IARIW 2024

IARIW 2024

Thursday, August 22 – Friday, August 30

Household Production and Inequality in Living Standards in the U.S., 1965–2018

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Paper prepared for the 38th IARIW General Conference
August 26-30, 2024

Session 6A-2, Further Improving Household Distributional Results with Particular Reference to Adjusting the Top of the Distribution II

Time: Friday, August 30, 2024 [11:00-12:30 GMT]

Not all leisure is created equal: Examining synergies between income and leisure enjoyment*

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July 2024

Abstract

What is the relationship between leisure utility and income? We address this question with fine-grained data on emotional wellbeing reported during leisure activities in the U.S. showing that individuals in poorer families experience less happiness during leisure activities. Poorer individuals devote more time to leisure and engage in less pleasurable leisure activities, but the effects of diminishing marginal utility of leisure and the detailed type of leisure activity undertaken, as well as with whom, contribute little to explaining the positive leisure-income gradient. Instead, we provide suggestive evidence that income creates psychological spillover effects on leisure enjoyment by relieving the background stress associated with financial scarcity. Our results undermine the current consensus, motivated by the robust negative correlation of leisure time and income, that the distribution of leisure time countervails income inequalities: time devoted to leisure appears to be a poor proxy for the actual leisure utility and the extent to which leisure reduces measured inequality in wellbeing has been overstated. Our results also shed light on the complementarity between income and leisure in the labour supply decision.

Keywords: leisure, consumption, inequality, emotional wellbeing
JEL Classification: D63, I3, J22

[*] *Acknowledgements.* The authors gratefully acknowledge comments by participants at the BeWell meeting (Berlin, 2024), the conference on Well-being, Public Policies, and Sustainable Human Development (Paris, 2024), and the Royal Economic Society conference (Belfast, 2024). We are also grateful to Tom Günther, Ronnie Schöb, Anthony Lepinteur, Nancy Folbre, and Andrew Clark for helpful discussions.
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1. Introduction

The trade-off individuals face between the consumption of market goods and leisure is one of the most influential notions of economics. In this study, we answer the question of whether income enhances the utility derived from leisure and investigate why that is. To this end, we utilize detailed data on emotional well-being during leisure activities in the United States. We document that individuals from poorer households tend to experience less happiness during leisure pursuits than individuals from richer households. In the process, we highlight a crucial distinction: the positive association between leisure time and happiness is not observed for other activities, such as work or household chores. This suggests that common explanations, such as a happy disposition leading to higher productivity or income simply making people happier, may not sufficiently explain the positive income-leisure enjoyment relationship.

We propose and subsequently test for three nonexclusive alternative reasons for this relationship: (i) The marginal utility of leisure is decreasing: we posit that the utility value of each unit of leisure is greater when less overall leisure is consumed. As high-income earners in the U.S. work more (and devote less time to leisure), they may also benefit more from enjoying an additional hour of leisure. (ii) Earning more income allows workers to 'buy' particularly enjoyable leisure experiences. That is, more income allows individuals greater opportunities to satisfy their leisure preferences. (iii) Increasing income may create a psychological spillover effect in that it allows individuals to enjoy any leisure activity more as they are less preoccupied with making ends meet.

While explanations (i) and (ii) relate to the usually assumed complementary between consumption and leisure in the standard model of labour supply, explanation (iii) is derived from the nascent research on the importance of mental bandwidth in psychology and economics. This literature suggests that poverty may have negative psychological consequences on cognitive function (Mani et al. 2013, Shah et al. 2019). The link between poverty and counterproductive behavior can further deepen poverty, as the poor are relatively worse at managing their finances and healthcare and are less productive workers (Duncan et al. 2017, Kaur et al. 2021). While this could be explained by the characteristics of the poor themselves, such as being less well-educated, recent work highlights the role of mental processes. The idea here being that the human cognitive system has limited capacity, whereby financial background stress can reduce cognitive 'bandwidth,' and limit people's ability to engage in cognitive tasks. In contrast, the abundance enjoyed by richer individuals implies a freedom from tradeoffs: "when we buy something under abundance, we do not feel we have to give anything up.

Psychologically, this is pleasing." (Mullainathan and Shafir 2013, 96). We suspect that this effect might matter especially during leisure activities, which is when people have time to spend their money.

In essence, we hypothesize that the reduction in cognitive 'bandwidth' associated with the stresses and strains of being poor may not only impede decision-making, but may also mean that the poor experience lower utility from a unit increase in consumption of goods consumed during leisure time. In support of this premise, experiments in India found that subjects randomised to higher levels of financial stress reported less satisfaction on consumption activities in general (Schofield and Venkataramani 2021). They argue that poverty imposes a 'double tax' as the poor spend less but also enjoy less utility from a *given* unit of consumption as poverty reduces the bandwidth available to fully engage in leisure activities. To our knowledge, no research has studied this relationship using large, nationally representative data and with a view to examining the income-leisure utility relationship.

In the process, we pursue a novel approach to the measurement of leisure utility by relying on survey questions on momentary happiness when engaged in leisure activities. Increasingly, economists have relied on self-reported measures of well-being as a proxy for utility and this work has greatly contributed to our understanding of what makes individuals and societies better off, augmenting the standard economics approach of revealed preferences (e.g., Weimann et al. 2015). When it comes to the enjoyment of specific activities this literature has put forward measures of momentary happiness as indicators of utility (Kahneman and Krueger 2006, Han and Kaiser 2024). For instance, studies find systematic differences in the emotional well-being of employed and unemployed workers across activities (e.g., Lawes et al. 2023). While the employed devote more time to unenjoyable activities such as work, they enjoy their leisure episodes more than the unemployed (Knabe et al. 2010, Wolf et al. 2022). Similar to our explanations for the positive relationship between income and leisure utility, Krueger and Mueller (2012, p. 598) speculate that this saddening effect of unemployment "could be due to the low amount of income the unemployed have to spend on leisure activities, to diminishing marginal utility of leisure, or because the unemployed have time to think about their predicament."

In relation to income, some studies clearly indicate a positive correlation with momentary happiness across activities while debating if (and for whom) there is a saturation point beyond which income no longer increases emotional well-being (Kahneman and Deaton 2010, Killingsworth 2021, Killingsworth et al. 2023). Using the same data as we do, Stone et al.

(2018) find no significant relationship between income and feeling happy, but a negative association of income with sadness and pain. These mixed results might mask heterogeneous impacts of income on these emotions during certain activities, such as work and leisure. Bryson and MacKerron (2017) find that poorer individuals enjoy working relatively more in comparison to rich individuals. In turn, this implies that richer individuals enjoy other activities more than working. As far as we are aware, no study has analysed the relationship between income and emotional well-being specifically experienced during leisure activities.

To examine this relationship, we use data of the American Time Use Study (ATUS) on people's feelings of happiness elicited for a random subset of activities using the 'day reconstruction method' (DRM). In a first step, we focus on enjoyment during leisure episodes. Here we find a positive relationship between income and feeling happy during leisure activities, in sharp contrast to other activities. All results continue to hold in an individual fixed-effects regression where the effect of income on leisure enjoyment is computed relative to other activities pursued by the same individual (such as work or household production) as well as when using the net affect instead of momentary happiness.

Including additional covariates in the empirical model in combination with a Gelbach (2016) decomposition allows us to quantify the contributions of reasons (i)-(iii) for the positive income-leisure utility relationship. Factors such as the diminishing marginal utility of leisure and its quality, both in terms of the specific activity undertaken as well as with whom it was experienced, explain this positive correlation to a relatively small degree. This is despite the fact that the ATUS data provide detailed measures of time use, allowing us to control for the composition of leisure time in a fine-grained manner. Proxies for background stress, however, such as feeling stressed during the day or life evaluation, enable us to explain the income-leisure enjoyment relationship to a large extent. This suggests that higher incomes alleviate preoccupation with financial constraints, creating psychological spillover effects on leisure enjoyment. In further support of this hypothesis, we examine non-linearities in the income-leisure utility relationship: the positive relationship between income and leisure enjoyment is limited to the lower part of the income distribution. For less financially constrained individuals (top 60% of the income distribution), we no longer find leisure enjoyment to increase with income.

An important policy implication of our finding is to challenge the prevailing view that the distribution of leisure time in the U.S. mitigates income disparities. While most analyses of inequality rely on measures of money incomes or consumption only, some recent research has

sought to incorporate leisure into this discussion (Aguiar and Hurst 2007; Attanasio and Pistaferri 2016; Han et al. 2020). As the poor in the U.S. increasingly devote more time to leisure activities, it is argued that leisure may partly mitigate the recent growth in income inequality. However, if the utility of a unit of leisure varies systematically across the income distribution, looking only at the distribution of leisure time may overstate the degree to which leisure mitigates the welfare consequences of inequality.

Attempts to quantify this impact on inequality measurement are hampered by the problem of how to value leisure, including the use of the market wage (the "full-income approach") (Han et al. 2020, Schreyer and Diewert 2014). For example, if increases in leisure time among the poor are involuntary (such as if they were unemployed), then market wages are a poor proxy for the utility derived from this leisure. Our novel approach offers a direct measure of the total utility received from leisure, considering both the time devoted to leisure activities and the experiential value of these activities, as measured by momentary happiness. This is essentially Kahneman's et al. (1997) utilitarian notion of experienced utility, where total utility is a function of time and enjoyment. We find that considering total leisure utility in this way mitigates measures of income inequality to a much lesser extent compared to considering leisure time only, due to the correlation between income and leisure enjoyment.

In a final step of our analysis, we discuss theoretical implications of the psychological spillover effect of income on leisure utility for the trade-offs between income and leisure in models of labour supply. Essentially, our findings provide a new reason for why income and leisure time are complements. In the standard model of labour supply, a person may choose to work less in response to a wage increase because they may now afford to devote more time to other activities while not having to give up as much consumption as before. In the presence of our spillover effect, the same reaction can be explained by an increase of the marginal utility value of leisure resulting from higher income. Furthermore, the standard model is used to explain why an increase of labour supply results from a higher wage, since each additional hour used for work creates a higher gain of consumption. Again, our spillover effect justifies such an effect in a different way: the increase of the wage makes working an additional hour more beneficial because this enhances the enjoyment of the remaining hours of leisure more than before.

We proceed as follows. Section 2 describes the data. Section 3 establishes the general empiricial relationship between income and momentary utility during leisure activities. Section

4 engages in a decomposition of the reasons for this relationship. Sections 5 and 6 discuss the political and theoretical implications of our work. Section 7 concludes.

2. Data

Conducted annually since 2003 by the United States Census Bureau, the American Time Use Survey (ATUS) is a nationally representative time-use survey which uses a time diary format to provide measures of the amounts of time people spend on various activities, including working, leisure, childcare, and household activities. A Well-Being Module (WBM), sponsored by the National Institute on Aging, was added to the ATUS, and fielded for three full years in 2010, 2012, and 2013.[1] For these years, time diaries were accompanied by self-reported ratings of how people felt during three randomly selected episodes. The pooled WBM data contains 102,796 episodes from 34,565 distinct individuals.

Emotional wellbeing

The ATUS-WBM uses a partial "day reconstruction method" (DRM) to capture emotional wellbeing. The DRM is widely considered the best option of gathering emotional wellbeing data unless real-time measurements are feasible (Kahneman and Krueger 2006).[2] The phrasing used to elicit wellbeing experienced during the chosen episodes is: "between [the start time of the activity episode] and [the time at which the episode ended] yesterday, you said you were doing [stated activity]. The next set of questions asks how you felt during this particular time. Please use a scale from 0 to 6, where a 0 means you did not experience this feeling at all and a 6 means the feeling was very strong." These feelings include happiness, fatigue, stress, sadness, and pain. Our focus is on the feeling of happiness, which we consider an overall measure of a person's emotional wellbeing. If measured during leisure episodes, this rating serves as a proxy of leisure enjoyment and thus instantaneous leisure utility. We also reproduce our analyses

[1] For comprehensive documentation of the structure and content of the ATUS's Wellbeing Module see: Panel on Measuring Subjective Well-Being in a Policy-Relevant Framework; Committee on National Statistics; Division on Behavioral and Social Sciences and Education; National Research Council; Stone AA, Mackie C, editors. Subjective Well-Being: Measuring Happiness, Suffering, and Other Dimensions of Experience [Internet]. Washington (DC): National Academies Press (US); 2013 Dec 18. Appendix B, The Subjective Well-Being Module of the American Time Use Survey: Assessment for Its Continuation. Available from: https://www.ncbi.nlm.nih.gov/books/NBK179213/. We exclude the 2021 WBM from our analysis, given that it coincided with COVID lockdowns.

[2] The experience sampling method (Hektner et al. 2007) and the day reconstruction method (Kahneman et al. 2004) are best suited to assess emotional wellbeing. Alternative methods entail retrospective summary assessments of emotions over several days or weeks, which are subject to substantial recall bias (Dolan et al. 2017).

using a net affect measure (Bradburn (1969, 2015) whereby the average rating across the four negatively connoted feelings is subtracted from the happiness rating.

Leisure

We define leisure activities as including the following broad categories: socializing, watching TV, listening to music, reading, relaxing, arts and entertainment, participating in sports, exercise, and recreation, and attending sports/recreational events (see Appendix Table A.1 for detailed activity codes defined as leisure). Our definition of leisure is similar to Aguiar and Hurst's (2007) "Leisure Measure 1," corresponding to activities that are arguably pursued only for direct enjoyment. As such, we exclude activities that may provide enjoyment but are also intermediate inputs that raise productivity at work, such as sleeping, eating, or personal care (Biddle and Hamermesh 1990). We also exclude activities such as gardening or time with pets that may come under household production. However, in Appendix C, we reproduce our main results using a broader definition of leisure that includes both sets of activities, with similar outcomes. For consistency and ease of interpretation, we use hours (or hours per week) as our unit of time.

Family income

Family income is obtained from matched records in the Current Population Survey (CPS) that was conducted for the same set of households 2–5 months prior to the Wellbeing Module. Respondents were asked to choose a category (among 16) that best represented total combined family income in the past year. Incomes are missing (and therefore imputed by the CPS) for about 20 percent of the sample (in Appendix C, we reproduce our main results after excluding individuals with imputed family income).[3] In order to obtain a point estimate, we use data on household income from the CPS Annual Social and Economic Supplement (ASEC) (for 2010, 2012 and 2013).[4] For each of the 16 categories used in the CPS-ATUS family income variable, we calculate average household income in the ASEC and apply that average to transform the categorical family income variable to a continuous one in the ATUS. When we simply apply

[3] Our results are, in fact, strengthened after we exclude allocated incomes; in the case of allocated incomes in the CPS, Hirsch and Schumacher (2004) argue that estimates are attenuated through what they call "match bias," when the attribute being studied (in their case, union status) is not a criterion used to match donors to nonrespondents.
[4] The CPS ASEC collects detailed information from each individual in the household on income from various sources, and adds up all income to construct total household income

the midpoint of each range to construct a continuous variable, our results remain qualitatively unchanged.

We then apply the CPI-U series from the US Bureau of Labor Statistics (BLS) to transform household income into constant 2013 dollars. To account for household size and composition, we divided income by the equivalence scale $(A + 0.7K)^{0.7}$ that follows NAS recommendations (Citro and Michael 1995; Han et al. 2020), adjusting for economies of scale in consumption and differences in consumption between children and adults. Our main results are unchanged when using OECD and square root scales to equivalize family income (see Appendix C).

Other variables

Other variables that we use as covariates include the day of the week and the month in which the ATUS interview took place. We also use information on where the individual lives (region and metropolitan status), as well as the individual's age, gender, marital status, parenthood status (whether they have children under 18 living with them), and education, selected for comparability with prior research (Knabe et al. 2010; Stone et al 2018).[5] Sample means for all variables are presented in Appendix Table A.2.

Weights

For all our estimates, we use module weights provided by BLS that account for the time respondents spent doing each sampled episode and the probability that a specific episode was sampled are used (weights also account for weekend oversampling and other features of ATUS sampling design) (National Institute on Aging, Bureau of Labor Statistics, and U.S. Census Bureau 2014).

3. How does leisure enjoyment vary with income?

We start our analyses by descriptively inspecting the relationship between income and momentary happiness during episodes in which the respondent engaged in leisure activities. Instantaneous leisure utility increases with family income (see Figure 1): a 100 percent increase in income (i.e., a doubling) is associated with 3.8 percent standard deviation increase in happiness. However, when individuals engage in *non*-leisure activities (primarily paid work

[5] Categories for region are north-east, north central, south, and west. Categories for highest educational attainment are less than high school, high school, some college but no degree, associate's degree, bachelor's degree, master's degree and a PhD or professional degree.

and household production), happiness appears to decline with income.[6] This implies that the positive association of income and emotional well-being is limited to leisure activities.

Next, we look to quantify the relationship between income and leisure utility by estimating the model:

$$z_{ij} = \beta_0 + \beta_1 Y_i + \boldsymbol{X}_i'\boldsymbol{\gamma} + \epsilon_{ij} \quad (1)$$

over the subsample of all 21,728 leisure episodes, where z_{ij} refers to individual i's happiness score during the leisure episode j, Y_i is equivalized log family income, and $\boldsymbol{X}_i'$ is a full set of dummy variables for day of the week, month, and year in which the diary was conducted, region and metropolitan status, age, gender, marital and parenthood status, and education. We are interested in β_1, the increase in leisure enjoyment associated with an increase in family income.

The first column of Table 1 presents estimates of eq. (1) (henceforth referred to as our "baseline" estimate): a 100 percent increase in income (i.e., a doubling) is associated with a 4 percent standard deviation increase in happiness during leisure episodes (column 1). Note that the inclusion of comprehensive demographic covariates does not attenuate the correlation between income and leisure enjoyment (as seen, for example, in Figure 1). Using net affect during leisure episodes instead of momentary happiness as a first check confirms this result (Table 1, column 2).

Higher incomes might be associated with higher leisure enjoyment because income is correlated with person-specific characteristics (e.g., stable traits) that enhance emotional wellbeing in general (i.e., for *all* activities). It is also conceivable that higher emotional wellbeing enhances income, for instance, via productivity. Figure 1 suggests that this is not the case, as happiness during non-leisure episodes appears to decline with income, implying the absence of a general positive income-happiness relationship (consistent with previous findings using the same data: Stone et al. 2018, Han and Kaiser 2024). To demonstrate the uniqueness of the income-leisure enjoyment relationship more rigorously, we exploit the structure of the ATUS which collects feelings for three randomly chosen episodes for the *same* individual. We include non-leisure activities to estimate the effect of income on the *difference* in happiness between leisure and non-leisure activities for the same person. In the process, we disentangle the leisure-specific income effect from a potentially generally positive effect of income on

[6] Unlike our findings for leisure episodes, this result hinges on the measure of emotional wellbeing used. Income does not appear to be significantly related to the net affect during non-leisure episodes (see Figure B.1 in the Appendix). The negative association between happiness and income and non-leisure episodes is driven primarily by paid work episodes (and care of household members, to a lesser extent).

emotional wellbeing experienced during all kinds of activities (Killingsworth 2021). We therefore estimate

$$z_{ij} = \alpha_i + \beta_0 L_{ij} + \left(L_{ij}\right).\beta_1 Y_i + \left(L_{ij}\right).\boldsymbol{X}_i'\boldsymbol{\gamma} + \epsilon_i \quad (2)$$

where *j* indexes episodes within an individual, and $L_{ij} = 1$ if activity *j* is a leisure activity and 0 otherwise. The level effects of the $\boldsymbol{X}_i'$ control variables of equation (1) are now absorbed into the individual fixed effect, but we interact all of these variables (each dummy for day of the week, month, year, age, gender, region and metro, whether married, children, and education) with a the leisure episode indicator L_{ij}. This allows for the difference in happiness between leisure and non-leisure activities to vary across demographic and geographic groups and to depend on when the interview was conducted. These estimates, presented in Table 1, column 3, show that the effect of income on leisure utility (when measured relative to its effect on non-leisure episodes) is actually higher than the baseline estimates (which is unsurprising considering how happiness decreases with income during non-leisure episodes). A 100 percent increase in income is associated with a 5 percent standard deviation increase in happiness during leisure activities (relative to happiness during non-leisure activities).

We are cautious in claiming that our fixed effects estimates identify the *causal* impact of income on leisure enjoyment. Potential reasons why they may fail to do so include: (i) factors correlated with income that affect how a person experiences leisure specifically: for example, a relatively open person enjoys leisure more relative to non-leisure activities and also has better labour market outcomes (and hence income); and (ii) enjoyment from leisure might spill over onto other activities sampled during the day (or vice versa): so, for example, a particularly unenjoyable work episode might affect subsequent leisure enjoyment, and as the fixed effects specification draws on the comparison with the work episode to estimate enjoyment during leisure, estimated leisure enjoyment would even be negatively biased. Given these caveats, we proceed by examining potential mechanisms through which income might improve leisure enjoyment to assess the plausibility of such a relationship. In the process, we focus on the more conservative income coefficient obtained from estimating equation (1) in order to explain the income-leisure enjoyment relationship as such, rather than differences in the income effect on the happiness experienced during leisure episodes relative to other episodes (equation 2).

4. Why does emotional wellbeing during leisure rise with income?

In this section, we look at possible reasons to explain why income enhances leisure enjoyment. We group potential explanations into four categories: (i) the diminishing marginal utility of leisure in connection with higher leisure time among low-income individuals (in short, the quantity of leisure time); (ii) the ability of higher-income individuals to select leisure activities that yield greater enjoyment, with differences along both the type of the activity itself and whom it is performed with (i.e., the quality of leisure time); and, (iii) the possibility that income creates a positive spillover effect in that it alleviates worries about the tightness of money (i.e., background stress).

The quantity of leisure time

A precondition for diminishing marginal utility of leisure time playing a role in our results is that time devoted to leisure falls with family income, for instance, because working more hours increases family income. As Figure 2 shows, there is a negative relationship between the hours of leisure available and family income. If diminishing marginal utility of leisure holds, then higher-income individuals may have a higher average utility from leisure because they devote less time to leisure activities. Relatedly, as poorer individuals devote more time to leisure, they are also likely to have a greater number of discrete leisure episodes: an increased likelihood of sampling leisure episodes that are repetitive (and therefore less enjoyable) might also help explain the positive income coefficient on leisure enjoyment.

To illustrate the extent to which the quantity of leisure time influences the baseline estimates of Table 1, we add covariates to proxy for both the diminishing marginal utility of leisure, namely the total time devoted to leisure (in hours per week) and the number of times the detailed activity (to which that leisure episode belongs) has already occurred that day (see column 2 in Table 1). In line with our expectation of the diminishing marginal utility of leisure, an increase in total leisure time is associated with a decrease in instantaneous leisure utility, as is the case for activities that have occurred multiple times in the day. However, it does not appear to substantially affect the relationship between income and leisure utility, with the coefficient on log income declining only slightly from the baseline estimate of Table 1 (0.036 compared to 0.040). This implies that the marginal utility of leisure time plays a minor role in explaining the positive income-happiness relationship documented before.

The quality of leisure time

Next, we turn to the idea that richer individuals enjoy their leisure time more than poorer individuals because they can buy more pleasurable leisure activities. Indeed, our data imply that high-income individuals allocate their leisure time differently: they are less likely to spend this time watching TV or relaxing and are more likely to engage in reading or sports/exercise activities (see panel a of Figure 3).[7] If the latter activities yield more wellbeing (though the choice of leisure activity is itself also endogenous) then existing patterns of leisure time should help explain the wellbeing premium during leisure associated with income. For example, some leisure activities that are more likely to be done by the rich (e.g., boating, vehicle racing, or hunting) because they are expensive, may also be more enjoyable. A second difference in the nature of leisure time could come from whom these activities are experienced with: higher-income individuals are less likely to experience leisure activities alone; instead, they are more likely to spend leisure time with their spouse/partner or their friends, than with their children or other family members (though this could merely reflect their greater likelihood of being married, and smaller likelihood of having children) (panel b of Figure 3).

To proxy for the composition of leisure activities, we include covariates for who else was present during the episode (column 3 of Table 1). Having others present (be it a spouse or partner, one's child, other family, friends, or other people) is associated with higher leisure utility. Column 4 of Table 1 includes covariates for the broad type of leisure activity: nearly every category is associated with higher leisure utility than watching TV. However, these broad codes might not capture the distinctions between leisure activities that higher incomes can purchase (e.g., "sports and exercise" can include both playing baseball and golfing, and the latter—more expensive—activity might be more enjoyable). If this were the case, including covariates for more detailed leisure activities would attenuate the coefficient on income. In column 5, we replace broad leisure type with covariates for the most detailed possible codes for leisure activities (of which there are 82, listed in Appendix Table A.1: examples include vehicle racing or boating or hunting—on which the rich in our sample devote relatively more time—as well as, watching wrestling or rollerblading or playing basketball—to which the rich devote less time).

While even these fine codes may not capture the distinctions that money can purchase, the fact that moving from broad to detailed leisure activity results in little change in the coefficient

[7] The biggest difference is in TV watching, with the rich spending almost 8 hours less per week on TV compared to the poor. The rich, of course, devote less time to leisure in general, but they do spend more time on activities involving reading, the arts, sports and exercise, and watching sports.

of log income on leisure utility suggests that the rich may not enjoy leisure more simply because they can buy more expensive leisure activities. That is, leisure enjoyment increases with income *given* the activity, and it matters little whether we consider broad activities (sports) or detailed ones (baseball vs. golfing). Overall, the coefficient on log income in the most saturated specification (i.e., column 5) is about one-fourth smaller than the baseline estimate, suggesting that the two explanations, diminishing marginal utility of leisure and the composition of leisure activities, do explain some of the income-leisure utility relationship. We will scrutinise this conclusion further by means of a decomposition analysis below.

Mental bandwidth

As we have seen, accounting for the diminishing marginal utility of leisure and differences in the types of leisure activities pursued explains only a small fraction of the positive income leisure utility relationship. We now turn to the possibility that income has "spillover" effects on leisure enjoyment, because it affects mental processes. The idea here being that the poor are less able to enjoy their leisure time due to the many difficulties and distractions associated with being poor: poverty has been shown to impede cognitive capacity (Mani et al. 2013) and impair consumption experience more generally (Schofield and Venkataramani 2021, see also Section 1 for the detailed argument). As a way to test this hypothesis, we add various covariates which could proxy for the stresses and worries that come with poverty. We start with a narrow measure of the background stress from low income, which is the feeling of being stressed experienced by the individual during the day.[8] While research shows that the stresses of working life are more pronounced in high-income people (Nagler et al. 2023), we assume that having to think twice about even the smallest expenditures makes the leisure experience more stressful for poorer individuals. This is confirmed by Figure 4.

As a next step we include our measure of feeling stressed in equation (1) to test whether it mediates the income-happiness relationship established before. As Table 3 shows, including stress reduces the income coefficient from 0.040 to 0.023 (cf. columns 1 and 2). At first glance, this seems to be a more substantial change compared to previously discussed explanations for the income-leisure enjoyment relationship. We will later perform a decomposition analysis to precisely quantify the contributions of the different explanations.

[8] Daily stress is computed by averaging standardized stress scores reported by an individual for all three randomly sampled activities. Results are similar when we include an even narrower measure of stress (i.e., stress experience during the leisure episode itself).

In addition to this, we employ an alternative proxy for the mental burden associated with low income, namely cognitive well-being as measured by Cantril's ladder which is assumed to cover mental strain and stresses much more comprehensively than the momentary feeling of stress. Respondents are asked to "[…] imagine a ladder with steps numbered from zero at the bottom to ten at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. If the top step is 10 and the bottom step is 0, on which step of the ladder do you feel you personally stand at the present time?" This is widely regarded as an evaluative measure of well-being as opposed to the momentary measures we are using as our proxy utility indicators. Indeed, research documents systematic differences between evaluative and momentary indicators of well-being, for instance, in relation to income and unemployment. It would thus seem that they measure somewhat distinct dimensions of subjective wellbeing (Knabe et al. 2010, Han and Kaiser 2024).

Once we add Cantril's ladder as a covariate in our analysis, we can see in Table 3 that the coefficient measuring the relationship between income and leisure utility falls markedly compared to the baseline estimate (cf. columns 1, 3), with the coefficient falling from 0.040 to 0.010 (i.e., by three-fourths). Including both proxies for financial stress in column 3 nearly eliminates the income coefficient. In the most saturated specification in column 4 (i.e., all covariates for leisure quality and quantity plus the two proxies for financial stress) the coefficient on log income is slightly negative and not statistically distinguishable from zero.

Decomposing the income coefficient on leisure enjoyment

The results of the previous section imply that proxies for the mental burden associated with low income are crucial for explaining the income-leisure enjoyment relationship. To systematically quantify the contribution of each set of variables to the change in the coefficient of log income, we present an order-invariant decomposition of this effect (Gelbach 2016). Specifically, following Gelbach (2016), we can decompose the difference between $\beta_1^{baseline}$ — the baseline estimate (Table 1, column 1)—and β_1^{full}, the coefficient in the most saturated regression (Table 1, column 5) as

$$\beta_1^{baseline} - \beta_1^{full} = \sum_{k=1}^{K} \beta_2^k \cdot \gamma_k$$

where β_2^k is the coefficient on each explanatory variable in the saturated regression (for example, 0.061 for having a spouse present during the episode) and γ_k is the coefficient on log income in the auxiliary regression of that explanatory variable on log income (with a total of K covariates included in the saturated regression but not the baseline regression). Intuitively, the contribution of a particular explanatory variable depends on how closely it is correlated with log income, weighted by its effect on leisure enjoyment in the full regression.

The Gelbach decomposition of the change in the leisure utility-income coefficient is illustrated by Figure 5. The 0.044 change in the coefficient on log income comparing the baseline to the saturated regression (i.e., comparing column 5 in Table 3) for instantaneous leisure utility can be attributed to a 0.004 contribution (or roughly 10 percent of the baseline estimate) of the proxies for the quantity of leisure in connection with diminishing utility (total time devoted to leisure and activity sequence). Proxies for the quality of leisure, in other words, the leisure composition or types of leisure activities, account for a 0.007 contribution (or 18 percent of the baseline estimate). It would seem though that most of the income-leisure enjoyment relationship is attributable to our narrow (23 percent, daily stress) and broad measures of the mental burden of low income (50 percent, life satisfaction).

Non-linear income effects

If the alleviation of financial worries helps explain why leisure enjoyment increases with income, we might expect to see non-linear effects of income on leisure enjoyment. The literature referred to above stresses the importance of poverty in limiting mental bandwidth and consumption experience. This means that income should make the biggest difference in leisure enjoyment between the poor and middle-income groups (who are neither poor nor rich), but matter much less for differences in leisure enjoyment between middle income groups and the rich. To some extent, our baseline model (equation 1) incorporates this notion by estimating the effect of income in logs.

Expanding on this idea, we regress leisure enjoyment on family income, with the same set of covariates as the baseline estimate, but we include family income as dummy variables for each quintile rather than as a continuous logged variable. The estimated coefficients for the different income quintile groups are plotted in Figure 6, with the poorest 20 percent serving as reference group. It becomes apparent that income matters for differences in momentary happiness during leisure episodes between the bottom three quintiles, in line with our reasoning about the role of poverty in affecting leisure enjoyment. In contrast, income no longer

contributes to differences in leisure enjoyment within the top 60 percent of the income distribution.

5. Does total leisure utility increase with income? Implications for the measurement of inequality

A positive income-leisure utility relationship has significant implications for the measurement of inequality. It is now well established that leisure time varies negatively with income in the U.S. (Aguiar and Hurst 2007, 2009; Han et al. 2020). At first glance, this implies that measures of inequality focusing purely on income measures may overstate true inequality in wellbeing, as they fail to consider relatively low levels of leisure time among high-income earners. In effect, those on low incomes may be partly compensated by more leisure (Attanasio and Pistaferri 2016). This research would suggest that including both leisure and consumption/income (as opposed to just consumption/income) when measuring well-being results in less inequality as the rich typically enjoy less leisure time.

While the inclusion of leisure in measures of inequality is valuable, a problem is that leisure time may not be a good proxy for leisure utility. This would be the case if, for example, for a given unit increase in leisure the experiential value is higher for the rich than the poor, as implied by our findings up to here.[9] While some recent research has sought to incorporate the *value* of time spent on leisure when examining levels of inequality (Han et al. 2020), measures of such value typically rely on the market wage. This is problematic for both conceptual reasons (wages only pin down the marginal—not average—value of leisure, and wages may not approximate the shadow price of leisure time when the choice of working hours is subject to external constraints, e.g., involuntary unemployment) and practical ones (wages are not observed for the non-employed). If the divergence between (imputed) wage rates and the true value of leisure differs systematically across income groups, then such measures of the correlation between leisure utility and income are biased.

Our novel approach offers a direct measure of the total utility received from leisure, considering both the time devoted to leisure activities and the experiential value of these activities, as measured by momentary happiness. We use this measure to address the question of whether total leisure utility decreases or increases with income. The answer will depend on

[9] Note that spillover effects highlighted in our explanation cannot be captured by higher expenditures on leisure activities.

which of two opposing forces is greater: the fact that income is positively related with leisure utility or the fact that the rich typically have less leisure time.

We follow the utilitarian notion of experienced utility (Kahneman et al. 1997) and calculate total leisure utility as the average time-weighted happiness enjoyed during leisure episodes. 21,728 leisure episodes are collapsed into average leisure utility (weighted by the duration of the episode) for 16,910 individuals. For example, if a particular individual has had two leisure episodes sampled in the Wellbeing Module, with one episode lasting for 0.5 hours with a happiness score of 5 and another episode lasting 2 hours with a score of 4, then the average leisure utility for that individual is computed to be 4.2. (Note that averages are computed with the raw happiness scores rather than standardized measures to avoid negative values for total leisure utility.)

We then multiply average leisure utility by total time (hours per week) devoted to leisure, obtaining a measure of time-weighted happiness as proxy for total utility derived from leisure. To continue the earlier example, if the individual had spent a total of 28 hours per week on leisure, then the time-weighted happiness from leisure for that individual would be calculated as 117.6. We then recalculate the total leisure utility as a 'percentage of maximum possible' (POMP) score (Cohen et al. 1999). This enables us to compare the total leisure utility obtained from time-weighted happiness with alternative approaches using a different measurement scale, such as leisure time in hours.

Figure 7 below presents scatterplots of leisure time (panel a) and time-weighted happiness from leisure (panel b) by percentile of family income: both measures fall with income, implying a mitigating impact on measure of inequality. Having said that, the income gradient reduces by 50% if time-weighted happiness is used to approximate leisure utility rather than leisure time.[10] This bears testimony to the importance of considering the actual experience of leisure in measures of inequality. What is more, this result hinges on the chosen method of measuring leisure enjoyment. As we show in the bottom panel (c) of Figure 7, replacing momentary happiness by the net affect produces an even weaker and statistically insignificant relationship between income and total leisure utility. Here, it would seem that considering leisure no longer exerts a mitigating effect on inequality.

One might argue that, by the same logic, the less enjoyable non-leisure time high-income earners experience (e.g., as in Figure 1) further mitigates inequalities in living standards.

[10] Two of Han et al. (2020) measures of the value of leisure (i.e., the average market wage rate, and the 25th percentile wage rate) would yield identical POMP scores to the total leisure time measure.

However, this would not necessarily alter our conclusion up to here, as the result also depends on the chosen measure of emotional wellbeing: using the net affect would not point to a negative association between income and the enjoyment of non-leisure episodes (Appendix Figure B.1). Overall, our findings provide a much more nuanced view on the often-held conviction that considering leisure in measures of economic inequality reduces measured inequality.

6. Implications for labour supply

A second implication relates to labour supply models. In particular, the psychological spillover effect from income on leisure enjoyment implies a different complementarity and thus also trade-off between income and leisure than the standard model of labour supply. Under the standard model, the economic trade-off is clear. If we work less, we can spend more time on other utility-enhancing activities, such as leisure, but we obtain less income and so have to do without other forms of consumption. Under this framework, an agent receives utility therefore both from the consumption of goods and from the consumption of leisure. Different workers will typically view the trade-off between labour and leisure differently with some, for example, requiring a much greater monetary bribe in the form of additional consumption to give up a unit of leisure consumption. Income is therefore the key economic variable that guides people when choosing the optimal combination of labour and leisure which maximises their utility and this choice will vary according to individual tastes.

The question we pose is what happens to this trade-off if the utility of leisure is inextricably linked with income? What happens if a unit of leisure brings more utility when rich as opposed to being poor as the rich are not too preoccupied with financial concerns to enjoy leisure? Then, it may not only be a case that individuals are trading off consumption utility for leisure utility when decreasing labour supply after a wage increase, rather at the same time they may be maximizing leisure utility, too. To illustrate, on the one hand, a pay raise would increase the marginal utility of leisure meaning that individuals could be inclined to substitute leisure for work. On the other hand, if the utility derived from leisure also increases in line with income, then this provides an incentive for individuals to substitute labour for leisure after an increase of the wage, as this will increase the utility derived from the remaining hours of leisure. The level of labour supply will then depend on the relative strength of these two opposing forces. Changes of unearned income yield an unambiguously negative effect on labour supply, as the marginal utility of leisure is enhanced without having to work more.

Our findings may thus lead to similar conclusions as the standard model when it comes to the impact of a change in income on labour supply. For instance, if levels of leisure are low, the incentive created by a rise in the wage to work more for the benefit enjoying ever fewer hours of leisure is presumably relatively small compared to the incentive to enjoy more of the now more valuable leisure time. This may justify a backward-bending labour supply curve in analogy to the income effect in the standard model. However, the reasons for the trade-off between income and leisure are fundamentally different in that the value of income at least partly derives from the psychological spillover effect of not having to deal with scarcity all the time. The availability of income becomes valuable in itself, rather than spending all income on consumption, which may imply including income rather than consumption as an argument in the utility function. In the same vein, consumption could consist of several goods, including a short-term savings motive providing the peace of mind necessary for fully enjoying one's leisure time.

6. Conclusion

Our study is the first to document and examine the positive relationship between income and leisure enjoyment. Based on nationally representative US data about individual time use and momentary happiness, we find substantial income differentials in leisure enjoyment which are not reflective of generally positive associations between income and emotional wellbeing. They can also be hardly explained by the different quantity and composition of leisure time enjoyed by different income groups. This implies that typical reasons for the complementarity between consumption and leisure, such as diminishing marginal utility, or the ability to afford a more pleasurable leisure experience, play a minor part in the relationship between income and instantaneous leisure utility. Instead, using proxies for background stress, our analyses suggest that higher incomes alleviate preoccupation with financial constraints, creating spillover effects on leisure enjoyment.

Our results speak to the debate on inequality measurement, especially in the US: while much of this debate is framed in terms of income, economists have incorporated the role of leisure. In particular, the aforementioned literature has argued that greater inequality in income or the consumption of goods and services is partially offset by greater inequality in leisure time, driven by increasing leisure time among the poor. However, our results suggest that greater leisure time among the poor is counterbalanced by lower enjoyment of leisure episodes. Approximating total leisure utility through time-weighted momentary happiness drastically

reduces the mitigating impact from incorporating leisure time into the economic analysis of inequality.

We also note that our findings may entail more fundamental insights about how income and leisure benefit each other. As is known from the previous literature referenced above, worries about being able to make ends meet constrain the mental bandwidth necessary to perform cognitive tasks. Our results show that this seems also true for the psychological capacity to have a good time during leisure pursuit. Adding to previous work, our findings give reason to speculate about a vicious cycle, where poverty not only hinders cognitive function but also prevents restful leisure, which negatively affects productivity and thus perpetuates disadvantage.

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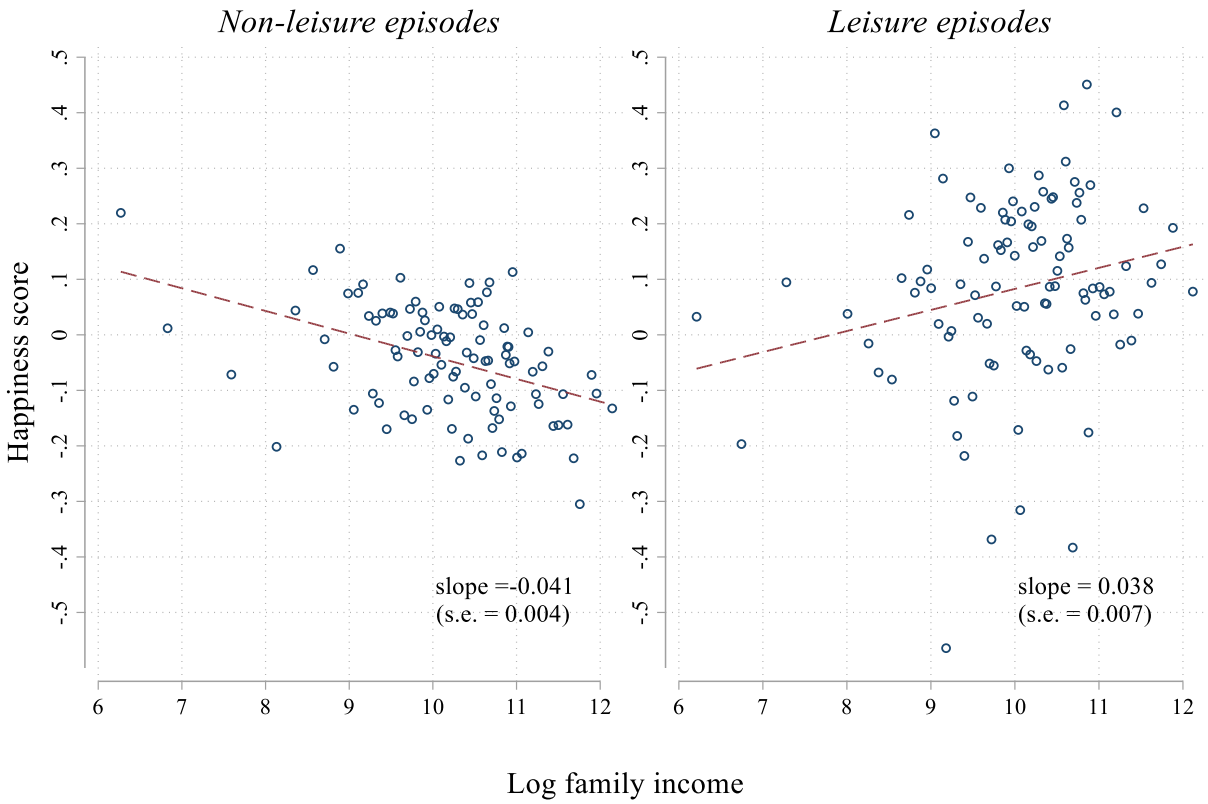
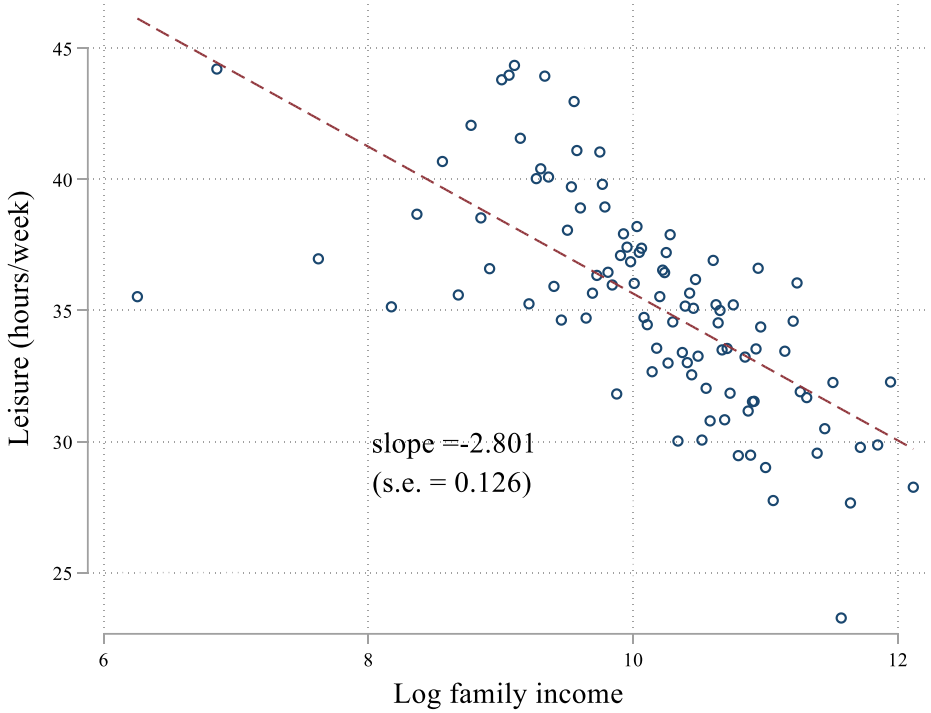
Figures

***Figure 1**. Happiness during non-leisure and leisure episodes*



Source: ATUS Wellbeing Module 2010, 2012, 2013 (21,728 leisure and 81,068 non-leisure episodes). Markers represent mean (standardized) happiness score by percentile of family income, while the red lines show happiness predicted from a regression on log income, controlling for day of the week, month, and year in which diary was conducted.

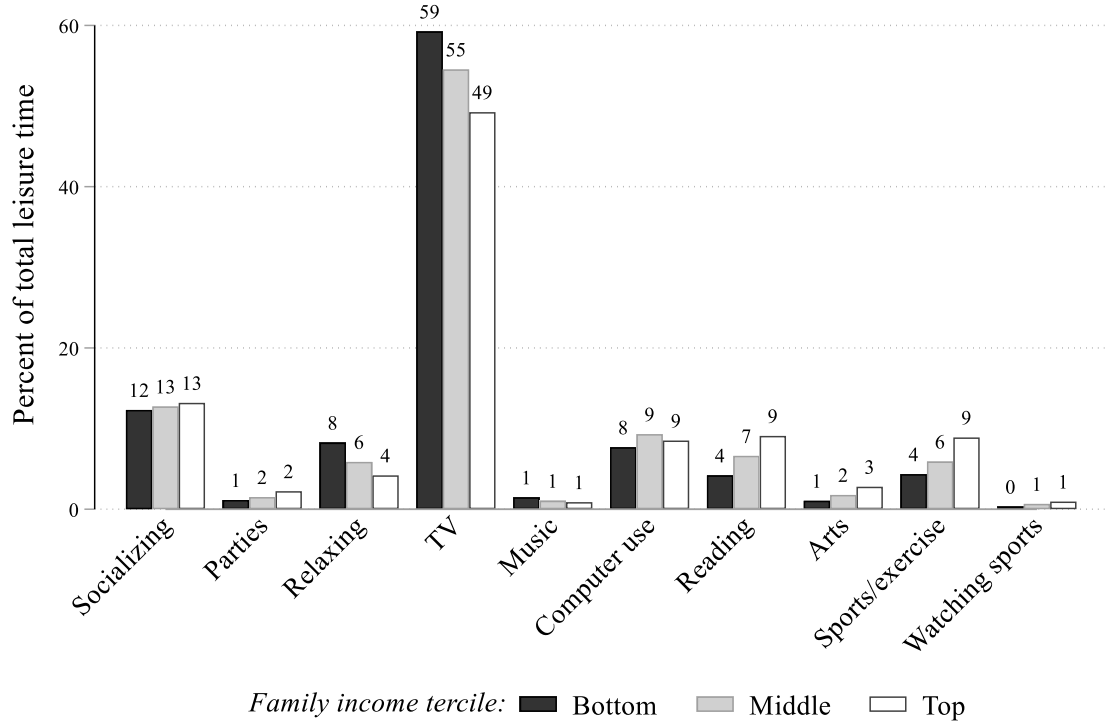
***Figure 2**. Bivariate distribution of leisure time and family income*



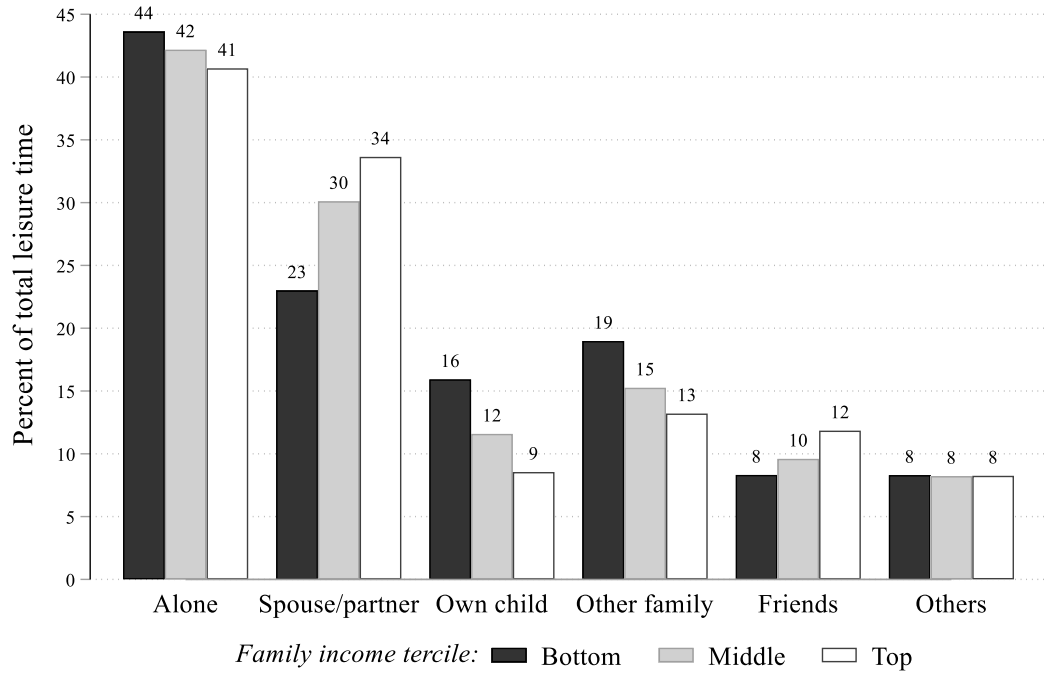
Source: ATUS 2010, 2012, and 2013 (N=37,088 individuals). Binned scatterplot of leisure hours per week reported by individual on log of equivalized family income, with linear fit conditioning on day of the week, month, and year in which diary was conducted.

***Figure 3**. Family income tercile and the nature of leisure activities*

(a). Share of leisure time devoted to broad activities.

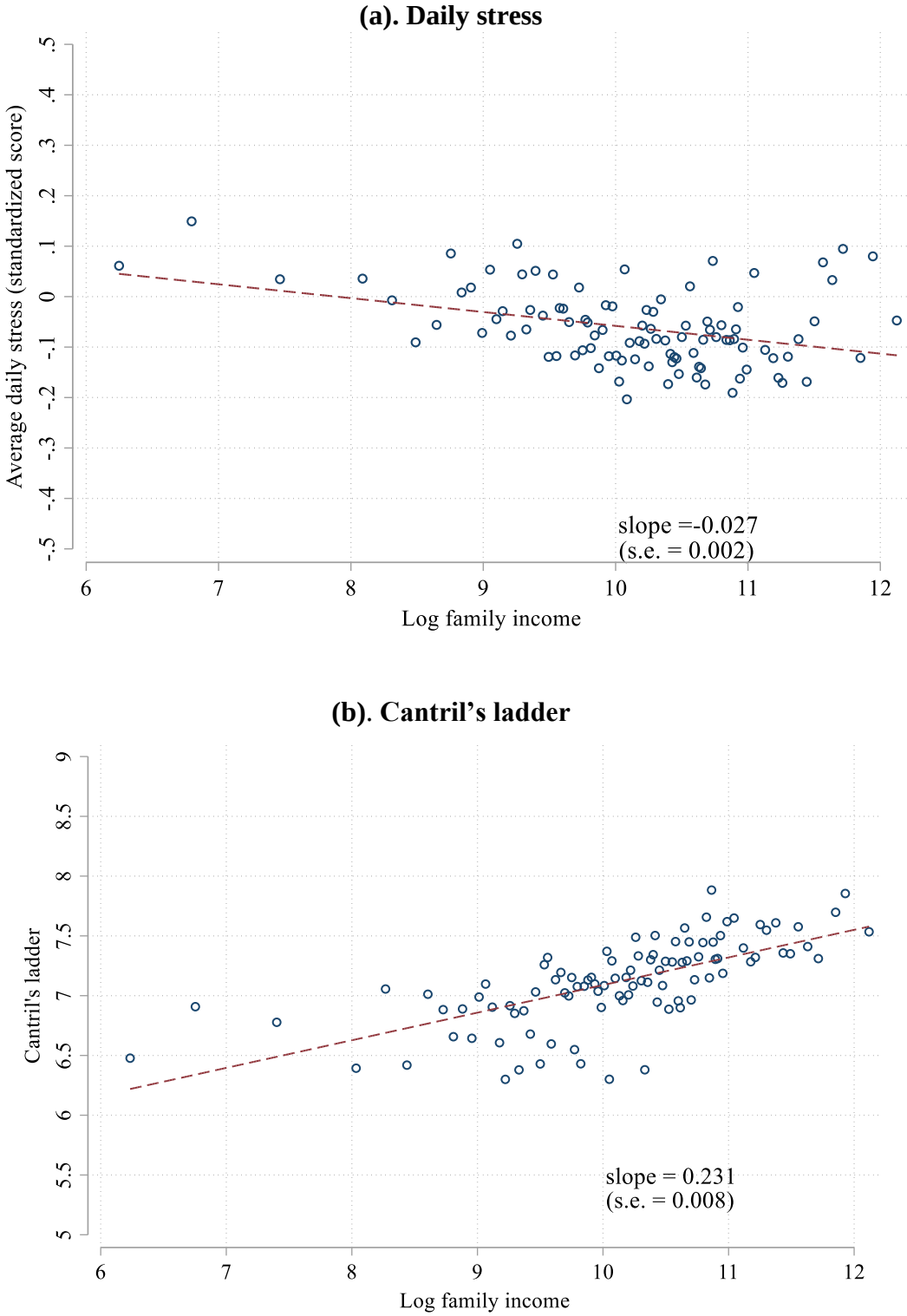


(b). Share of leisure time experienced with whom.



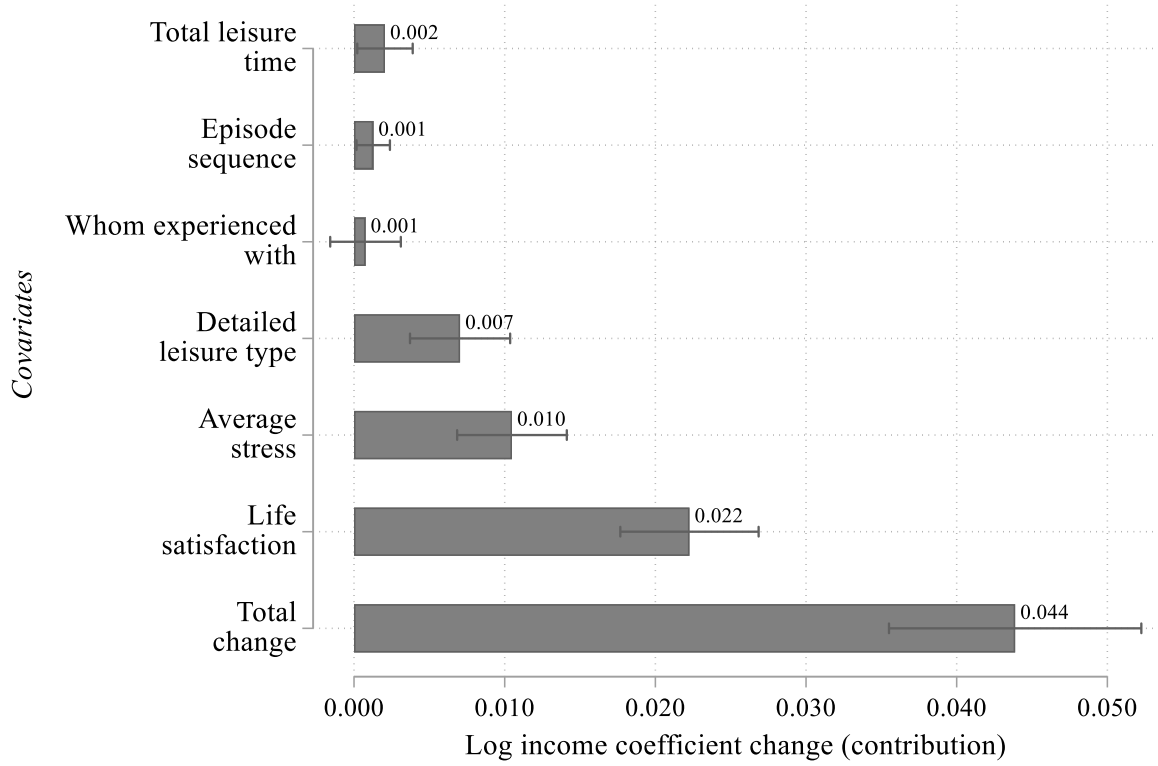
Source: ATUS 2010, 2012, and 2013 (N=37,088 individuals). Panel (b): whom you spend leisure time with is not mutually exclusive, so relative shares do not add up to 100 percent.

Figure 4. *Family income and proxies for background stress.*



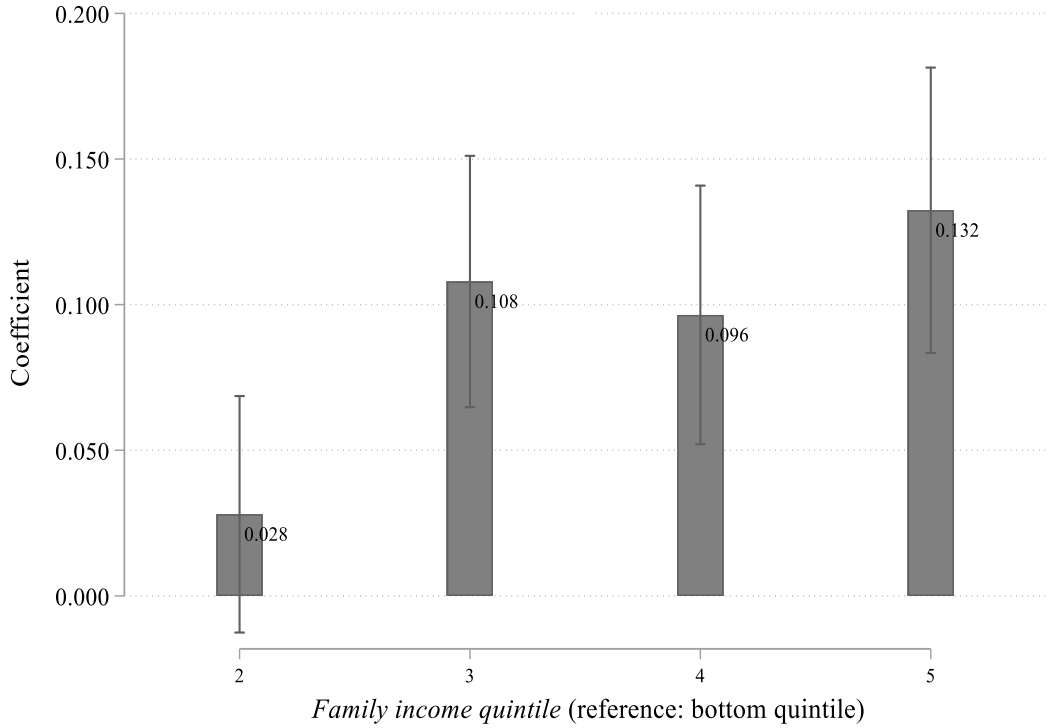
Source: ATUS Wellbeing Module 2010, 2012, 2013. Markers represent average daily stress (panel a) and Cantril's ladder (panel b) by percentile of family income. Red lines represent linear fit controlling for day of the week, month, and year in which diary was conducted.

***Figure 5**. Decomposition of change in baseline leisure utility estimates.*



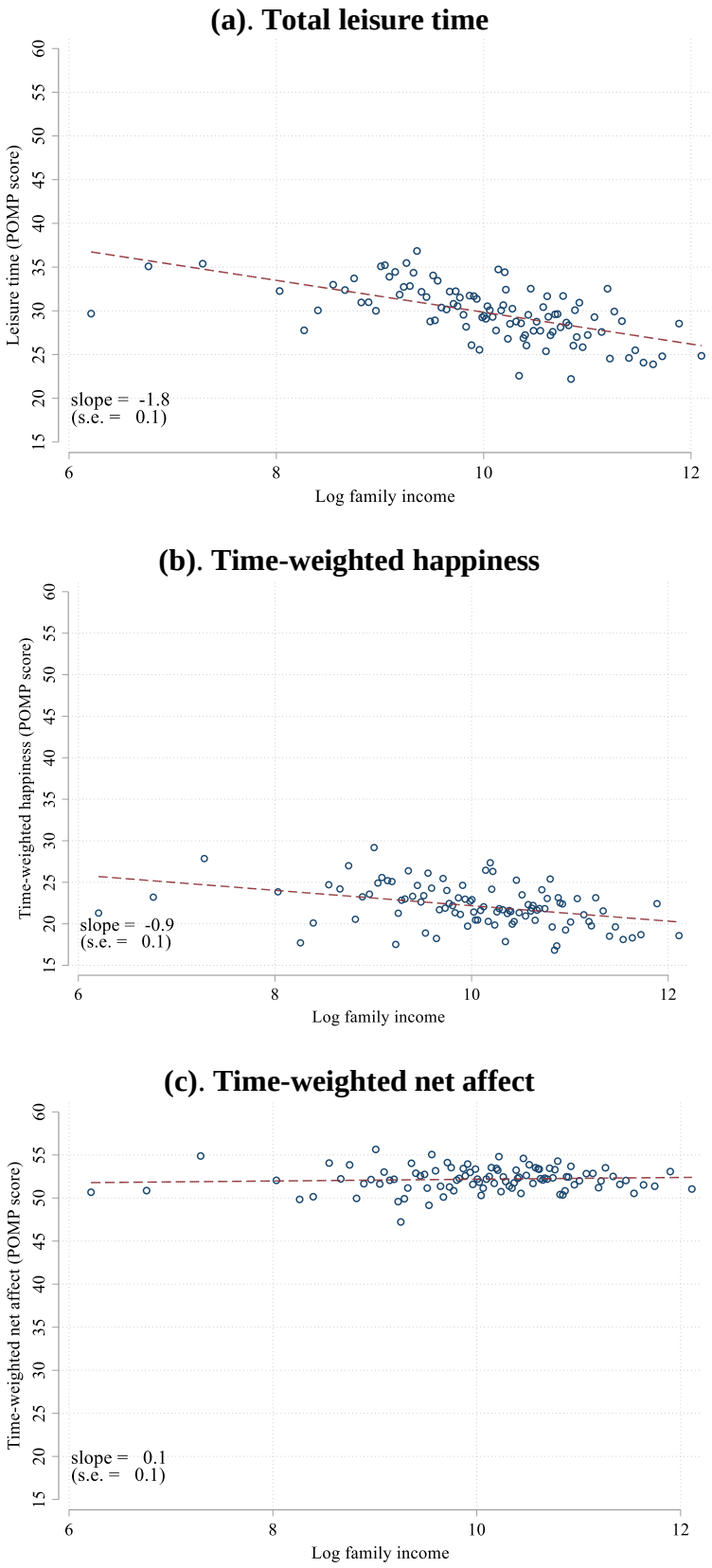
Source: Same as Figure 1. See text for details on decomposition.

***Figure 6**. Leisure enjoyment and income quintile.*



Source: Same as Figure 1. Coefficients on income quintiles obtained from regression of standardized happiness score during leisure episodes on quintile dummies and all other controls in baseline specification.

Figure 7*. Total leisure utility (POMP score) and family income*



Source: Same as Figure 1. Markers represent mean measure of total leisure utility (time weighted happiness and net affect from leisure, and total leisure time) by percentile of family income, while the red lines show the measure of total leisure utility predicted from a regression on log income, controlling for day of the week, month, and year in which diary was conducted.

Tables

Table 1. *Income and leisure enjoyment*

	(1) Baseline happiness	(2) Baseline net affect	(3) Baseline happiness (FE)
Log income	0.040***	0.068***	
	(0.008)	(0.007)	
Leisure			-0.289***
			(0.089)
Leisure * Log income			0.050***
			(0.007)
Number of episodes	21,728	21,728	102,796

*Source: ATUS 2010, 2012, and 2013 Wellbeing Module Sample. Outcome variables are normalized happiness scores for columns (1) and (3), and normalized net affect for (2). Columns (1, 2): Dummies for day, month, year, region, metropolitan area, age, gender, education, marital status, and whether own child under 18 in the household) included in every specification but not shown. Column (3): in addition to individual fixed effects, interactions of control variables with leisure included in all specifications but not shown. * p<0.10, ** p<0.05, *** p<0.01.*

Table 2. *Income and happiness during leisure episodes*

	Baseline	+ Quantity	+ Quality (with whom)	+ Quality (broad type)	+ Quality (detailed type)
Log income	0.040***	0.036***	0.035***	0.030***	0.030***
	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)
Total leisure time		-0.001***	-0.001***	-0.001***	-0.001***
		(0.000)	(0.000)	(0.000)	(0.000)
Sequence in the day (reference: first)					
Second		-0.058***	-0.055***	-0.023	-0.023
		(0.017)	(0.016)	(0.017)	(0.017)
Third or higher		-0.118***	-0.089***	-0.047**	-0.047**
		(0.022)	(0.022)	(0.022)	(0.022)
Who else present (reference: alone)					
Spouse or partner			0.106***	0.105***	0.102***
			(0.018)	(0.018)	(0.018)
Own child			0.303***	0.289***	0.281***
			(0.025)	(0.025)	(0.025)
Other family			0.295***	0.221***	0.214***
			(0.019)	(0.021)	(0.021)
Friends			0.406***	0.269***	0.262***
			(0.023)	(0.025)	(0.026)
Others			0.142***	0.052*	0.058**
			(0.026)	(0.028)	(0.028)
Broad leisure activity (reference: watching TV)					
Socializing				0.247***	
				(0.024)	
Attending social events				0.326***	
				(0.061)	
Relaxing, thinking				0.073**	
				(0.029)	
Music				0.204***	
				(0.066)	
Games and computer use				0.020	
				(0.024)	
Reading				0.067**	
				(0.029)	
Arts and entertainment				0.276***	
				(0.054)	
Sports/exercise/recreation				0.365***	
				(0.030)	
Watching sports				0.031	
				(0.099)	

*Source: ATUS 2010, 2012, and 2013 Wellbeing Module Sample (N=21,728 leisure activities). Outcome variables are normalized happiness scores. Dummies for day, month, year, region, metropolitan area, age, gender, education, marital status, and whether own child under 18 in the household) included in every specification but not shown. Covariates for detailed leisure type (82 categories) included in specification (4) but not shown. * p<0.10, ** p<0.05, *** p<0.01.*

Table 3. *Income and happiness during leisure episodes: proxies for financial stress*

	Baseline	Daily stress	Cantril ladder	Both explanations combined	+ Quantity-quality proxies
Log income	0.040***	0.023***	0.010	0.005	-0.004
	(0.008)	(0.007)	(0.009)	(0.009)	(0.009)
Average stress		-0.378***		-0.268***	-0.259***
		(0.009)		(0.011)	(0.011)
Cantril's ladder			0.153***	0.119***	0.114***
			(0.004)	(0.004)	(0.004)

Source: ATUS 2010, 2012, and 2013 Wellbeing Module Sample (N=21,728 leisure activities). Outcome variables are normalized happiness scores. Dummies for day, month, year, region, metropolitan area, age, gender, education, marital status, and whether own child under 18 in the household) included in every specification but not shown. All covariates for leisure quantity and quality (i.e., total leisure time, activity sequence, who else was present, and detailed activity type) included in column (5) but not shown. * p<0.10, ** p<0.05, *** p<0.01.

Appendix A

Table A.1. Detailed leisure activity codes

12 Socializing, Relaxing, and Leisure	
1201 Socializing and Communicating	
120101	Socializing and communicating with others
120199	Socializing and communicating, n.e.c.*
1202 Attending or Hosting Social Events	
120201	Attending or hosting parties/receptions/ceremonies
120202	Attending meetings for personal interest (not volunteering)
120299	Attending/hosting social events, n.e.c.*
1203 Relaxing and Leisure	
120301	Relaxing, thinking
120302	Tobacco and drug use
120303	Television and movies (not religious)
120304	Television (religious)
120305	Listening to the radio
120306	Listening to/playing music (not radio)
120307	Playing games
120308	Computer use for leisure (exc. Games)
120309	Arts and crafts as a hobby
120310	Collecting as a hobby
120311	Hobbies, except arts & crafts and collecting
120312	Reading for personal interest
120313	Writing for personal interest
120399	Relaxing and leisure, n.e.c.*
1204 Arts and Entertainment (other than sports)	
120401	Attending performing arts
120402	Attending museums
120403	Attending movies/film
120404	Attending gambling establishments
120405	Security procedures rel. to arts & entertainment
120499	Arts and entertainment, n.e.c.*
1205 Waiting associated with Socializing, Relaxing, and Leisure	
120501	Waiting assoc. w/socializing & communicating
120502	Waiting assoc. w/attending/hosting social events
120503	Waiting associated with relaxing/leisure
120504	Waiting associated with arts & entertainment
120599	Waiting associated with socializing, n.e.c.*
*1299 Socializing, Relaxing, and Leisure, n.e.c.**	
129999	Socializing, relaxing, and leisure, n.e.c.*
13 Sports, Exercise, & Recreation	
1301 Participating in Sports, Exercise, and Recreation	
130101	Doing aerobics
130102	Playing baseball
130103	Playing basketball

130104	Biking
130105	Playing billiards
130106	Boating
130107	Bowling
130108	Climbing, spelunking, caving
130109	Dancing
130110	Participating in equestrian sports
130111	Fencing
130112	Fishing
130113	Playing football
130114	Golfing
130115	Doing gymnastics
130116	Hiking
130117	Playing hockey
130118	Hunting
130119	Participating in martial arts
130120	Playing racquet sports
130121	Participating in rodeo competitions
130122	Rollerblading
130123	Playing rugby
130124	Running
130125	Skiing, ice skating, snowboarding
130126	Playing soccer
130127	Softball
130128	Using cardiovascular equipment
130129	Vehicle touring/racing
130130	Playing volleyball
130131	Walking
130132	Participating in water sports
130133	Weightlifting/strength training
130134	Working out, unspecified
130135	Wrestling
130136	Doing yoga
130199	Playing sports n.e.c.*
1302	*Attending sports/recreational events*
130201	Watching aerobics
130202	Watching baseball
130203	Watching basketball
130204	Watching biking
130205	Watching billiards
130206	Watching boating
130207	Watching bowling
130208	Watching climbing, spelunking, caving
130209	Watching dancing
130210	Watching equestrian sports
130211	Watching fencing
130212	Watching fishing

130213	Watching football
130214	Watching golfing
130215	Watching gymnastics
130216	Watching hockey
130217	Watching martial arts
130218	Watching racquet sports
130219	Watching rodeo competitions
130220	Watching rollerblading
130221	Watching rugby
130222	Watching running
130223	Watching skiing, ice skating, snowboarding
130224	Watching soccer
130225	Watching softball
130226	Watching vehicle touring/racing
130227	Watching volleyball
130228	Watching walking
130229	Watching water sports
130230	Watching weightlifting/strength training
130231	Watching people working out, unspecified
130232	Watching wrestling
130299	Attending sporting events, n.e.c.*
1303	*Waiting Associated with Sports, Exercise, & Recreation*
130301	Waiting related to playing sports or exercising
130302	Waiting related to attending sporting events
130399	Waiting associated with sports, exercise, & recreation, n.e.c.*
1304	*Security Procedures Related to Sports, Exercise, & Recreation*
130401	Security related to playing sports or exercising
130402	Security related to attending sporting events
130499	Security related to sports, exercise, & recreation, n.e.c.*
1399	*Sports, Exercise, and Recreation, n.e.c.**
139999	Sports, exercise, & recreation, n.e.c.*

Source: ATUS Activity Coding Lexicons and Coding Manuals (accessed here: https://www.bls.gov/tus/lexicons.htm).

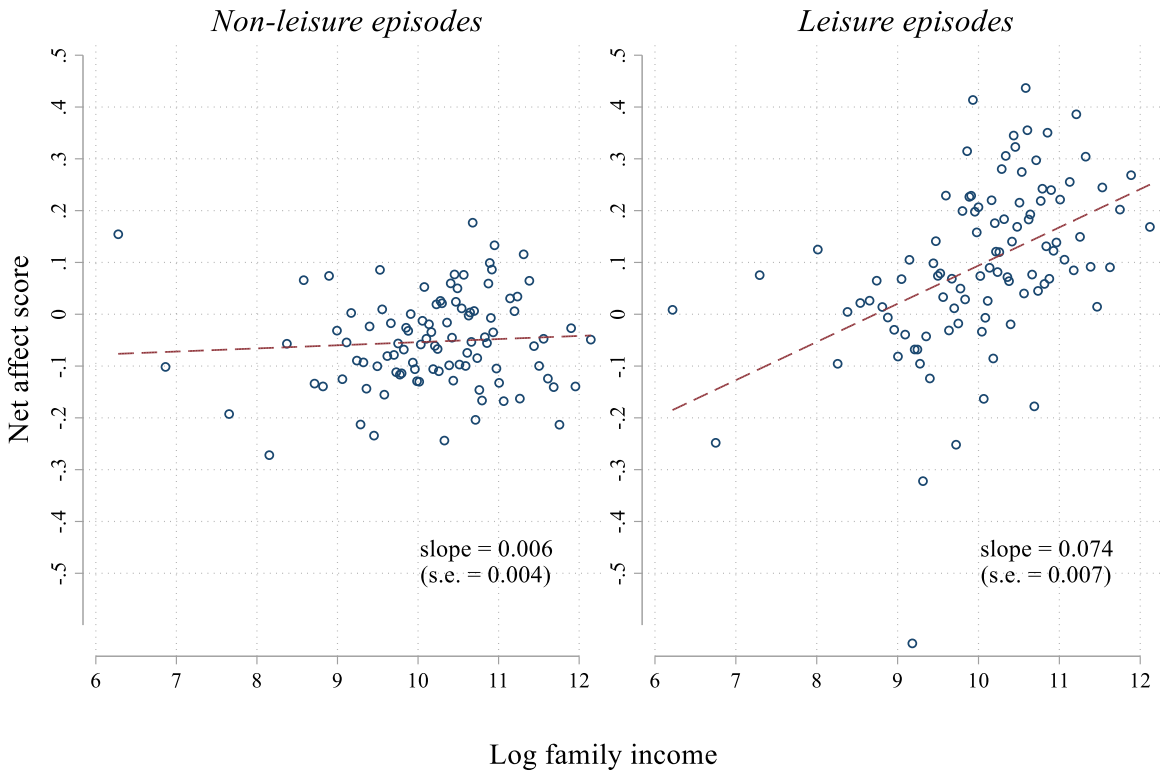
Table A.2. Sample Means, by Family Income Tercile

	All	*Income tercile*		
		Low	Middle	High
All activities				
Happiness	-0.000	0.008	0.017	-0.026
Stress	0.000	0.012	-0.022	0.007
Net affect	0.000	-0.048	0.024	0.025
Leisure activities				
Happiness	0.084	0.024	0.118	0.123
Stress	-0.266	-0.173	-0.320	-0.328
Net affect	0.096	-0.012	0.149	0.176
Leisure activities: Who else present (share of total)				
Spouse or partner	0.284	0.220	0.310	0.336
Own child	0.121	0.141	0.122	0.095
Other family	0.162	0.193	0.145	0.143
Friends	0.105	0.093	0.116	0.109
Others	0.072	0.075	0.068	0.072
Leisure activities: Sequence in the day (share of total)				
Second	0.240	0.267	0.217	0.231
Third or higher	0.118	0.130	0.120	0.102
Leisure time (hours/week)	35.498	39.156	35.073	32.080
Leisure activity selected for WBM				
Socializing	0.048	0.052	0.047	0.045
TV and music	0.195	0.230	0.197	0.159
Games, computer use, and reading	0.057	0.059	0.054	0.057
Sports and exercise	0.022	0.018	0.023	0.024
All other leisure	0.033	0.036	0.032	0.031
Demographic covariates				
Age	44.771	42.909	44.733	46.584
Female	0.521	0.549	0.517	0.496
Married	0.520	0.410	0.534	0.618
Own child<18	0.283	0.318	0.285	0.244
HS	0.290	0.371	0.322	0.173
Some College	0.168	0.159	0.189	0.156
Associate's	0.083	0.066	0.098	0.087
Bachelor's	0.187	0.083	0.189	0.292
Master's	0.079	0.021	0.060	0.158
PhD/Professional	0.028	0.005	0.011	0.067
N	102633	33715	33817	33497

Source: ATUS 2010, 2012, and 2013 Wellbeing Module Sample.

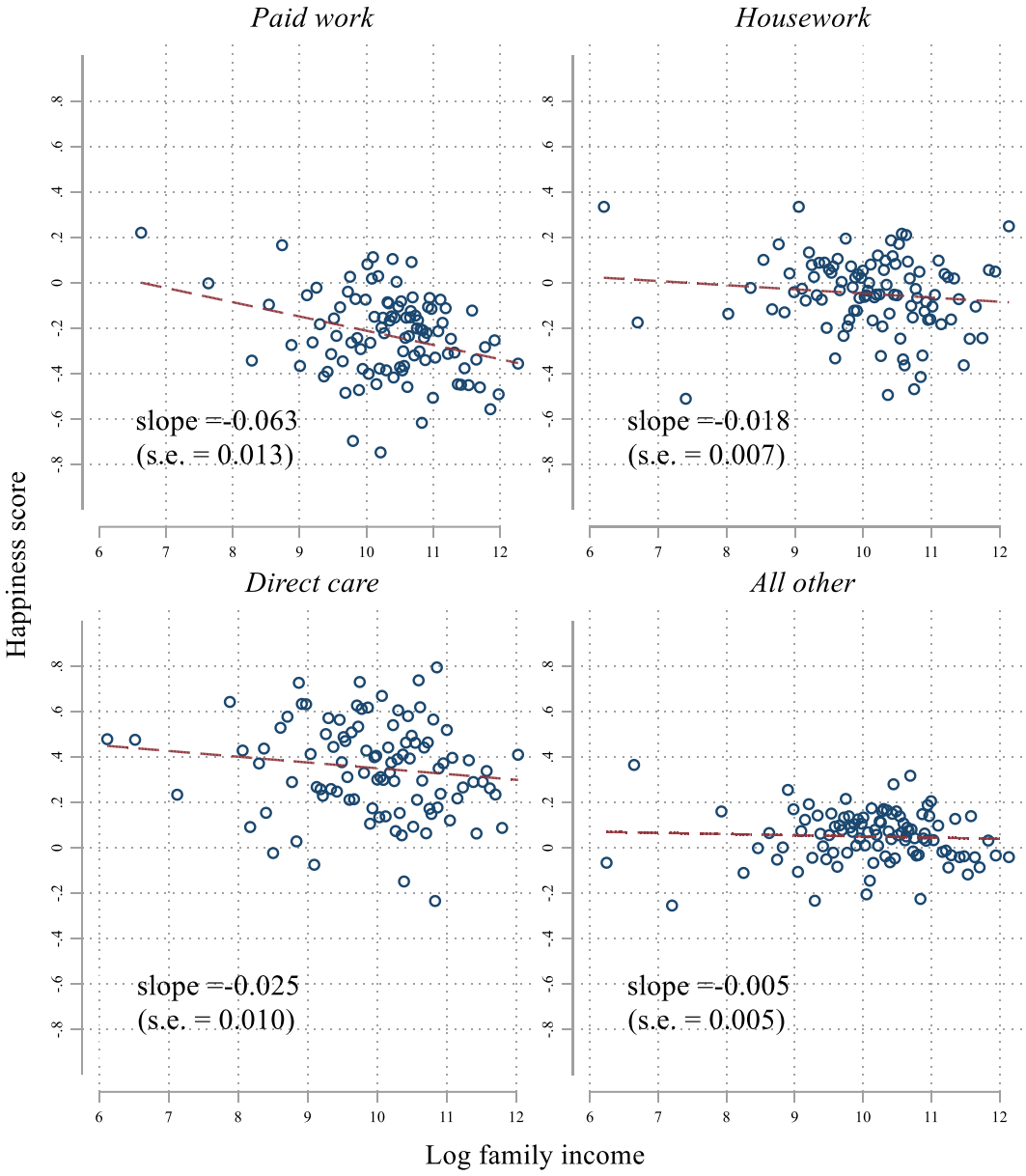
Appendix B

Figure B.1. Net affect during leisure and non-leisure episodes



Source: ATUS Wellbeing Module 2010, 2012, 2013 (21,728 leisure and 81,068 non-leisure episodes). Markers represent mean (standardized) net affect score by percentile of family income, while the red lines show net affect predicted from a regression on log income, controlling for day of the week, month, and year in which the diary was conducted.

Figure B.2. Happiness during non-leisure episodes (by broad type)



Source: ATUS Wellbeing Module 2010, 2012, 2013 (81,068 non-leisure episodes). Non-leisure activities are classified as paid work (work at one's main job and other work related activities: 6,686 episodes), housework (cooking, cleaning, and shopping: 21,913 episodes), direct care (childcare and the care of household adults" 6,172 episodes), and all other activities (a residual category that includes eating and drinking, educational and religious activities, and travel: 46,297 episodes).Markers represent mean (standardized) happiness score by percentile of family income, while the red lines show happiness predicted from a regression on log income, controlling for day of the week, month, and year in which diary was conducted.

Appendix C

Table C.1*. Income and leisure enjoyment (robustness checks)*

	(1) Baseline happiness	(2) Baseline net affect	(3) Baseline happiness (FE)
A. Expanded leisure definition			
Log income	0.036***	0.067***	
Leisure			0.031
			(0.083)
Leisure * Log income			0.034***
			(0.006)
Number of episodes	40,905	40,905	102,796
B. Excluding imputed incomes			
Log income	0.042***	0.078***	
	(0.009)	(0.009)	
Leisure			-0.552***
			(0.076)
Leisure * Log income			0.049***
			(0.007)
Number of episodes	16,558	16,558	78,773
C. OECD equivalization scale			
Log income	0.038***	0.065***	
	(0.008)	(0.007)	
Leisure			-0.277***
			(0.088)
Leisure * Log income			0.050***
			(0.007)
Number of episodes	21,728	21,728	102,796
D. Square root equivalization scale			
Log income	0.043***	0.071***	
	(0.008)	(0.007)	
Leisure			-0.299***
			(0.090)
Leisure * Log income			0.050***
			(0.007)
Number of episodes	21,728	21,728	102,796

*Source: Same as Table 1 in the text. Panel (a): Broader definition of leisure used that includes sleeping, eating, personal care, gardening, and time with pets. Panel (b): Only individuals with incomes that are not imputed are included.. Panels (c) and (d): Family income is first equivalized using the OECD scale (1+0.7(A-1)+0.5K) followed by the square root scale ((A+K)^0.5)), where A and K refer to the number of adults and children in the household, respectively. * p<0.10, ** p<0.05, *** p<0.01*