.

[31]For older children the peer connections may reinforce or depreciate the health capital or preferences supporting health capital (Davidson and Jago, 2009)

Regression analyses

To see if the patterns in the CDS match the results in the CPA literature we exploited the longitudinal nature of the PSID in order to estimate a few simple models of time use in active leisure pastimes for children in the CDS-III as a function of whether or not the PCG was physically active in some way when the child was young. We first examine children's participation in active leisure activities (AL_1) as measured by time diary data in the CDS-III, and PCGs' reports of exercising in 2002. This allows us to measure children's "exposure" to physical activity while they were young.[32]

Other measures are used as control variables in our regressions. The regressions will incorporate measures designed to describe children's personal characteristics, their family background, and any PCG's characteristics that might influence time use (other than the PCG's tendency to be physically active).

For child characteristics, we are particularly interested in how time spent in active leisure activities varies by age, race, and gender. We measure age by taking the PSID variable that records individuals' birth year, and subtracting this year from 2007 (CH_AGE_07). To examine race we divide children into two groups: whites and nonwhites. In the regression analysis we take account of one additional child characteristic--whether the child has a health limitation or not. This measure is constructed from a CDS question posed to primary caregivers: Question A9a. "Does CHILD currently have any physical or mental condition that would limit or prevent (his/her) ability to do usual childhood activities such as play, or participate in games or sports?" We use this information to create a dummy variable indicating whether the child had a health limitation or not (HL_CH_02). While not reported upon, the effect is the one expected: less active leisure if a child has health limitations.

Because the existing literature suggests that family income can influence sports participation (Sener, Copperman, Pendyala, and Bhat 2008), our regressions include a control for family income (FAM_INC_07). In the United States, participation on formal teams may involve sign-up fees or the purchase of equipment, and classes like karate classes or skating lessons are rarely free. Moreover, a family's income may be related to the type of neighborhood that the family resides in, and existing research has documented associations between the average income in a neighborhood and safety and the presence of parks, fields and trails, which may affect children's ability to be physically active (Sallis and Glanz 2006). We measure family income (FAM_INC_07) using the PSID's total family income variable, which includes income from all sources. This variable is taken from the 2007 wave of the PSID and refers to the calendar year of 2006.

Finally, to determine whether any association between PCG physical activity and child physical activity that is found is robust, some of our regression models will include additional controls for primary caregiver's education (PCG_ED_07) and whether or not the primary caregiver smokes. The PSID collects education data for heads and wives of its households. Because we can link children from the CDS to PSID families, we are able to use the information about heads and wives to assign education levels to the child's primary caregiver. Education (PCG_ED_07) is measured as years of schooling; the variable is continuous through 16, with a upper code value of 17 to indicate individuals who have done some postgraduate work. This is taken from the 2007 wave of the PSID.

[32]While we explored connections between children's time use and each of the three different measures of PCGs' tendency to be physically active that were discussed earlier, it is the PCG exercises variable that tends to show the strongest association with child's time use. Accordingly, we only report the regression output for this covariate.

The role of PCGs' tendency to be physically active—We explored the relationship between children's time use in 2007 and a measure of whether the child's PCG was physically active or not while the child was young. The relevant empirical model is,

$$Y_t = \alpha + \beta\,\mathrm{PCG\_EX\_02}_{t-1} + \psi\,Z_t + \rho\,\mathrm{FAM\_INC\_07}_t + \lambda\,\mathrm{PCG\_ED\_07}_t + \delta\,\mathrm{PCG\_SMK}_t + \varepsilon_t \quad \text{(equation 1)}$$

where Y_t is our dependent variable, Z_t is a vector of child characteristics that are known to be correlated with children's time use, and epsilon is an error term.

For these regressions we have run a series of models, starting with a baseline model that examines the bivariate relationship between our outcome variable and the dummy variable indicating whether the PCG exercises or not in 2002 (PCG_EX_02). After this analysis we ran models that added the controls for child characteristics, then family income, and then the PCG education and PCG smokes or not measures. So equation 1 represents the "full" model, while our table of regression output will show results for each of the different specifications that lead up to this full model. In these regressions we exploit the longitudinal nature of the PSID by making use of two waves of the CDS. Specifically, we use the CDS-II variable measuring how often the PCG exercises (PCG_EX_02), while our outcome measures of the child's activity come from CDS-III (the third wave of the survey, conducted in 2007). This specification allows us to explore the hypothesis that "exposure" to physical activity at a young age has important effects on children's decisions about time use when they are older. The outcome measures that we examine are: AL1_07, the amount of time spent in active leisure by the child (measured in seconds in the regressions), and (b) the ratio of time spent in active leisure pursuits to time spent on passive leisure activities (AL1_07/PL_07) Also, we focus on mothers in the CDS analysis because our main interest is in whether the child's primary caregiver (95 percent of whom are moms) exposed the child to physical activity when the child was young. Two of the measures of PCGs' tendency to be physically active that are discussed above can be obtained directly from the CDS-II. However, the data for one is not available in the CDS. Instead it is contained in the PSID core. Specifically, information about whether adults are engaged in activities that are strenuous enough to raise the heart rate, which is what the "heavy physical activity" variable measures, is collected in the PSID core. Accordingly, when constructing our dataset, we were required to incorporate data from the 2001 PSID (which is closest in calendar year to the 2002 CDS) in order to determine whether a CDS-III child had a PCG who engaged in heavy physical activity when the child was younger. [33] Given the concern over the use of OLS and the concern over limited dependent variable models such as Tobit (Stewart 2009), we estimate the models in Table 6 using both OLS and Tobit.[34] All regressions are estimated in Stata, and incorporate Stata's cluster-robust technique for computing standard errors.

We find that the measure of PCG exercise (PCG_EX_02) has a more substantial relationship to the child's active leisure time (AL-1) as of 2007 rather than (b) the question about PCG

[33]We thank an insightful reviewer for this suggestion. Also we explore the use of Tobit as well as OLS. As noted there is a question as to which is preferred (Stewart, 2009).

[34]Specifically, the controversy is as follows: It is rather commonplace for researchers to turn to Tobit regressions when faced with a dependent variable that takes on a value of zero for a non-trivial fraction of observations. Researchers have typically treated such data as censored; the argument generally advanced for using Tobits to estimate such a model is that the researcher faces a problem because the observed values of Y are not normally distributed (Wooldridge 2009). In such a case using a Tobit estimation strategy adjusts for the distributional problem. Tobit models are therefore common for economic variables and decisions that involve corner solutions. However, Stewart (2009) has argued that the appropriate estimation strategy for time diary data is ordinary least squares (OLS). He argues that one observes zeroes in time diary data because there are some activities that individuals do not do every day, causing the survey to record zeroes in instances in which the dependent variable is truly positive. For example, Stewart notes, it is reasonable to assume that everyone purchases clothing. However, because time diary data are collected on a single day, a survey is likely to record many individuals with zero time spent engaged in this activity. Stewart (2009) shows that Tobit estimates can be biased under such circumstances, and that OLS is the better estimation strategy.

involvement in heavy physical activity (PCG_HPA_01). (See Table 6 row 1.) In most instances this obtains even when the child's characteristics are controlled for. In the Tobit regression where the dependent variable is logged, the pattern persists after family income (FAMINC_07) is controlled for. However, a consistent feature of all the regressions is that once additional controls are added to measure - the PCG's education (PCG_ED) and the primary caregiver's tendency to smoke (PCG_SMK_07), the variable, PCG_EX_02, is no longer statistically significant in predicting subsequent active leisure (AL_1_07). Our interpretation is that the resource measure of mother/primary caregiver education and family income is consistent with the generally strong intergenerational connections in economic and health domains (Gouskova, Chiteji and Stafford, 2010, Schoeni, McGonagle and Stafford, 2008), and that encouraging early physical exercise is one of the paths to such an association.[35] These regressions that use PCG exercises variable to measure a PCG's tendency to be physically active therefore do suggest that there is some benefit to early "exposure" to exercise for the child--that children age 10–18 whose PCGs exercised regularly when the child was young tend to spend more time being active themselves--but that this effect is mediated through PCG's education and family income.[36]

As shown in Table 7, in the regressions in which the dependent variable is the ratio of active leisure time to passive leisure (AL_1/PL), the results are similar.[37] There is a positive and statistically significant association between the ratio of time allocated to active leisure activities compared to passive leisure and a child's having been exposed to exercise when he or she was younger (as measured by the PCG_EX_02 variable). This positive association exists even when child characteristics are controlled for. However, the as with the Table 6 results, the association is not always robust to the inclusion of additional controls for family income and other PCG characteristics such as education and smoking. Stafford and Yeung (2005) demonstrates that families with greater resources allocate more developmental time to their child. This fact pattern explains the weakened association between the outcome measure and the exposure measure after family/PCG background controls are added.

The carryover to young adulthood

The next brief exploration is of the carry over to young adulthood. Here the goal still remains to determine whether early exposure to physical activity influences decisions that offspring make on their own about time use later in life. Accordingly, the relevant empirical model is similar to that expressed by equation 1 (above). However, our outcome measure now comes from the TA module of the PSID.[38] Moreover, as it is easier to match individuals in the TA sample to both parents, the regressions in Table 8 also include controls for father's education in addition to mother's (although, as commonly found in the literature, it is mother's education that tends to matter most for child development purposes in our regressions).[39]

The time measures analyzed are stylized reports of time rather than diary based time measures. Specifically, in Table 8 we explore the relationship between a young adult's self-

[35]As noted previously, our regression analysis focuses on children whose PCG is their mom. The prior footnote explains why. As over 95 percent of children fit this description, we do not lose many cases by restricting the data in this way.

[36]Interestingly, despite the aforementioned debate about Tobits versus OLS, we do not find much difference between the size of the marginal effects estimated by the two procedures. As seen in Table 6, the numbers in the different columns of each row are often similar.

[37]We thank the referees for suggesting that we include an analysis of this outcome variable.

[38]Moreover, we add an additional lag in some models to allow for the possibility that having a PCG who exposed her young adult to physical activity in 1997 might matter, in addition to exposure received in 2002. Because young adults are, by definition, quite old when surveyed in 2007 (they are age 18–23), these are individuals for whom it is possible to use the CDS data to capture many points in their childhood.

[39]Research suggests that it is a child's mother's education that is particularly influential for child development purposes (Magnuson 2007, for example).

report of being physically active (YA_PA_07) and a number of different covariates, such as whether the young adult had a PCG who frequently participated in sports or outdoor activities alongside the young adult when the young adult was a dependent minor (PCG_SI_02/97), and whether the young adult had a PCG who frequently participated in sports-like activities alongside the child when the individual was young. Our dependent variable is the vigorous physical activity measure that first appeared in Table 5. For the regression analysis however, we have recoded the data to rescale it so that lower values represent lower frequencies of engagement.[40] This change makes for easier interpretation of the results. The regressions reported below are estimated using ordinary least squares.

In the simple baseline regression in column 1 we simply use the 1997 and 2002 measures to determine whether the primary caregiver "exposed" the young adult to physical activity when the young adult was a child by participating in sporting or outdoor activities with the young adult when he or she was a child. As shown in the table, the 2002 (and 1997 separately, not shown) exposure measures individually has a substantial and similar effect. When both are used in the second column, the effect of the two combined is significant while the effect of each is reduced individually. As young adults age, the prior participation in sports or outdoor activities, in conjunction with the PCG during the years 2002 and 1997, shows an impact. Other explorations (not reported) show that team sports involvement is an important pathway from the PCG to shape the child's later physical activity. It can also be noted that the gender differential as shown in Table 3 for teenagers, appears to carry over from teenage years.

IV. Discussion

In this paper we have argued that early childhood experience seems to matter for early life outcomes by the route of shaping preferences. The theory could be one in which the parental activity shapes a long term, patient and foresighted perspective for their child or, alternatively where the early childhood experience itself leads to a type of what appear to be myopic, Bayesian, path-dependent preferences. Either way, the importance of a preference connection is that the early life course health of children as they become adults is self produced.

Unlike financial transfers – and to some extent labor market human capital where parental financial resources play a major role in the United States – the health state of younger persons is self-produced with physical activity as a central element. We further argue that time diaries seem to be effective in capturing the physical activity of young adults and are another way in which time diaries can be of value in understanding human well-being. Empirically, we observe a type of non-linearity in which higher levels of direct involvement with the child's early physical activity carry over through time.

In terms of the existing literature, where the question of tracking or persistence through time versus intertemporal variablility over the life course has been raised, our research indicates the presence of substantial tracking. Very active parental (PCG) involvement can shape later choices through early and direct participation in sports and other heavy physical activity. The panel data, spanning childhood into young adulthood, allow us to show that this transmission across generations carries over at least into young adulthood, and is clearly more pronounced for young men.

[40]The variable reported in the TA dataset (TA070715) spans the range 1 to 6, with "1" representing the highest frequency of activity and "6" representing never. We recoded the data in order to have the lower values correspond with lower frequency of participation. Specifically, we subtract TA070715 from 6 in order to create a variable that spans the range 0 to 5, with zero representing an individual who never engaged in vigorous physical activity, and 5 representing individuals who did vigorous physical activity several times a week or more (the highest possible response allowed).

Acknowledgments

We thank Suzanne Bianchi (UCLA), Jonathan Gershuny (Oxford), Thomas McCurdy (U.S. EPA) and reviewers for numerous helpful suggestions. The authors wish to acknowledge the financial support of the National Institutes of Health (Grant AG29409-02s1).

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Appendix A. Data Description Table

Variable Name	Description	Years Included
Demographics/PCG/resources		
CH_AGE_02	Age of child in years as of 2002	2002, 2007
MALE	=1 if male child, 0 otherwise	2007
WHITE	= 1 if white) otherwise	2007
FAM_INC_07	Family income, in $100,000's (mean=.715, 25th percentile=.287, median=.535, 75th percentile=.920, std dev=.738	2007,2003
HL_CH_02	Does PCG report the child as having physical or mental health limits as of 2002? (= yes)	2007
PCG_SMK_07	PCG reports being herself a smoker as of 2007	2007
PCG_ED_07	Years of schooling of PCG as of 2007 (1 – 16; 17 is past college)	2007
OCG_ED_07	Other caregiver's (mostly the father or grandmother) years of schooling	2007
Exercise Variables		
AL1 (02 and 07)	Active leisure of the child the average of a random weekday and a weekend day (narrow definition)	2007, 2002
AL2 (02 and 07)	Active leisure of the child (more inclusive definition)	2007, 2002
PL (02 and 07)	Passive leisure of the child	2007
PCG_SI_CH_97 and 02	Does the Primary Caregiver report being involved with the child's sports and active leisure 1997 and 2002 (differing levels 0 – 4)	2007
PCG_EX_02	How frequently does the PCG exercise herself? (Never=1 … Several times a week =7)	2002
PCG_HPA_01	PCG report from PSID core on whether routinely engages in heavy physical activity	2001
YA_AL_0 - 3	Young adult (TA) reports no (0) to high (3) physical activity as of 2007	2007 (TA)

Appendix B--Descriptive statistics for the control variables (for regressions using the CDS sample)

Variable	Mean (standard deviation)
Child age	14.07 (2.2)
Child is male (yes = 1, no = 0)	.505 (.50)
Child is white (yes = 1, no = 0)	.625 (.48)
Child has health limitation (yes = 1, no = 0)	.064 (.24)
Family income (in dollars)	80,907.53 (86,235.79)
Mom's education level	13.1 (2.9)

Variable	Mean (standard deviation)
Mom smokes (yes = 1, no = 0)	.166 (.37)

Appendix C--Descriptive statistics for the control variables (for regressions using the TA sample)

Variable	Mean (standard deviation)
Young adult's age	20.2 (1.6)
Young adult is male (yes = 1, no = 0)	.518 (.50)
Young adult is white (yes = 1, no = 0)	.635 (.48)
PCG education level	13.0 (2.9)
OCG education level	13.4 (2.8)
PCG frequency of participation in sports or outdoor activities alongside the young adult when the young adult was a child back in 2002	1.66 (.97)
PCG frequency of participation in sports or outdoor activities alongside the young adult when the young adult was a child back in 1997	2.46 (1.2)
Family income (in 1,000 dollar units)	8,333.73 (5,151.52)

Table 1

Children's Time Use--Active (AL) and Passive Leisure (PL): Average daily minutes

	AL_1	AL_2	PL
2007/2008	44.67 st. error = 2.40 CV=6.19	106.04 st. error = 3.64 CV=4.15	170.83 st. error = 3.76 CV=2.72

Notes: Author's analysis of cross-sectional data from the CDS-3. All data are weighted. AL-1denotes active leisure/sports without the PSID variable "active leisure/play games included." It therefore represents the narrow measure of active leisure (AL) time. AL-2 denotes the broader definition of the concept, which includes time spent playing games.

Table 2

Minutes spent on an average day at various quartiles and among different child subgroups--2007 CDS cross section

	PL average daily minutes	AL_1 average daily minutes	AL_2 average daily minutes
75th percentile	232.5	67.5	165.0
Median	152.5	15	82
25th percentile	89.5	0	15
N	1424	1424	1424

Notes: The daily averages are for what can be thought of as a synthetic week, consisting of one randomly selected weekday and a randomly selected weekend day. Here we follow the day sampling design of CDS and do not reweight for weekdays versus weekends. Authors' analysis of cross-sectional data from the 2007 CDS. Population weights are applied to provide a representative sample of children age 12–18 as of 2007.

Table 3

Minutes spent on an average day by gender and race

	Boys	Girls	White children	Non-white children
Mean values with standard error in parenthesis				
PL	166.92 (se=4.22)	175.30 (4.25)	181.49 (se=5.10)	168.44 (se=5.71)
AL_1	53.35 (se=2.57)	35.23 (se=2.40)	51.59 (se=3.69)	40.3 (se = 2.72)
AL_2	135.99 (se=4.23)	74.34 (se=3.32)	88.05 (se=4.29)	111.30 (se=5.64)
Median values				
PL	150	154	154	162.5
AL_1	26	0	15	0
AL_2	117.5	45	85	56
N	708	681	415	513

Notes: Authors' analysis of cross-sectional data from the 2007 CDS. All data are weighted. Standard errors in parenthesis. PL denotes passive leisure. AL-1denotes active leisure/sports without the PSID variable "active leisure/play games included." It therefore represents the narrow measure of active leisure (AL) time. AL-2 denotes the broader definition of the concept, which includes time spent playing games.

Table 4

PCG involvement and Time diary Measure of Child's Time in Active Leisure--Average daily minutes (Coefficient of variation in brackets)

	PCG's report about the frequency of engaging in sports and outdoor activities with the child in 2002/2003 (PCG_SI_02)				
	Not in past month	**1–2 times a week**	**About once a week**	**Several times a week or more**	**All**
Minutes children spend on active leisure activities (average)					
2002/2003	*N=478*	*N=382*	*N=263*	*N=221*	*N=1344*
AL_1	26.7 [6.8]	32.2 [6.3]	40 [6.3]	50.5 [5.3]	35.0 [6.3]
AL_2	130.7 [3.2]	140 [2.8]	138.6 [2.8]	152.4 [2.7]	138.6 [2.9]
2007/2008 (CDS-3)	*N=479*	*N=379*	*N=253*	*N=218*	*N=1329*
AL_1	41.7 [6.2]	43.3 [5.8]	39.4 [6.1]	55.8 [6.1]	44.0 [6.1]
AL_2	103.3 [4.4]	107.8 [3.8]	88.6 [4.3]	123.4 [3.9]	105 [4.1]

Notes: All data are weighted using CDS-3 child weights. There are 1494 CDS children in the balanced panel. Children with all PCG types are included here. Coefficient of variation in brackets. AL-1denotes active leisure/sports without the PSID variable "active leisure/play games included." It therefore represents the narrow measure of active leisure (AL) time. AL-2 denotes the broader definition of the concept, which includes time spent playing games.

Table 5

Average Reported Physical Activity of Young Adults in 2007/08 and Prior PCG Report of Jointly Engaging in Sports or Outdoor Activities with the Child in 2002/03

PCG participated in sports or outdoor activities with the child in 2002/03 (PCG_SI_02)	**Young adult average physical activity score (2007/08) (YA_PA_07) (1 is more active; 5 and 6 are inactive)**
Not in the Past Month	2.40
1 - 2 Times Last Month	2.40
About Once a Week	2.50
Several Times a Week or More	1.78

Notes: Authors' analysis of data from the PSID 2007 Transition to Adulthood (TA) Supplement combined with data from the 2002 CDS. The sample is all young adults in the 2007 TA module. Analysis incorporates the PSID/TA statistical weights.

Table 6

Marginal effects from OLS and Tobit regressions: Outcome variable is active leisure time (AL-1_07) on an average day (measured in seconds per day).

Marginal effects for the PCG_EX_02 regressor				
Model	**OLS with dependent variable in levels**	**Tobit with dependent variable in levels**	**OLS with logged dependent variable**	**Tobit with logged dependent variable**
with child characteristics	604.416 (t=1.58)	618.484 (t=1.83)	.628 (t=1.76)	.762 (t=2.52)
with child characteristics and family income	425.093 (t=1.07)	405.339 (t=1.14)	.319 (t=0.87)	.586 (t=1.90)
full model (controls are child characteristics, family income, PCG education and PCG smokes)	249.753 (t=0.57)	284.670 (t=0.71)	.289 (t=0.72)	.515 (t=1.46)

Notes: Author's analysis of time diary data from the 2007 CDS; t-statistics are in parenthesis. All regressions incorporate the PSID weights. All regressions use cluster-robust estimators for the standard errors. AL-1 is the narrow measure of children's time spent engaged in active leisure endeavors. N = 1117.

Table 7

Comparison of OLS and Tobit regressions: Outcome variable is the ratio of active leisure time to passive leisure time

Marginal effects for the 2002 Exercise of PCG (PCG_EX_02) regressor		
Model	**OLS**	**Tobit**
with child characteristics	.5077 (t=1.69)	.5499 (t=1.95)
with child characteristics and family income	.4288 (t=1.53)	.4518 (t=1.77)
full model (controls are child characteristics, family income, PCG_ED and PCG_SMK)	.3497 (t=1.46)	.384 (t=1.61)

Notes: For these regressions the dependent variable is measured in levels. Authors' analysis of time diary data from the 2007 CDS. t-stat in parenthesis. All regressions incorporate the PSID weights. All regressions use cluster-robust estimators for the standard errors. N = 1117.

Table 8

Young Adult Score of Regular Time Engaging in Vigorous Physical Activity, 2007

Covariates	Model 1	Model 2
PCG_SI_02 (PCG engaged in sports or outdoor activities with the child in 2002)	.169*** (.057)	.125* (.071)
PCG_SI_97 (PCG engaged in sports or outdoor activities with the child in 1997)		.089 (.065)
MALE (1-0)		.415** (.145)
WHITE (1-0)		−.003 (.181)
AGE__CH_07		.047 (.048)
PCG_ED_07		.083** (.037)
OCG_ED_07		.016 (.037)
FAM_INC_07 (in $1,000)		.00094 (.0043)
Intercept	3.50 (.109)	.923 (1.078)
Adjusted R^2	*.012*	*.077*
N		540

Notes: Authors' analysis of data from the 2007 Transition to Adulthood supplement. Standard errors are in parenthesis. All regressions incorporate the PSID's statistical weights, and report output that uses robust standard errors that account for clustering.

* p<.10;

** p<.05;

*** p<.01.