

Understanding the Growth of Solitary Leisure in the U.S., 1965 – 2018

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Abstract

This research examines the extent to which solitary leisure in the U.S. has grown over the past 60 years. The demographic and technological developments of the past decades have profoundly altered the way people live life. An increase in social isolation is one potential such change, though its prevalence remains debated and challenging to directly quantify. To provide this direct quantification, we focus on an area of life where social isolation has the potential to be especially detrimental: leisure time. We assess changes in leisure spent alone via nationally representative U.S. time-use data spanning six decades. Findings indicate that time spent alone during leisure has more than doubled among working-aged adults, from 58 daily minutes in 1965 to 119 in 2018. Further, the probability of spending five hours or more in solo leisure a day has increased nearly six-fold. Multivariate analyses indicate this increase is partly accounted for by population changes, most notably reductions in marriage rates and increases in living alone, but most of the growth of solo leisure remains unexplained. Leisure is an important source of social capital and network formation, and increasingly solitary leisure may undermine well-being in the moment and across the life course.

Keywords: social isolation, time use, population change, United States, historical trends, technology

UNDERSTANDING THE GROWTH OF SOLITARY LEISURE IN THE U.S.

Growing social isolation in the U.S. is typically thought to relate to population aging (Hawkley et al. 2019), declines in marriage rates and the growth of solo living (Snell 2017; Verdery and Margolis 2017), and the proliferation of technology in the second half of the 20th century through to today (Hall and Liu 2022; Parigi and Henson 2014). Putnam (2001), for example, saw technological transformation undercutting opportunities for building relationships. Sander and Putnam (2009) reiterated this sentiment later, describing the 90s as a time when people “increasingly watched *Friends* rather than had friends” (pg. 10). Yet, some empirical research challenges the idea that social circles have shrunk (Antonucci, Ajrouch, and Webster 2019; Wang and Wellman 2010), and the extent to which social isolation is changing, and why it may be changing, continues to be debated (Hall and Liu 2022; Parigi and Henson 2014). At the same time, time-diary studies generally agree that the amount of time people spend alone in a day has increased (Anttila, Selander, and Oinas 2020; Atalay 2024; Kannan and Veazie 2023). Despite time diaries being well equipped for focusing on the context in which social isolation is experienced—and such context is important for understanding when social isolation is likely to be most problematic (Hall and Merolla 2020; Lam and García-Román 2020; Rinderknecht, Doan, and Sayer 2021)—time-diary data have until recently been underutilized for studying trends in time spent alone (Anttila et al. 2020; Atalay 2024; Fisher 2015; Kannan and Veazie 2023). We extend this recent work and leverage the contextual detail of diary data by focusing on growth in social isolation specifically during leisure activities.

We define leisure as activities which are optional, pleasurable, and primarily beneficial to the person engaging in the activity as opposed to others. Examples in this study include both

sedentary (e.g., relaxing) and active (e.g., athletics) leisure, and both leisure mediated by technology (e.g., watching television) and typically not mediated by technology (e.g., religious activities and hobbies). Although this approach makes assumptions about what people enjoy (Sevilla, Gimenez-Nadal, and Gershuny 2012), these assumptions are supported by studies with similar definitions of leisure finding positive relationships between time spent in leisure and improved emotional well-being (Musick, Meier, and Flood 2016; Negraia and Augustine 2020). This approach also allows us to focus on the kinds of leisure activities explored in related research (Anttila et al. 2020; Atalay 2024).

Social isolation appears to be particularly important to study during leisure activities. This is because increases in time spent alone have been concentrated within leisure relative to other daily activities (Anttila et al. 2020; Atalay 2024; Clark 2002), and because time spent alone during leisure appears to be especially damaging. Roeters, Cloin, and van der Lippe (2014), for example, assessed Dutch diary data and found that spending more leisure time alone (or a greater proportion of leisure time alone) was associated with worsened mental health, while time spent alone during housework was unrelated to mental health. Similarly, Lam and García-Román (2020) assessed diary data from older U.S. adults, and they found that time spent alone during leisure, eating and drinking, and (to a lesser extent) traveling associated negatively with happiness during these activities compared to time spent with others during these activities. Time spent alone was also positively correlated with sadness during leisure and eating and drinking. By contrast, doing housework alone was not associated with worse emotional well-being. One explanation for the damaging effects of solo leisure is that, ultimately, loneliness originates from people experiencing less social engagement than they desire (Peplau, Miceli, and Morasch 1982). Expectations for what adequate levels of social engagement look like are based partly on

social comparisons which tend to inaccurately inflate the sociality of others (Deri, Davidai, and Gilovich 2017; Feld 1991; Peplau et al. 1982). Leisure spent alone, therefore, may at times be perceived as time spent missing out on others' social activities, whether accurate or imagined. Further, beyond the context of daily life experiences, social leisure is useful for building relationships, and ultimately social leisure appears to be a valuable means for forming and maintaining social capital (Buz et al. 2014; Glover 2018; Hall 2019; Iso-Ahola and Park 1996). Growth of solo leisure is therefore a source of concern both due to its immediate effects and its effects across the life course.

Although a few articles have examined overall rates of social isolation or changes in leisure spent with others in the U.S. via time diaries (Kannan and Veazie 2023; Sevilla et al. 2012), to our knowledge only Atalay (2024) has directly examined changes in solo leisure in the U.S. Atalay (2024) provides a detailed assessment of the changing sociality of leisure among U.S. residents using the American Time Use Survey (ATUS), spanning 2003 to 2022. We extend that study by utilizing the American Heritage Time Use Study (AHTUS) (Fisher and Gershuny 2015; Robinson and Martin 2009), which contains harmonized versions of the ATUS and earlier time-use datasets, allowing us to examine changes in solo leisure across a broader timespan than any previous time-use research on social isolation. One consequence of using the AHTUS, however, is that we cannot utilize the health and well-being data available only in the ATUS, nor can we extend our main analysis beyond working-aged adults. We instead expand upon Atalay (2024) in other ways. First, we provide an expanded overview of what people were doing when they engaged in leisure alone. Second, we examine both overall growth in solo leisure and growth among its most intensive consumers, especially those who engaged in at least five hours of solo leisure per day. And third, in addition to adjusting for several important demographic

characteristics relevant to social isolation, we closely examine differences in how solo leisure has changed by different levels of marital status and household composition. Overall, our aim is to provide a detailed overview of how the sociability of leisure has changed in the U.S. over the past 60 years. Our analysis helps highlight how solo leisure itself has changed, and the unequal ways in which solo leisure has grown in the lives of the U.S. public.

Growing solitude?

Netflix, the globally dominant streaming video platform, reports as its main competitors “all activities that consumers have at their disposal in their leisure time,” including “going out to dinner with friends or enjoying a glass of wine with their partner” (Netflix 2023). Research on digital and social media and, before it, television and radio, has long been concerned that goals such as these are being realized; that healthy social interaction is being supplanted by solitary and potentially less meaningful media consumption (Parigi and Henson 2014; Putnam 2001; Turkle 2011). Despite these concerns, the extent to which technological developments over the past 60 years, especially the internet, has led to an increase in time spent alone remains debated (Hall and Liu 2022; Parigi and Henson 2014). Early research on the impacts of internet connectivity reported greater internet use being associated with less time spent communicating with household members, declines in the size of people’s social circles, and greater depression and loneliness (Kraut et al. 1998). Yet, follow-up research found that these negative effects largely dissipated, and that internet usage was now generally associated with greater social involvement, larger social circles, and enhanced well-being (Kraut et al. 2002). In contrast, McPherson and colleagues (2006) reported declines in the size of discussion networks in the U.S. between 1985 and 2004, concluding that technological developments, among other factors, may contribute to shrinking social networks. This work received methodological criticism (Fischer

2009; McPherson, Smith-Lovin, and Brashears 2009; Paik and Sanchagrin 2013) and several studies have since reported conflicting findings regarding the relationship between digital technology and core discussion networks (Chen 2013; Vergeer and Pelzer 2009; Vriens and van Ingen 2018; Wang and Wellman 2010), including one study reporting growth in the number of friends reported between 2002 and 2007 (Wang and Wellman 2010). Time-diary studies, by contrast, appear to more consistently detect growth in social isolation (Anttila et al. 2020; Atalay 2024; Kannan and Veazie 2023).

Time spent in solitary leisure

Time diaries provide a unique opportunity to speak to the debate regarding changes in social isolation. Time diaries record experiences across all 24 hours of a specific day in multiple, sequential episodes, each of which revolve around a specific activity with precise start and stop times and often include contextual information, such as the presence of others during the episode. Alternative modes of measuring social isolation include assessing the size of people's social networks. The process of accurately measuring network size is methodologically challenging (Bearman and Parigi 2004; Hampton 2022), and although network size associates with the subjective perceptions of social isolation (i.e., loneliness) (Hawkley et al. 2008), it is unclear to what extent network measures capture differences in time spent alone. Network data also do not capture the context in which social isolation is experienced—i.e., network data will tell you who a person engages with, but typically not when, where, or for how long. Other approaches rely on respondents recalling how often they engaged with others over broad timescales. For example, the General Social Survey asks respondents how often they spend time visiting neighbors, friends, and relatives, with response options including (1) never, (2) about once a year, (3) several times a year, (4) about once a month, (5) several times a month, (6) once

or twice a week, and (7) almost every day (Clark 2015). These kinds of questions lack contextual detail on the times respondents spent alone. Further, they suffer from reliability problems relative to such data collected via time diaries. This is because reporting typical experiences requires respondents to aggregate experiences across time, which can be challenging, especially for activities which are irregularly timed (Juster, Ono, and Stafford 2003). By contrast, time diaries facilitate recall by typically only having respondents report on each episode of their previous day in sequence, which does not require aggregating together different experiences (Bonke 2005; Juster et al. 2003). Time-diary data therefore offer a unique degree of detail and reliability for studying changes in sociability, yet only a small number of articles utilize time diaries for this purpose. These include Clark (2002) and Turcotte (2007), who both reported growing isolation in Canada, from 1986 to 1998 and 2005, respectively; Vaage and Kitterød (2012), who reported growing isolation in Norway between 1990 and 2010; and Anttila and colleagues (2020), who reported growing isolation between 1987 and 2010 in Finland. Anttila and colleagues (2020) and Clark (2002) noted that this growth was partly concentrated within leisure activities, which is consistent with analyses of U.S. time-use data from 2003 to 2022 (Atalay 2024). Robinson et al. (2015), by contrast, reported little change in social engagement between 2003 and 2013 in the U.S. However, a key difference between Robinson et al. (2015) and research finding growth in social isolation is that Robinson et al. (2015) (along with Turcotte (2007) and Vaage and Kitterød (2012)) did not assess changes in social isolation specifically within leisure.

To our knowledge, only four other studies have employed diary data to assess changing sociability during leisure among working-aged adults. The first is research by Sevilla, Gimenez-Nadal, and Gershuny (2012), who found that leisure time grew in the U.S. between 1965 and 2003, but that the proportion of such leisure spent with other adults diminished, ultimately

leading to reductions in leisure time spent with adults during this time period despite the overall growth in leisure time. Vilhelmson, Elldér, and Thulin (2018) reported, similarly, that leisure spent alone increased by approximately half an hour per day between 1990 and 2011 among Swedish young adults, and Kannan and Veazie (2023) reported various degrees of decline in social leisure among U.S. residents between 2003 and 2020 across all age groups they examined, from 15 to over 65. By contrast, van Ingen and Dekker (2011) reported no change in solo leisure in the Netherlands between 1975 and 2005, but deriving conclusions about the growth of solo leisure from that research is challenging because media consumption was not included in their definition of leisure. In the present study, we provide an expansive view of the growth of solo leisure in the U.S. by (a) simultaneously utilizing precise measures of activity involvement and co-presence, (b) including both media- and non-media-related leisure activities, and (c) we do so over a broader timescale than any previous research on solo leisure, ultimately capturing six decades of American life. Consistent with findings reported by Anttila et al. (2020) and others, we expect solo leisure will have grown during this time span--though the extent of this growth, and for whom the growth has been most significant, remains unclear.

Composition of solitary leisure

Along with a focus on total time spent in solo leisure there has been a focus on the composition of solo leisure. Although at times detrimental, solitude can also be a positive experience, providing people with feelings of freedom, creativity, intimacy, and enhanced spirituality (Long and Averill 2003). A student sample reported that solitude is most beneficial when occurring outdoors in a natural environment (Long and Averill 2003), yet research has found that most time alone occurs in the home (Larson 1990; Larson, Csikszentmihalyi, and Graef 1982), and in their examination of time-use data in the U.S., from 1965 to the 90s, Robinson & Godbey (1997)

found that “TV-watching has in fact cut into the time we have allocated to almost everything else in our lives...” (pg. xv). A more recent examination of time-use data in the U.S. reported a continuing increase in screen viewing, both via television and internet connected technologies (ICTs) (Robinson et al. 2015)—with approximately half of the U.S. public’s free time being devoted to screen viewing by the early to mid-2000s. Solitude generally, and solo leisure in particular, is not necessarily problematic, but more sedentary, home-bound leisure appears both more concerning for well-being and increasingly more prominent in the daily lives of the U.S. public. Given the importance of understanding compositional changes in leisure for judging changing rates of solo leisure, we analyze changes in the leisure activities people have engaged in alone between 1965 and 2018. We anticipate the elevated screen usage reported in previous research will also be observed when focusing specifically on solo leisure, especially in more recent years.

Heavy consumption of solitary leisure

Research focused on television and ICT usage is often particularly interested in the heaviest of consumers. Wang and Wellman (2010), for example, identified several potential advantages of heavy ICT consumption, such as these heavy consumers having the most online friends and the most growth between 2003 and 2007 in in-person engagement with friends at least once per week. However, research more often focuses on the negative consequences of such heavy consumption. Heavy consumption of digital media by adolescents correlates, for example, with spending more offline activities alone (Thulin and Vilhelmson 2019), and heavy consumption of the internet by adolescents correlates with elevated blood pressure and obesity (Barrense-Dias et al. 2016; Cassidy-Bushrow et al. 2015). Heavy consumption of television, similarly, correlates with lower life satisfaction (Frey, Benesch, and Stutzer 2007) and obesity (Coon and Tucker

2001; Foster, Gore, and West 2006; Guerrero and Forment 2019). We follow our analysis of average rates of solo leisure and composition of solo leisure with an overview of the changing probability of being in one of four consumption groups, ranging from little-to-no solo leisure consumption to the heaviest consumers of solo leisure. Although we expect an overall increase in solo leisure, we are unsure if this increase will be consistent across levels of consumption. This analysis is therefore primarily exploratory.

Demographic changes relevant to social isolation

Anttila and colleagues (2020) reported that time spent alone increased in nearly all population groups. Adjusting for changes in these groups, therefore, did not explain this growth—though population aging and the growing number of single households explained some of this growth in social isolation. The United States, like Finland, is an aging country with a growing proportion of people remaining unmarried and living alone (Bloome and Ang 2020; Cohen et al. 2011; Kochhar et al. 2014; Verdery and Margolis 2017). We therefore expect adjusting for demographic factors will explain some but likely not all of the change in solo leisure between 1965 and 2018.

Even if demographic background may not fully explain growth in solo leisure, it is still important to better understand the kinds of people who are associated with the highest consumption of solo leisure given its implications for well-being (Glover 2018; Lam and García-Román 2020; Roeters et al. 2014). Little work looks specifically at social isolation during leisure, and even fewer studies look at the interrelation of solo leisure and demographic background. A significant body of research, though, has looked at the interrelation of overall rates of social isolation and demographic background, and this work indicates that demographic factors are likely to be important predictors of solo leisure. For example, social isolation appears

higher among those who have never married, who live alone, African Americans compared to Whites, and unemployed persons compared to those who are employed (Cornwell 2011; Kannan and Veazie 2023). Lower educational attainment associates with higher rates of kin contact and lower rates of non-kin contact, resulting in lower education associating with more time alone overall in the U.S. (Cornwell 2011). The relationship between gender and social isolation is complex and depends on factors such as marital status, presence of children, and stage of the life course (Ajrouch, Blandon, and Antonucci 2005; Cornwell 2011; Munch, McPherson, and Smith-Lovin 1997; Umberson, Lin, and Cha 2022)—but, generally, men appear more socially isolated than women (Fischer 1982; Klinenberg 2013). The relationship between age and social isolation has received significant attention (Gierveld 1998; Holt-Lunstad and Smith 2015; Wenger et al. 1996). Research finds that older U.S. adults have significantly lower rates of social contact relative to younger age groups, though this varies by gender, household structure, and life-course factors (Cornwell 2011; Marcum 2013).

As discussed previously, Anttila et al. (2020) found that solo leisure grew partly due to declines in marriage rates and changes in household composition, which is consistent with research finding that living alone and being unmarried are associated with less time spent with others (Cornwell 2011). While research highlights these and similar connections, no research to our knowledge has explored how these relationships may be changing. If we assume that technological advancement has made solo leisure more alluring, then it follows that those with the least control over their free time should report the least growth in solo leisure. Such control is a primary advantage of being unmarried and living alone (Klinenberg 2013), whereas those who are married, and especially those who are married with children, are likely to be constrained in the amount of solo leisure they can pursue. Therefore, in addition to the linear effect found in

previous research, we also expect to find an interactive effect, such that the association between solo leisure and being unmarried and living alone will expand over time.

Overall, demographic factors are both important predictors of social isolation and, at least in the case of gender, their relationship to social isolation appears to be growing over time (Anttila et al. 2020). In seeking to account for changes in solo leisure by adjusting for demographic background, we adjust for population changes between 1965 and 2018 in sex, race, age, employment status, education, marital status and household composition. We also model the steeper growth of social isolation among male relative to female respondents reported by Anttila and colleagues (2020), and we model the steeper growth we anticipate observing among those who are unmarried and living alone relative to married respondents.

Data and Methods

We utilize five nationally representative¹ U.S. time-diary surveys collected in 1965-66 (referenced as 1965), 1975-76 (referenced as 1975), 1998, 2003, 2010, and 2018, and harmonized in the American Heritage Time Use Study (AHTUS) (Fisher and Gershuny 2015; Robinson and Martin 2009).² Each of the five time-diary surveys we use in our analysis is an independent sample. These diaries were collected independent of each other until the beginning of the American Time Use Survey (ATUS) (Hofferth et al. 2020), which the AHTUS includes from 2003 to 2018. Time diaries are surveys designed to measure how respondents spend their time (i.e., in what activities) and the amount of time they spend in each activity type.

Respondents report their time use by describing each activity they engaged in during the previous day, in sequence, and report contextual information about most activities, such as the presence of others. We exclude all diaries flagged as poor quality within the AHTUS or diaries with missing data on any of our independent variables.³ We correct a small proportion of leisure

activity episodes in which instances of reported isolation likely included others (see online supplement B for more information). For comparability with the 1965 data, our primary analyses only include working age adults (19-65).⁴ In total, our primary analyses include data from 36,275 U.S. residents weighted to be nationally representative by age group and sex, and provide an even distribution of days of the week.

Table 1
Descriptive statistics (Proportion/Mean (SD))

	1965	1975	1998	2003	2010	2018
<i>Time-Use Variables</i>						
Solo Leisure	58 (79)	75 (115)	87 (135)	100 (147)	112 (160)	119 (173)
Social Leisure	173 (147)	192 (165)	152 (163)	167 (165)	163 (169)	151 (166)
<i>Demographic Variables</i>						
Female	.53	.53	.52	.51	.51	.51
White	.88	.90	.80	.83	.78	.79
Employed	.72	.70	.85	.78	.74	.78
Age						
19-34	.38	.44	.45	.35	.34	.35
35-49	.36	.29	.33	.37	.34	.32
50-65	.26	.27	.21	.28	.32	.33
HH Composition						
Married w/ child	.54	.43	.33	.39	.38	.34
Married & childless	.27	.26	.21	.24	.18	.21
Unmarried w/ others	.13	.17	.30	.22	.23	.24
Unmarried & alone	.07	.14	.16	.16	.21	.21
Education						
High school & below	.73	.66	.37	.39	.35	.28
Some college	.15	.17	.29	.21	.21	.19
College +	.13	.18	.34	.40	.44	.53
N _(diary)	1,959	3,638	902	15,785	9,805	6,611
N _(respondent cluster)	—	1,213	—	—	—	—

Results are weighted to be nationally representative of U.S. residents aged 19-65 by sex and age group. Note that the 1975 is unique because the AHTUS contains multiple observations per respondent. 1975 results cluster for 1,213 respondents. HH = household.

Outcome measures

Our primary outcome measure is time (i.e., daily minutes) spent engaging in leisure activities alone (i.e., solo leisure). For each leisure activity reported in a diary, respondents indicated the presence of others, such as friends and family. We operationalize solo leisure as engagement in leisure activities without the presence of others. In contrast with related research (e.g., Anttila et al. 2020; Roeters et al. 2014), we define episodes where the respondent only reported the presence of strangers as time spent with others. This is necessary due to the 1998 dataset consisting of a much higher proportion of leisure activities occurring in the presence of only unknown individuals, at 3% of all leisure activities reported that year, compared to other years, which are each under 1%. We believe this difference is due to the 1998 diary instrument having provided respondents with an “other” co-presence response category, which the AHTUS interprets as only including individuals unknown to the respondent but may include known individuals, such as neighbors (Center for Time Use Research 2022).⁵ Lastly, we operationalize co-presence as being physically in the same space with others. It is therefore possible for a respondent to have reported being alone during instant messaging and other forms of social interaction during leisure activities that are not face-to-face. We discuss the implications of this measurement limitation in the discussion section.

Our definition of leisure includes nine broad categories, including (1) watching television / videos, (2) gaming, (3) computer use,⁶ (4) relaxing, (5) physical activities, which broadly include fitness, recreation, and sports-related activities, (6) reading, (7) hobbies, (8) religious activities, and (9) “other” leisure (i.e., activities capturing unspecified forms of leisure or activities which were reported too infrequently when alone to receive their own category). (See online supplement D for an overview connecting these leisure categories to exact AHTUS

activity codes and a discussion of how these leisure coding choices compare to related research.) Additionally, we categorize each respondent into one of four groups based on their level of solo leisure consumption: (1) Minimal Consumers includes all respondents under the 50th percentile of solo leisure consumption (0 to 34 daily minutes of solo leisure), (2) Moderate Consumers consists of the 50th percentile to under the 75th percentile (35 to 149 minutes), (3) Major Consumers consists of the 75th percentile to under the 90th percentile (150 to 299 minutes), and (4) Intensive Consumers consists of the 90th percentile and greater (300+ minutes). We primarily analyze solo leisure as a continuous measure of time. Our further assessments of how each of our nine solo leisure categories changed between 1965 and 2018 assist us in interpreting overall changes in solo leisure. Similarly, we assess changes in the predicted probability of being in each solo leisure consumption group to understand the extent to which changes in solo leisure are concentrated among a small group of intensive consumers.

Independent variables

Our demographic independent variables include respondents' sex (coded as: 0=male and 1=female), race (coded as: 0=non-White and 1=White), employment status (coded as: 0=unemployed or not in labor market and 1= employed), age (coded as: 1= 19-34, 2= 35-49, and 3= 50-65), household composition/marital status (HH Composition, coded as 1= married w/child, 2= married & childless, 3= unmarried w/others, and 4= unmarried alone), and educational attainment (coded as 1= high school & below, 2= some college, 3= college +).⁷

We measure leisure as solo leisure (our dependent variable) and social leisure, which we model as an independent variable in a sensitivity analysis. Thus, social leisure includes all time spent in leisure activities not captured by our solo leisure measure.

Analytic approach

We aggregate together all episode-level data at the day level, capturing the total amount of time spent engaging in solo leisure and the total amount of time spent engaging in social leisure across the entire diary day. Our analyses include in two broad sections: (1) solo leisure trends and (2) solo leisure trends adjusting for population changes.

We begin with an analysis of solo leisure by year without control variables. We conduct this analysis in three steps. First, we use an OLS regression to analyze changes in overall rates of solo leisure. Second, we use multiple OLS regressions to analyze the nine forms of solo leisure which made up our primary, combined solo leisure measure. Third, we divide our sample into four groups based on their rates of solo leisure consumption, and we use a multinomial logistic regression to analyze changes in the probability of being in each group by year. Together, these analyses highlight how solo leisure changed in the U.S. between 1965 and 2018.

Next, we build off of our OLS model predicting solo leisure by survey year (Model 1) by adjusting for our demographic variables (Model 2), which allow us to assess the extent to which population changes explain changes in solo leisure. We then further explore how solo leisure changes for different levels of household composition using predicted values from Model 2, and we conduct a sensitivity analysis assessing if growth in solo leisure is due to growth in leisure more generally.

All analyses utilize survey weights provided in the AHTUS. Analyses including the 1975 data used clustering to account for the multiple diary responses from some respondents in these data.

Results

Descriptive changes in solitary leisure

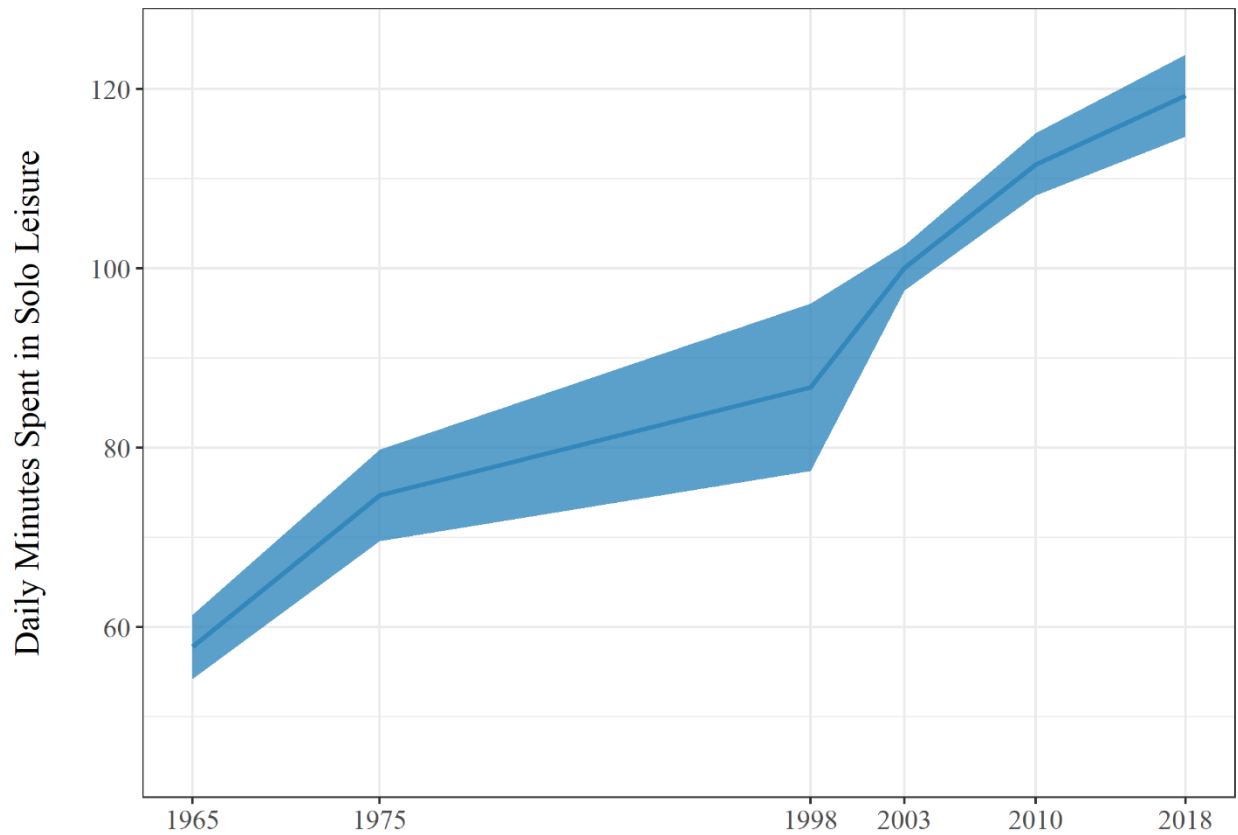


Fig. 1. Changes in solo leisure. Bands are 95% CIs. Values are predicted based on Model 1 in Table 2.

We begin by assessing how the amount of solo leisure has changed between 1965 and 2018 in terms of: a) overall rates (Figure 1), b) changes in the types of solo leisure in which people engage (Figure 2), and c) percentiles (Figure 3). Overall, time spent in solo leisure has increased steadily since 1965. Figure 1 shows that, on average, respondents in 1965 reported approximately 58 minutes of solo leisure per day, which increased to 119 minutes in 2018 ($\Delta =$

62, $p < .001$ —i.e., there was a positive change in solo leisure of approximately one hour between 1965 and 2018). The growth in solo leisure is statistically significant between each survey year (1965 vs. 1975: $\Delta = 17$, $p < .001$; 1975 vs. 1998: $\Delta = 12$, $p < .05$; 1998 vs. 2003: $\Delta = 13$, $p < .01$; 2003 vs. 2010: $\Delta = 12$, $p < .001$; 2010 vs. 2018: $\Delta = 8$, $p < .01$).

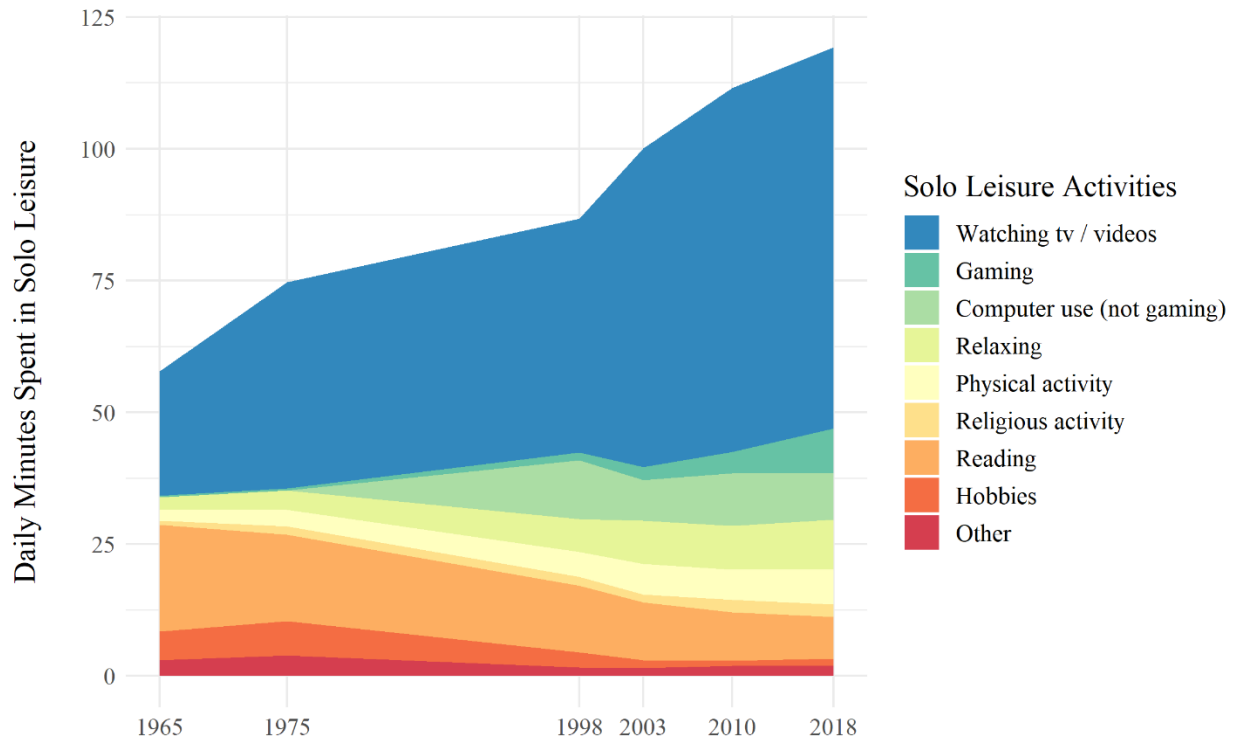


Fig. 2. Changes in the composition of solo leisure. Values are predicted based on models presented in Table A1.1 and Table A1.2 in the appendix.

Solo leisure has approximately doubled since 1965, and Figure 2 shows that TV consumption has driven most of this change, increasing from about 24 minutes in 1965 to 72 minutes in 2018 ($\Delta = 49$, $p < .001$). Solo gaming (likely computer gaming) has also increased between 1998 and 2018 ($\Delta = 7$, $p < .001$), whereas non-gaming computer use has remained

largely flat in this timespan ($\Delta = -2$, *n.s.*). This increase in solo leisure spent watching TV / videos is consistent with findings from other research (Anttila et al. 2020). The minimal change in total computer use, gaming or otherwise, is consistent with findings from analyses of 2000-2015 U.K. data in which the vast majority of growth in digital device usage occurred as a secondary activity (Gershuny and Sullivan 2019), which means that most device usage occurs while people are engaged in a different primary activity such as: taking care of children; grocery shopping; working for pay, etc. This secondary device usage was not recorded in AHTUS data outside of the 1998 data. Solo relaxing and solo physical activity increased between 1965 and 2018 ($\Delta = 7$, $p < .001$; $\Delta = 4$, $p < .001$, respectively), albeit both increased from low baselines in 1965 of 2 minutes. Solo religious activities also increased slightly from a low baseline in 1965 of 1 minute ($\Delta = 2$, $p < .001$). Note that these values are quite small because they include both those who engage in these activities and the those who do not engage in these activities at all. The values should therefore be interpreted as the mean for the entire sample, not just for those who do these activities.

While solo leisure has grown significantly, several types of solo leisure have decreased. Most notably, reading has shrunk from about 20 minutes in 1965 to about 8 minutes by 2018 ($\Delta = -12$, $p < .001$)—however, it is possible that some time spent reading has moved onto digital devices and is therefore captured in the “computer use (not gaming)” category. Time spent engaging in other solitary hobbies has also dropped from about 5 minutes in 1965 to almost nothing in 2018 ($\Delta = -4$, $p < .001$). Similar to reductions in reading, people’s hobbies may increasingly be mediated by technology may therefore be reported in other categories.

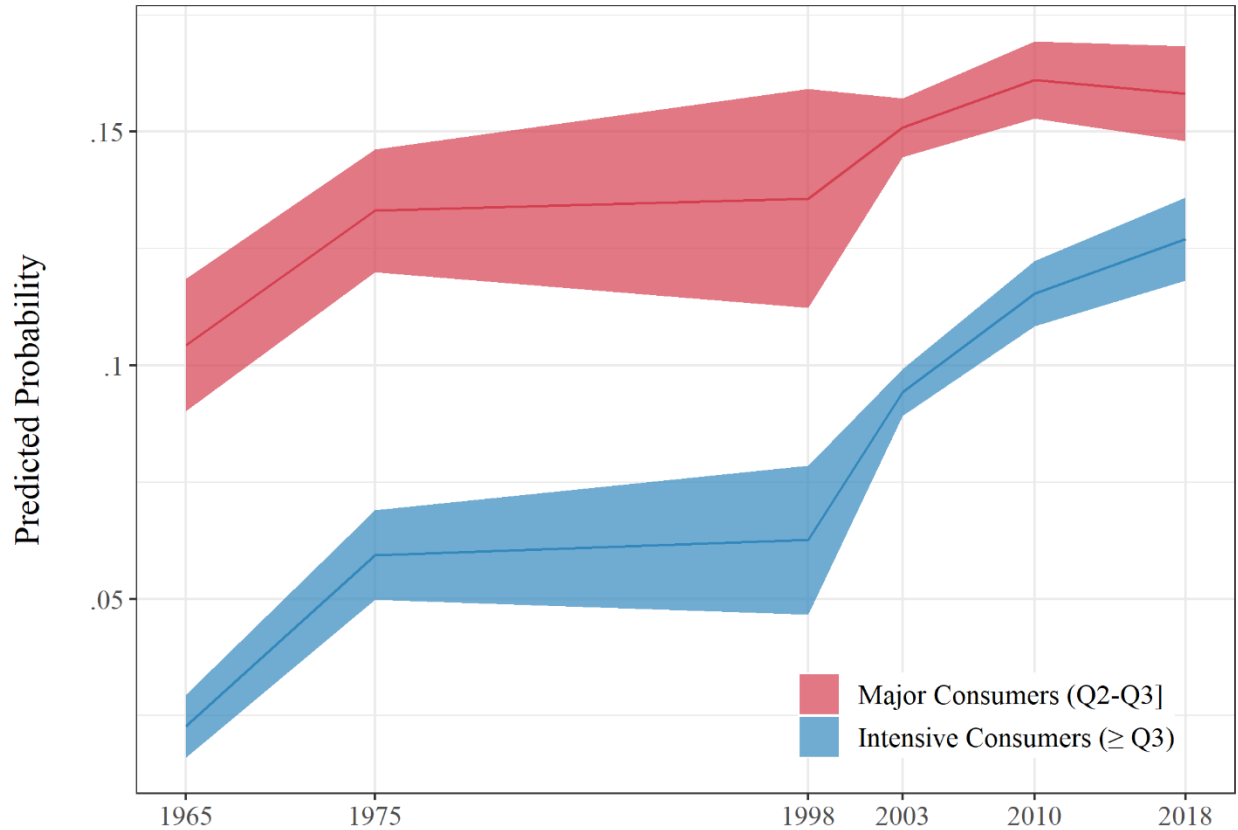


Fig. 3. Changes in the predicted probability of being either Major Consumers or Intensive Consumers. Major Consumers (Q2-Q3] include respondents who reported between 2.5 to just under 5 hours of daily solo leisure, and Intensive Consumers (\geq Q3) include respondents who reported 5 hours or more of daily solo leisure. Bands are 95% CIs. Values are predicted based on the model presented in Table A2 in the appendix.

Changes in average rates of solo leisure consumption do not capture the variance in such consumption, or how this variance has changed over time. To do so, we divide all respondents into four groups based on the percentile cutoffs in our continuous measure of daily solo leisure. The probability of being a Minimal Consumer or Moderate Consumer diminished between 1965 and 2018, from .55 and .32, respectively, to .46 ($\Delta = -.1, p < .001$ —i.e., there was a .1 decrease

in the predicted probability of being in the Minimal Consumer group between 1965 and 2018) and .26 ($\Delta = -.06, p < .001$). Figure 3 visualizes trends among Major Consumers and Intensive Consumers. The probability of being in either group increased similarly between 1965 and 2018, albeit more strongly for Intensive Consumers (.02 to .13, $\Delta = .1, p < .001$) than Major Consumers (.1 to .16, $\Delta = .05, p < .001$). For Major Consumers, this increase occurred almost entirely between 1965 and 2003 ($\Delta = .05, p < .001$) relative to 2003 to 2018 ($\Delta = .01, n.s.$). By contrast, this increase occurred both before ($\Delta = .07, p < .001$) and after ($\Delta = .03, p < .001$) 2003 for Intensive Consumers. Overall, while average rates of solo leisure doubled between 1965 and 2018, the probability of being an Intensive Consumer of solo leisure doubled since 1998, and increased almost six-fold since 1965.⁸

Adjusted changes in solitary leisure

Table 2

OLS regressions predicting number of daily minutes spent in solo leisure, 1965-2018

	Model 1	Model 2
Year (Ref = 1965)		
1975	16.89*** (3.18)	2.36 (4.36)
1998	28.94*** (5.11)	17.34* (7.63)
2003	42.29*** (2.24)	19.38*** (3.39)
2010	53.81*** (2.55)	14.75*** (3.75)
2018	61.5*** (2.96)	17.79*** (4.06)
Female	—	-31.91*** (3.81)
Year x Female		
1975 x Female	—	11.08 (5.77)
1998 x Female	—	3.19 (9.82)

	2003 x Female	—	-2.44 (4.39)
	2010 x Female	—	-3.04 (4.92)
	2018 x Female	—	-11.7* (5.56)
White		—	-19.9*** (2.33)
Employed		—	-63.83*** (2.31)
Age (Ref = 19-34)			
	35-49	—	22.34*** (1.68)
	50-65	—	53.41*** (2.25)
HH Composition (Ref = Married w/ child)			
	Married & childless	—	12.41** (4.51)
	Unmarried w/others	—	27.87*** (5.92)
	Unmarried & alone	—	67.78*** (9.40)
Year x HH Composition			
	1975 x Married & childless	—	-3.11 (6.77)
	1975 x Unmarried w/others	—	-4.08 (8.34)
	1975 x Unmarried & alone	—	37.49** (13.32)
	1998 x Married & childless	—	16.26 (13.12)
	1998 x Unmarried w/others	—	21.34 (12.28)
	1998 x Unmarried & alone	—	13.02 (16.21)
	2003 x Married & childless	—	9.41 (5.17)
	2003 x Unmarried w/others	—	33.36*** (6.75)
	2003 x Unmarried & alone	—	64.37*** (10.23)
	2010 x Married & childless	—	16.22** (5.82)
	2010 x Unmarried w/others	—	42.61*** (7.32)

	2010 x Unmarried & alone	—	74.63*** (10.52)
	2018 x Married & childless	—	14.35* (6)
	2018 x Unmarried w/others	—	60.90*** (8.2)
	2018 x Unmarried & alone	—	104.61*** (11.15)
Education (Ref = High school & below)			
	Some college	—	-5.4* (2.26)
	College grad +	—	-7.92*** (1.8)
Constant		57.79*** (1.83)	106.19*** (4.15)
R^2		.01	.21

Standard errors are in parentheses. HH = household.

* $p < .05$, ** $p < 0.01$, *** $p < 0.001$, two-tailed.

We next test the associations between solo leisure and our demographic variables in an attempt to explain the increasing trend in solo leisure described in the previous section. Table 2 shows that, compared to the model without control variables (Model 1), adjusting for population changes (Model 2) reduces the difference between 1965 and 2018 from 61 minutes to approximately 46 minutes, a decrease of 25%. Changes in household composition are responsible for virtually all of this decrease.⁹

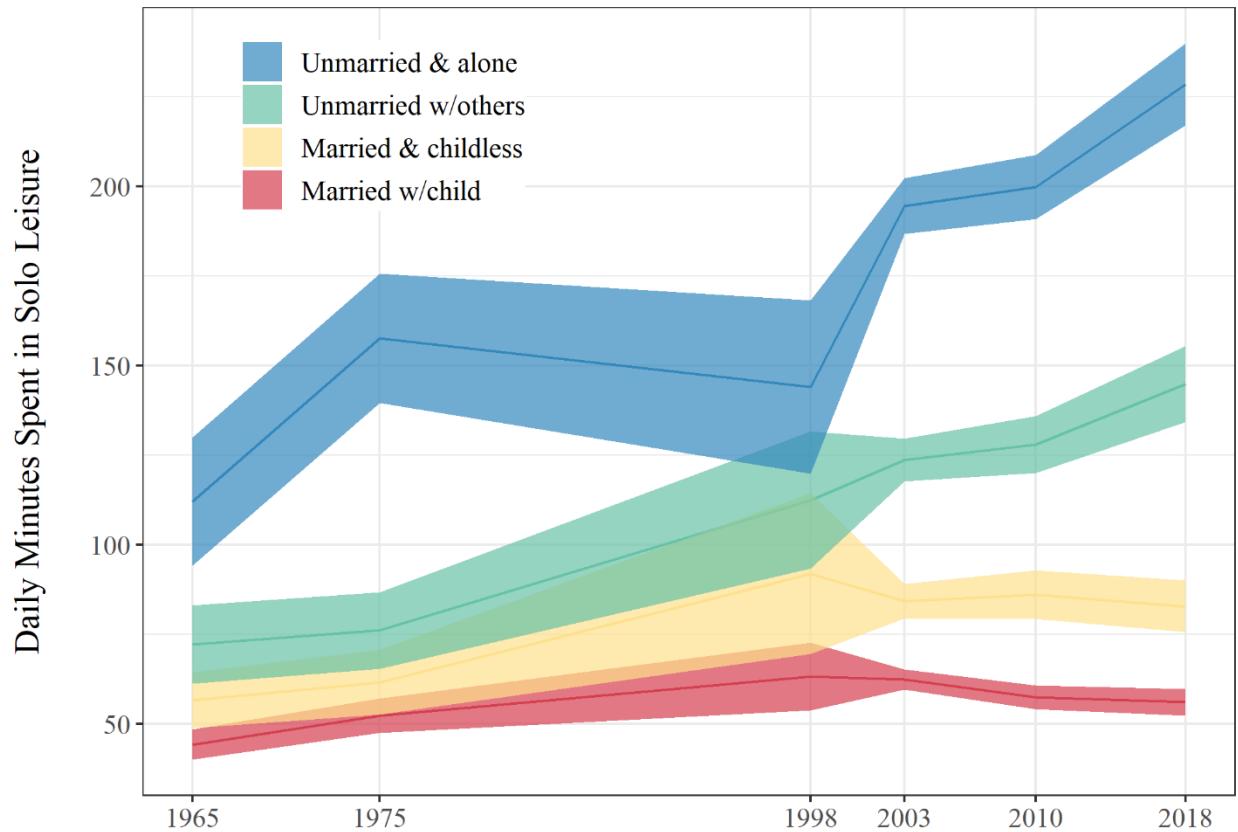


Fig. 4. Predicted changes in solo leisure by household composition category. Bands are 95% CIs. Values are predicted based on Model 2 in Table 2.

Figure 4 shows how solo leisure increased for all household composition categories between 1965 and 2018, albeit more strongly for unmarried respondents living alone ($\Delta = 116, p < .001$) than for unmarried respondents living with others ($\Delta = 73, p < .001$), more strongly for unmarried respondents living with others than for married respondents without children ($\Delta = 26, p < .001$), and more strongly for married respondents without children than for married respondents with children ($\Delta = 12, p < .001$).¹⁰ Although they do not explain the growth in solo leisure, all other demographic variables significantly predict solo leisure. Overall, being non-White, unemployed, being male, having only a high school education relative to some college

experience or greater, and being older (i.e., 50-65 relative to 35-49, and 35-49 relative to 19-34) positively correlate with solo leisure. Yet, employment and educational attainment also negatively correlate with social leisure, which indicates that these groups have comparatively less leisure time overall.¹¹ Lastly, unlike Anttila et al. (2020), we do not find evidence that the growth of solo leisure has been steeper for male respondents relative to female respondents.

One additional explanation for the growth of solo leisure is that such leisure may have increased due to growth in leisure overall (Robinson and Godbey 1997; Robinson et al. 2015). We assess this possibility with a sensitivity analysis building on Model 2 in Table 2 by further adjusting for total amount of time spent in social leisure (see Table A6 in the appendix). Rather than explaining the 46-minute difference between 1965 and 2018, adjusting for changes in social leisure produces the same 46-minute difference.

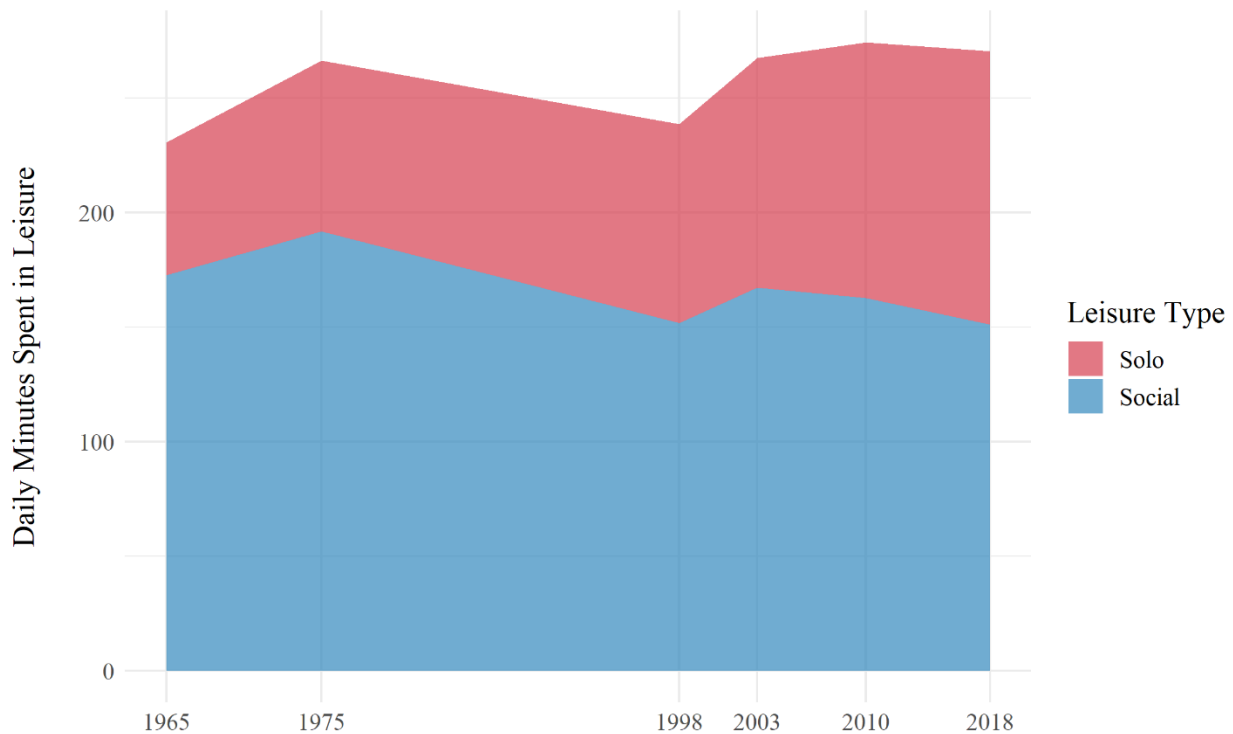


Fig. 5. Changes in the amount of solo and social leisure. Values for solo leisure are predicted based on Model 1 presented in Table 2 and values for social leisure are predicted based on Model 1 in Table A5 in the appendix.

Figure 5 further illustrates the relationship between solo and social leisure. Rather than both growing together, social leisure has overall declined slightly between 1965 and 2018 ($\Delta = -22$, $p < .001$) while solo leisure grew. Yet, there have been significant changes in social leisure between groups. Social leisure, on average, grew by 17 minutes a day for married respondents with children ($p < .01$) and by 27 minutes a day for married respondents without children ($p < .01$), but declined by 22 minutes a day for unmarried respondents living with others ($p < .05$), and declined by 44 minutes a day for unmarried respondents living alone ($p < .01$).¹²

Discussion

Social isolation associates with a range of negative health outcomes, including depression, loneliness (Ge et al. 2017; Jose and Lim 2014; Kawachi 2001), and heightened risk of mortality comparable to smoking, obesity, and physical inactivity (Holt-Lunstad et al. 2015; Holt-Lunstad, Smith, and Layton 2010; House, Landis, and Umberson 1988). These and other outcomes have led to long-running concerns regarding its growth (Parigi and Henson 2014; Putnam 2001). At the same time, the experience of social isolation can be healthy (Long and Averill 2003), and being with others can at times be detrimental (Hudson, Lucas, and Donnellan 2020; Kahneman et al. 2004). Diary data allow us to focus on social isolation when it may be at its most detrimental for well-being, which research suggests to be during leisure activities (Lam and García-Román 2020; Roeters et al. 2014). It is during these moments that we find evidence of growth in social isolation in American society, albeit unequal growth.

Overall, we find that rates of solo leisure have doubled among working-aged adults since 1965, reaching almost two hours of solo leisure a day, on average, by 2018—the vast majority of which consists of watching television and videos. Consumption of at least five hours of solo leisure jumped even more sharply, from being almost non-existent in 1965 to representing just under 13% of respondents in 2018. Reports of solo leisure associate with being male, non-White, unemployed, older, having lower educational attainment, and being married without children, unmarried and living with others, and especially being unmarried and living alone. Living alone not only strongly associated with solo leisure: our analyses find that this relationship is also strengthening over time. Being unmarried and living alone in 2018, for example, associated with over an hour more time spent in solo leisure per day than being unmarried and living alone in 1998, and almost two hours more time alone per day relative to being unmarried and living alone in 1965, net of other population changes. Prior research finds that living alone is not necessarily problematic because those who live alone tend to compensate for a lack of co-presence in the household by spending greater amounts of time with friends and relatives living outside the household (Alwin, Converse, and Martin 1985; Hill, Banks, and Haynes 2009; Klinenberg 2013), but our results suggest that such compensation may increasingly not be happening in more recent years. Living alone may therefore be growing in its associations with a range of negative outcomes (Holt-Lunstad et al. 2015; Smith and Victor 2019; Swader 2019) as it becomes more prevalent across affluent nations (Snell 2017; Verdery and Margolis 2017).

Demographic changes explain little of the growth in solo leisure between 1965 and 2018 among working-aged adults. Technological changes, notably the popularity of television and, more recently, internet-connected technologies (ICTs) are the focus of an ever-growing body of research examining the impacts of modernity on social connectedness and may explain some or

all of this remaining growth. ICTs provide a convenient means for maintaining connections despite geographic distance (Rainie and Wellman 2012; Vanden Abeele, De Wolf, and Ling 2018) and may positively impact social connectedness (Wang and Wellman 2010). Yet, the allure of television and ICTs may also compete with and, at times, displace face-to-face interaction (Robinson and Godbey 1997; Turkle 2011; Vanden Abeele et al. 2018; Vilhelmson et al. 2018). We find evidence of such displacement in how growth in solo leisure has been driven almost entirely by increases in time spent with technology, primarily watching television and videos. This is consistent with earlier research highlighting the displacing qualities of television (Putnam 2001; Robinson and Godbey 1997). The AHTUS, although valuable for providing the only U.S. dataset of time diaries spanning six decades, has two limitations that prevent us from exploring such displacement as it relates specifically to ICTs. The first limitation relates to how the AHTUS conceives of what it means to be alone. The AHTUS remains consistent over time in how it measures co-presence during an activity episode, specifically by focusing on face-to-face co-presence, even as the world has changed by moving increasingly online. The AHTUS is therefore missing social interaction mediated by technology despite its potential increasing prevalence as a source of connection. Second, not only are respondents not being asked to report digitally mediated co-presence, they are typically also not able to report activities from which digitally mediated co-presence can even be inferred. Such activities, including the use of social media platforms, are typically reported by respondents as occurring during other activities (i.e., as “secondary” activities) rather than being central enough to report as their own activity. Diaries designed to capture this secondary device usage report almost three hours of such usage a day in 2015 in the U.K., compared to about a half hour of time spent using computers as a main activity (Gershuny and Sullivan 2019). However, of the years examined in our article, the AHTUS only

provides a secondary measure of computer use in 1998. Overall, it is possible that some of the growth in solo leisure in more recent years, including the disproportionate growth of solo leisure among those living alone, may be due to a partial replacement of face-to-face engagement with digitally mediated engagement. Future explorations of solo leisure and social isolation more generally should, if possible, concentrate on the potential compensatory role of digitally mediated social interaction among those living alone and other groups, especially in light of the potential inferiority of such interaction for supporting well-being (Sherman, Michikyan, and Greenfield 2013). Future diary studies should also consider expanding their measures in order to capture digitally mediated co-presence (Rinderknecht, Doan, and Sayer 2022).

There are also factors outside of television and ICTs which may contribute to growth in solo leisure. While claims that urbanization contributes to social isolation have been extensively criticized (Fischer 1975, 2005; White and Guest 2003),¹³ an alternative but related explanation connects local community to the growth of solo leisure by focusing on the decline of “third places,” which Oldenburg (1999) defines as locations outside the home and work that provide people with opportunities to meet others and socialize, often spontaneously, and include coffee shops, bars, churches, and libraries (Finlay et al. 2019). The disappearance of such locations may be especially impactful on those living alone. Relative to those who are cohabitating, the well-being of those living alone is more dependent on neighborhood quality, including social support and social cohesion (Bromell and Cagney 2014; Thompson and Krause 1998), and such neighborhood quality appears to decline along with the disappearance of third places (Klinenberg 2019). Future research on those living alone should continue trying to capture these community-level factors to better understand the conditions under which living alone is most problematic.

Here, too, a focus on digitally mediated copresence may be fruitful given the potential of online spaces for fulfilling this role (McArthur and White 2016; Steinkuehler and Williams 2006).

Conclusion

Our findings contribute to the long-running debate over the extent to which American life has grown more isolating, if at all (Hall and Liu 2022; Parigi and Henson 2014; Putnam 2001; Sander and Putnam 2009; Wang and Wellman 2010). We find that the amount of time working-aged adults spend alone approximately doubled between 1965 and 2018 during leisure activities, a domain where socializing appears especially important for supporting well-being (Glover 2018; Lam and García-Román 2020; Roeters et al. 2014). Even if the number of friends or other personally important connections may not be declining, as is suggested by recent network research (Antonucci et al. 2019; Wang and Wellman 2010), our findings suggest significant and unequal changes in how these ties are being utilized. The primary example of such inequality lies in the comparatively more dramatic increases in solo leisure among unmarried respondents, especially unmarried respondents living alone. Future research should build on these findings to better understand the changing presence of others in daily life, the context under which this change has been most pronounced, and for whom these changes are most damaging.

Footnotes

1. See online supplement A for notes on individual AHTUS survey sample populations.
2. The AHTUS also includes data from 2004-2009, 2011, and 2012. We select 2010 as a convenient midpoint between 2003 and 2018. Using 2011 as an alternative midpoint produces substantively identical conclusions.

3. AHTUS flags diary records as poor quality if they have more than 90 minutes of missing main activity time, fewer than seven activities, or are missing time recorded in three or all four basic activities routinely completed in typical diaries, including sleep/rest, other personal care activities, eating, and travel/exercise. Based on these criteria, there are 1,988 poor-quality diaries across all years, approximately 1% of all diaries, which we excluded from all analyses. We also dropped 248 diaries reported by respondents lacking responses to one or more demographic variables.
4. See online supplement C for a descriptive overview of solo leisure trends among respondents 15-18 and 66+.
5. Alternatively, if we treated leisure episodes spent only in the presence of individuals coded by AHTUS as unknown to the respondent as time spent alone, average daily solo leisure would increase by well under one minute in all years except 1998, which would increase by almost 10 minutes.
6. One limitation of the AHTUS dataset is the merger of computer use for personal or household management (ATUS code 020904) with non-gaming computer use for leisure, such as social media consumption (ATUS code 120308). Analyses of ATUS data from 2003, 2010, and 2018 show that the number of computer-use-for-leisure activities is approximately double that of computer use for personal or household management reasons. Some example activities provided for household management / personal computer use, such as instant messaging, could also be considered leisure. Overall, although the computer use category extends beyond leisure, it predominately reflects leisure behavior.

7. The “unmarried w/others” category includes unmarried individuals living with adults and/or own children under 18—61% live with own child/children under 18, 65% live with other adult(s), and 25% live with both own child/children under 18 and adult(s). Across all years, approximately 17% of married respondents reported more than two adults in their household, potentially indicating the presence of extended family. We do not analyze these respondents separately. Similarly, there are too few instances of married respondents living alone to analyze separately from other married respondents.
8. Supplemental analysis (see Table A3 in the appendix) indicates that in 2018, being male, non-White, unemployed, older, being married without children, unmarried with others, and unmarried and alone (relative to being married with a child), and having a high school degree or less (relative to having some college or a college degree or more) associates with being in the heaviest consumption group (Intensive Consumers) relative to being outside of this group.
9. This conclusion is based on the model in Table A4 in the appendix, which removes household composition from Model 2 in Table 2. Once household composition is removed, the growth in solo leisure is 61 minutes, a reduction of just under 2% relative to the growth in solo leisure in Table 2, Model 1.
10. See online supplement E for an examination of predicted changes in solo leisure by household composition for each age group. Overall, changes in solo leisure within each age group are consistent with the trend presented in Figure 4, in that married respondents with children report the least growth in solo leisure, if any at all, and unmarried respondents living alone reported the largest growth in solo leisure.
11. See Model 2 in Table A5 in the appendix.

12. These changes are estimated from Model 2 in Table A5 in the appendix.
13. Consistent with these conclusions, extending Model 2 in Table 2 by adjusting for urban vs. rural (see Table A7 in the appendix) indicates that urbanization is not significantly related to solo leisure. However, this analysis required excluding the 1998 data (which did not measure urban vs. rural) and a small number of cases in other years which lack data for this measure.

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Appendix

Table A1.1

OLS regressions predicting solo leisure subcategories

	TV	Gaming	Computer Use	Relaxing	Physical Activity
Year (Ref = 1965)					
1975	15.52 ^{***} (2.23)	.1 (.18)	.0 —	1.31 ^{**} (.48)	1.03 (.70)
1998	20.80 ^{***} (3.48)	1.08 (.65)	11.18 ^{***} (2.42)	3.94 ^{**} (1.21)	2.63 ^{**} (.88)
2003	36.86 ^{***} (1.58)	2.15 ^{***} (.21)	7.67 ^{***} (.32)	5.93 ^{***} (.46)	3.66 ^{***} (.60)
2010	45.54 ^{***} (1.84)	3.67 ^{***} (.42)	10.04 ^{***} (.45)	6.00 ^{***} (.57)	3.50 ^{***} (.60)
2018	48.83 ^{***} (2.16)	8.07 ^{***} (.82)	8.82 ^{***} (.58)	7.22 ^{***} (.70)	4.42 ^{***} (.65)
Constant	23.54 ^{***} (1.22)	.36 ^{***} (.11)	-.0 —	2.3 ^{***} (.3)	2.15 ^{***} (.54)
R^2	.01	.01	.01	.0	.0

Standard errors in parentheses.

* $p < .05$, ** $p < 0.01$, *** $p < 0.001$, two-tailed.

Table A1.2OLS regressions predicting solo leisure subcategories (*continued*)

	Religious Activity	Reading	Hobbies	Other
Year (Ref = 1965)				
1975	.84** (.32)	-3.89** (1.25)	1.08 (.94)	.90 (.68)
1998	.85 (.51)	-7.61*** (1.48)	-2.57* (1.09)	-1.36 (.82)
2003	.68*** (.18)	-9.22*** (.93)	-3.98*** (.65)	-1.46*** (.41)
2010	1.68*** (.23)	-11.16*** (.95)	-4.41*** (.65)	-1.06* (.44)
2018	1.62*** (.26)	-12.37*** (.98)	-4.14*** (.65)	-.96* (.49)
Constant	.77*** (.15)	20.27*** (.87)	5.42*** (.61)	2.98*** (.38)
R^2	.0	.01	.01	.0

Standard errors in parentheses.

* $p < .05$, ** $p < 0.01$, *** $p < 0.001$, two-tailed.**Table A2**

Multinomial logistic regression with Minimal Consumers as the reference category

	Dependent Variable Category		
	Moderate	Major	Intensive
Year (Ref = 1965)			
1975	.76*** (.05)	1.26* (.13)	2.57*** (.47)
1998	.96 (.1)	1.4* (.19)	2.95*** (.62)
2003	.93 (.05)	1.63*** (.14)	4.66*** (.74)
2010	.94 (.06)	1.82*** (.15)	5.97*** (.96)
2018	.99 (.06)	1.84*** (.17)	6.78*** (1.1)
Constant	.58*** (.03)	.19*** (.02)	.04*** (.01)

Standard errors in parentheses. Values are relative risk ratios.

* $p < .05$, ** $p < 0.01$, *** $p < 0.001$, two-tailed.

Table A3

Logistic regression predicting presence in heaviest solo leisure consumption group (Intensive Consumers) in 2018

Female	.44 ^{***}
	(.04)
White	.73 ^{**}
	(.08)
Employed	.28 ^{***}
	(.03)
Age (Ref = 19-34)	
35-49	1.16
	(.16)
50-65	2.13 ^{***}
	(.26)
HH Composition (Ref = Married w/child)	
Married & childless	2.15 ^{***}
	(.38)
Unmarried w/others	5.56 ^{***}
	(.9)
Unmarried & alone	12.23 ^{***}
	(1.83)
Education (Ref = High school and below)	
Some college	.76 [*]
	(.1)
College grad +	.7 ^{***}
	(.08)
Constant	.13 ^{***}
	(.03)

Standard errors in parentheses. Values are odds ratios. N = 6,611.

* $p < .05$, ** $p < 0.01$, *** $p < 0.001$, two-tailed.

Table A4

OLS regression predicting number of daily minutes spent in solo leisure, 1965-2018, excluding household composition

Year (Ref = 1965)		
	1975	13.15** (4.75)
	1998	41.65*** (7.83)
	2003	47.60*** (3.51)
	2010	55.20*** (3.98)
	2018	70.89*** (4.70)
Female		-28.80*** (3.92)
Year x Female		
	1975 x Female	7.49 (6.25)
	1998 x Female	-3.95 (10.08)
	2003 x Female	-4.56 (4.55)
	2010 x Female	-9.22 (5.08)
	2018 x Female	-18.81** (5.80)
White		-36.16*** (2.42)
Employed		-63.03*** (2.45)
Age (Ref = 19-34)		
	35-49	10.60*** (1.80)
	50-65	66.53*** (2.20)
HH Composition (Ref = Married w/ child)		
	Married & childless	—
	Unmarried w/others	—
	Unmarried & alone	—
Year x HH Composition		

1975 x Married & childless	—
1975 x Unmarried w/others	—
1975 x Unmarried & alone	—
1998 x Married & childless	—
1998 x Unmarried w/others	—
1998 x Unmarried & alone	—
2003 x Married & childless	—
2003 x Unmarried w/others	—
2003 x Unmarried & alone	—
2010 x Married & childless	—
2010 x Unmarried w/others	—
2010 x Unmarried & alone	—
2018 x Married & childless	—
2018 x Unmarried w/others	—
2018 x Unmarried & alone	—
Education (Ref = high school & below)	
some college	.90 (2.37)
college grad +	-9.93*** (1.91)
Constant	129.85*** (4.44)
R^2	.11

Standard errors are in parentheses. HH = household.

* p < .05, ** p < 0.01, *** p < 0.001, two-tailed.

Table A5

OLS regressions predicting number of daily minutes spent in social leisure,
1965-2018

	Model 1	Model 2
Year (Ref = 1965)		
1975	18.93*** (4.89)	9.62 (8.20)
1998	-20.88** (6.92)	-10.89 (13.07)
2003	-5.42 (3.91)	2.70 (6.81)
2010	-10.05* (4.10)	4.95 (7.14)
2018	-21.63*** (4.26)	.36 (7.50)
Female	—	-43.61*** (7.30)
Year x Female		
1975 x Female	—	26.49** (9.50)
1998 x Female	—	30.99* (13.75)
2003 x Female	—	28.73*** (7.74)
2010 x Female	—	26.22** (8.13)
2018 x Female	—	32.16*** (8.44)
White	—	3.74 (2.47)
Employed	—	-59.86*** (2.36)
Age (Ref = 19-34)		
35-49	—	-22.61*** (2.13)
50-65	—	-31.49*** (2.46)
HH Composition (Ref = Married w/ child)		
Married & childless	—	15.53 (8.99)
Unmarried w/others	—	3.18 (10.41)
Unmarried & alone	—	-21.62 (14.31)
Year x HH Composition		

1975 x Married & childless	—	.25 (11.26)
1975 x Unmarried w/others	—	7.31 (14.41)
1975 x Unmarried & alone	—	-40.74* (16.80)
1998 x Married & childless	—	-15.95 (17.90)
1998 x Unmarried w/others	—	-1.61 (18.73)
1998 x Unmarried & alone	—	-48.40* (19.91)
2003 x Married & childless	—	11.09 (9.51)
2003 x Unmarried w/others	—	-15.85 (11.13)
2003 x Unmarried & alone	—	-53.90*** (14.68)
2010 x Married & childless	—	5.48 (10.13)
2010 x Unmarried w/others	—	-22.57 (11.59)
2010 x Unmarried & alone	—	-47.17** (15.05)
2018 x Married & childless	—	10.21 (10.53)
2018 x Unmarried w/others	—	-38.48** (12.10)
2018 x Unmarried & alone	—	-60.44*** (15.24)
Education (Ref = High school & below)		
Some college	—	-12.57*** (2.57)
College grad +	—	-25.13*** (2.04)
Constant	172.72*** (3.65)	253.82*** (7.20)
R^2	.0	.07

Standard errors are in parentheses. HH = household.

* $p < .05$, ** $p < 0.01$, *** $p < 0.001$, two-tailed.

Table A6

OLS regression predicting number of daily minutes spent in solo leisure, 1965-2018, including adjustment for social leisure

Year (Ref = 1965)		
	1975	4.29 (4.52)
	1998	15.16 (8.03)
	2003	19.93*** (3.59)
	2010	15.74*** (3.91)
	2018	17.86*** (4.18)
Female		-40.66*** (3.99)
Year x Female		
	1975 x Female	16.4** (5.84)
	1998 x Female	9.4 (9.92)
	2003 x Female	3.32 (4.51)
	2010 x Female	2.22 (5)
	2018 x Female	-5.25 (5.56)
White		-19.15*** (2.25)
Employed		-75.83*** (2.31)
Age (Ref = 19-34)		
	35-49	17.8*** (1.66)
	50-65	47.1*** (2.18)
HH Composition (Ref = Married w/ child)		
	Married & childless	15.52*** (4.64)
	Unmarried w/others	28.51*** (6.12)
	Unmarried & alone	63.44*** (9.94)
Year x HH Composition		

1975 x Married & childless	-3.06 (6.87)
1975 x Unmarried w/others	-2.62 (8.36)
1975 x Unmarried & alone	29.31* (13.48)
1998 x Married & childless	13.06 (13.13)
1998 x Unmarried w/others	21.01 (12.59)
1998 x Unmarried & alone	3.31 (16.32)
2003 x Married & childless	11.64* (5.26)
2003 x Unmarried w/others	30.19*** (6.88)
2003 x Unmarried & alone	53.56*** (10.70)
2010 x Married & childless	17.32** (5.85)
2010 x Unmarried w/others	38.09*** (7.42)
2010 x Unmarried & alone	65.16*** (10.93)
2018 x Married & childless	16.4** (6.04)
2018 x Unmarried w/others	53.18*** (8.19)
2018 x Unmarried & alone	92.49*** (11.49)
Education (Ref = high school & below)	
some college	-7.92*** (2.21)
college grad +	-12.96*** (1.76)
Social Leisure	-.20*** (.0)
Constant	157.09*** (4.55)
R^2	.25

Standard errors are in parentheses. HH = household.
 * p < .05, ** p < 0.01, *** p < 0.001, two-tailed.

Table A7

OLS regression predicting number of daily minutes spent in solo leisure, 1965-2018, including adjustment for urban vs. rural

Year (Ref = 1965)		
	1975	3.04 (4.39)
	2003	19.45*** (3.43)
	2010	15.07*** (3.79)
	2018	18.26*** (4.11)
Female		-31.54*** (3.84)
Year x Female		
	1975 x Female	10.54 (5.79)
	2003 x Female	-2.61 (4.42)
	2010 x Female	-3.83 (4.96)
	2018 x Female	-12.05* (5.60)
White		-19.14*** (2.37)
Employed		-64.25*** (2.33)
Age (Ref = 19-34)		
	35-49	21.60*** (1.71)
	50-65	53.16*** (2.27)
HH Composition (Ref = Married w/ child)		
	Married & childless	12.32** (4.55)
	Unmarried w/others	27.86*** (5.95)
	Unmarried & alone	66.62*** (9.50)
Year x HH Composition		
	1975 x Married & childless	-3.21 (6.79)
	1975 x Unmarried w/others	-4.52 (8.36)

1975 x Unmarried & alone	38.33** (13.39)
2003 x Married & childless	9.55 (5.21)
2003 x Unmarried w/others	32.99*** (6.78)
2003 x Unmarried & alone	65.00*** (10.32)
2010 x Married & childless	16.59** (5.86)
2010 x Unmarried w/others	42.68*** (7.36)
2010 x Unmarried & alone	75.46*** (10.60)
2018 x Married & childless	14.86* (6.04)
2018 x Unmarried w/others	60.19*** (8.25)
2018 x Unmarried & alone	105.08*** (11.24)
Education (Ref = high school & below)	
some college	-5.10* (2.32)
college grad +	-8.83*** (1.84)
Urban	3.66 (2.01)
Constant	103.44*** (4.49)
R^2	.21

Standard errors are in parentheses. HH = household. N = 37,611 diaries (35,191 respondent clusters)

* $p < .05$, ** $p < 0.01$, *** $p < 0.001$, two-tailed.

Online Supplement

Understanding the Growth of Solitary Leisure in the U.S., 1965 – 2018

CONTENTS

Supplement A. Notes on individual AHTUS survey sample populations.

Supplement B. Co-presence recoding

Supplement C. Descriptive trends in solitary leisure, ages 15-18 and 66+

Supplement D. Connecting activity categories to AHTUS coding scheme and related research.

Supplement E. Household composition trends by age group.

A. Notes on individual AHTUS survey sample populations.

Unlike later years, data collected in 1965 was limited to households where at least one adult was employed in an industry other than agriculture. Respondents recruited in 1965 therefore likely spent more time in paid work than the broader U.S. population in 1965. Alaska, Hawaii, and some smaller, rural states were also excluded. The 1975 data is a nationally representative sample of contiguous U.S. households. The 1998 data is representative of the national adult population living in the contiguous 48 states plus Washington DC. Note, however, that some time-use trends in these data appear out of sync with trends in other national U.S. samples (IPUMS 2022). Further, a separate study in the AHTUS was collected in this time period on only parents. We exclude these data from our analyses. 2003-2018 is a national population not living in military bases or institutions.

B. Co-presence recoding.

We closely scrutinized leisure activities reported as occurring alone yet are by definition social, the clearest example of which is “Receive or visit friends” (activity 72). Approximately 2% of responses during activity 72 occurred alone. Further, activity 72 does not consist of waiting associated with the activity (which is instead reported in activity 78), which could plausibly occur alone. Troublingly, instances of isolation in activity 72 occurred disproportionately in the 1998 data. Whereas the percent of isolation during activity 72 ranged from just under 1% in 1965 and 1975 to just under 2% in 2003, 2010, and 2018, it reached 18% in 1998. One potential explanation is that there was a mistake in the harmonization in 1998, resulting in activity 72 consisting of activities beyond receiving or visiting friends. However, further investigation indicated this is unlikely. 1998 consists of the smallest percentage of this activity out of all years, at just under 2%, whereas 1965 is just over 2% and all other years are closer to 3%—which is the opposite of what would be expected if activity 72 had been merged with other activities in 1998. We are unable to determine why any data in activity 72 would be reported as occurring alone, especially the volume of data in 1998, and we therefore assume these instances are mistaken and we recoded all such instances to occurring with others. This change only slightly reduced the average number of daily minutes spent in solo leisure in each year: 1965: 0, 1975: -1, 1998: -3, 2003: 0, 2010: 0, 2018: -1. Next, we examined public events (activity code 50 to 55 and 57). These also imply the presence of others, yet 6% of such episodes occurred alone. Again, as with activity 72, waiting associated with these activities are reported in activity 78. Unlike activity 72, the co-presence implied by public events may include strangers. To remain consistent with our choice to code episodes with only strangers present as time not spent alone, we recoded all public event activities as time spent with others. As with our previous change, this change only

slightly reduced the average number of daily minutes spent in solo leisure in each year: 1965: 0, 1975: -1, 1998: -1, 2003: -1, 2010: -1, 2018: -1.

Overall, the changes overviewed in this supplement had only a minor impact on the average number of daily minutes spent in solo leisure in each year: 1965: 0, 1975: -2, 1998: -4, 2003: -1, 2010: -1, 2018: -1.

C. Descriptive trends in solitary leisure, ages 15-18 and 66+

We focused our previous analyses on working age adults (19-65) to preserve comparability with the 1965 data. However, readers may find trends in solo leisure among other age groups informative, even if the trends cover a shorter period of time. We only present weighted descriptive analyses adjusting for the year of data collection (see Table SC.1 and Table SC.2, which are comparable to Model 1 in Table 2 for respondents aged 15-18 and 66+, respectively). Additional independent variables would require alternative models appropriate to each age group, which is beyond the focus of this paper.¹

Respondents aged 15-18 were first recruited in sufficient numbers to analyze at the beginning of the ATUS, in 2003. These respondents reported about 99 minutes of solo leisure in this year, 110 minutes in 2010, and 116 minutes in 2018. These differences are not statistically significant. 2018 also does not differ significantly from 2003 ($\Delta = 17$, *n.s.*), though the change is approximately the same as the change reported by working-aged adults.

Respondents over 65 were first recruited in 1975 and continued to be recruited in all years thereafter for which we have data. In 1975, these respondents reported approximately 175 minutes of solo leisure, which increased to 251 minutes in 1998 ($\Delta = 77$, $p < .001$), remained largely unchanged in 2003 relative to 1998 ($\Delta = 0$, *n.s.*), grew to 279 minutes in 2010 relative to 2003 ($\Delta = 28$, $p < .001$), and remained largely unchanged between 2010 and 2018 ($\Delta = 2$, *n.s.*). Overall, growth in solo leisure among respondents over 65 occurred largely before the 2000s.

¹ The sample size for these descriptive analyses are as follows. For ages 15-18, 2003: N = 1,208; 2010: N = 698; 2018: N = 327. For ages 66+, 1975: N (diaries) = 700, N (respondent clusters) = 248; 1998: N = 155; 2003: N = 3,030; 2010: N = 2,061; 2018: N = 2,167.

Table SC.1

OLS regression predicting number of daily minutes in solo leisure for respondents aged 15-18, 2003-2018

Year (Ref = 2003)		
	2010	11.20 (7.50)
	2018	16.79 (10.32)
Constant		99.09*** (4.06)
R^2		.0

Standard errors in parentheses. N = 2,233 diaries.

* $p < .05$, ** $p < 0.01$, *** $p < 0.001$, two-tailed.

Table SC.2

OLS regression predicting number of daily minutes in solo leisure for respondents aged 66+, 1975-2018

Year (Ref = 1975)		
	1998	76.68*** (21.48)
	2003	76.98*** (11.16)
	2010	104.84*** (11.75)
	2018	107.15*** (11.75)
Constant		174.62*** (10.24)
R^2		.02

Standard errors in parentheses. N = 8,112 diaries (7,661 respondent clusters).

* $p < .05$, ** $p < 0.01$, *** $p < 0.001$, two-tailed.

D. Connecting activity categories to AHTUS coding scheme and related research.

These nine solo leisure categories correspond to the following AHTUS activity codes: 1) 86; 2) 73; 3) 89; 4) 78; 5) 60, 62-64, 66; 6) 81-83; 7) 74-77; 8) 48 and 49; and 9) activities capturing unspecified leisure (70 and 71), listening to music (84), and listening to the radio (85). Leisure also includes public event activities (50-55, 57) which we coded as never occurring alone (see online supplement B) and include in our measure of social leisure. Our conception of leisure corresponds to the same activities that corresponded to leisure in Atalay (2024) with two exceptions: (1) the inclusion of computer use for personal or household management, as discussed in footnote 6, and (2) we do not include leisure-related travel due to the AHTUS merging such travel with non-leisure-related travel.

E. Household composition trends by age group.

Table SE.1

OLS regressions predicting number of daily minutes spent in solo leisure by age category

	19-35	35-49	50-65
Year (Ref = 1965)			
1975	-3.64 (6.11)	1.06 (6.79)	2.27 (13.66)
1998	21.15 (12.32)	16.86 (10.10)	16.56 (19.78)
2003	13.34* (5.49)	16.73*** (4.79)	43.46*** (10.04)
2010	6.16 (5.93)	19.31*** (5.35)	28.10** (10.41)
2018	16.95* (6.77)	20.52*** (5.55)	23.11* (11.20)
Female	-21.76*** (5.41)	-26.72*** (6.09)	-41.57*** (8.98)
Year x Female			
1975 x Female	14.77 (7.56)	10.24 (9.77)	4.06 (14.22)
1998 x Female	-13.12 (12.35)	3.42 (15.95)	5.76 (27.71)
2003 x Female	-8.93 (6.64)	-1.24 (6.70)	-5.56 (10.26)
2010 x Female	-15.41* (7.46)	-2.00 (7.48)	-.07 (11.07)
2018 x Female	-38.37*** (9.04)	-7.78 (7.81)	6.73 (11.90)
White	-14.03*** (3.85)	-20.10*** (3.23)	-26.39*** (5.00)
Employed	-33.07*** (3.92)	-53.95*** (3.87)	-98.85*** (4.02)
HH Composition (Ref = Married w/ child)			
Married & childless	16.55* (7.54)	20.40* (8.46)	22.60* (8.97)
Unmarried w/others	17.22* (6.93)	9.99 (8.28)	60.18** (18.96)
Unmarried & alone	55.07** (19.79)	67.10*** (17.33)	97.12*** (14.86)
Year x HH Composition			
1975 x Married & childless	7.16 (10.36)	9.51 (17.52)	-10.26 (14.76)
1975 x Unmarried w/others	.86 (9.56)	22.66 (16.08)	-27.33 (27.18)

1975 x Unmarried & alone	23.72 (23.77)	70.88* (27.96)	30.37 (23.40)
1998 x Married & childless	-1.76 (17.83)	46.62 (29.67)	7.94 (25.94)
1998 x Unmarried w/others	3.23 (13.94)	49.02** (19.02)	120.19* (60.02)
1998 x Unmarried & alone	-25.47 (24.81)	49.19 (28.70)	17.04 (39.76)
2003 x Married & childless	8.40 (9.12)	18.99 (9.76)	-11.67 (11.12)
2003 x Unmarried w/others	39.59*** (8.34)	53.47*** (9.67)	2.99 (21.59)
2003 x Unmarried & alone	52.58* (21.46)	68.78*** (18.59)	43.56* (17.01)
2010 x Married & childless	27.27** (10.57)	10.77 (11.02)	5.06 (11.58)
2010 x Unmarried w/others	51.04*** (9.09)	59.06*** (11.09)	29.69 (21.84)
2010 x Unmarried & alone	52.02* (21.62)	62.63** (19.15)	70.44*** (17.37)
2018 x Married & childless	18.41 (10.79)	8.64 (11.58)	3.48 (12.34)
2018 x Unmarried w/others	78.87*** (10.57)	46.37*** (11.28)	48.27* (23.75)
2018 x Unmarried & alone	75.13*** (22.60)	89.49*** (21.09)	102.21*** (18.32)
Education (Ref = High school & below)			
Some college	-5.27 (3.54)	-5.03 (3.41)	-3.79 (4.77)
College grad +	-.80 (3.22)	-9.68*** (2.48)	-11.50** (3.74)
Constant	84.80*** (6.47)	117.16*** (6.12)	173.73*** (9.91)
R^2	.14	.17	.23

Standard errors are in parentheses. HH = household.

* p < .05, ** p < 0.01, *** p < 0.001, two-tailed.

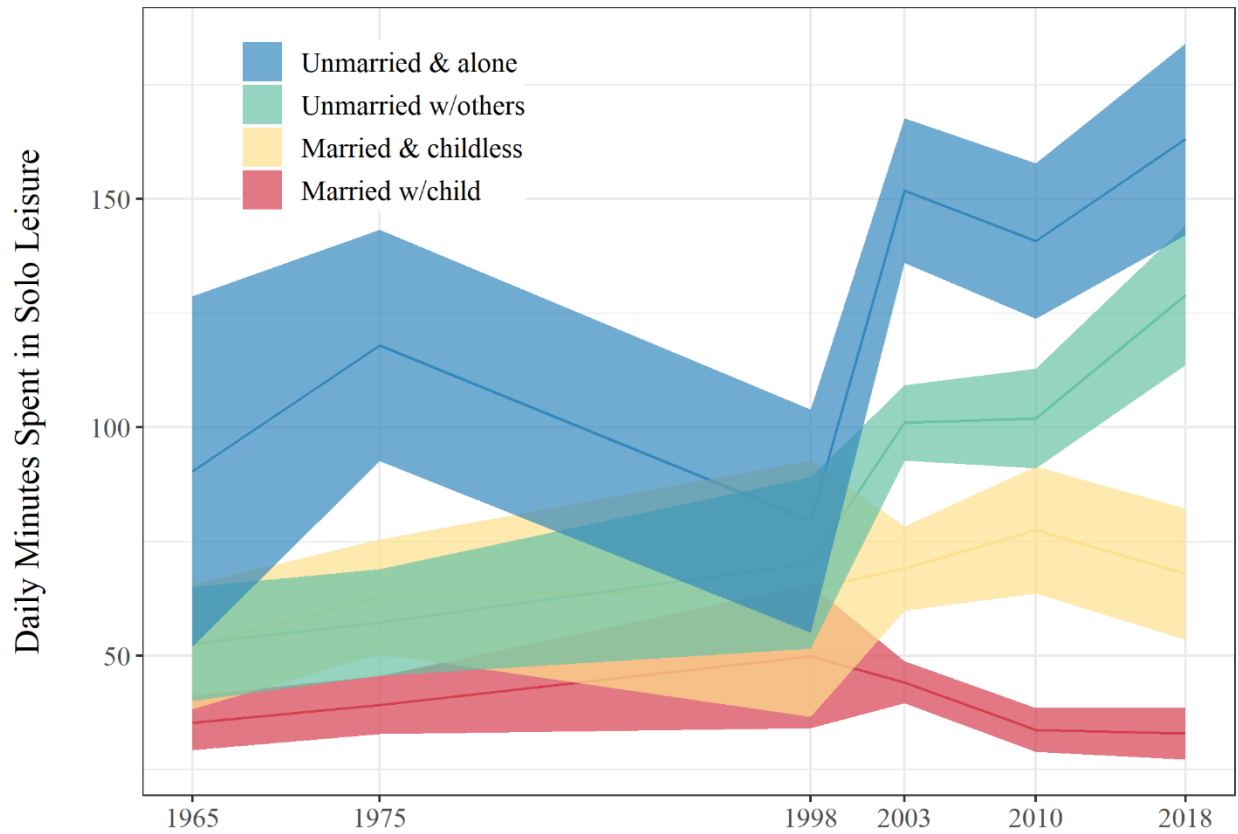


Figure SE.1. Predicted changes in solo leisure by household composition category among respondents aged 19-24. Bands are 95% CIs. Values are predicted based on the 19-34 Model in Table SE.1.

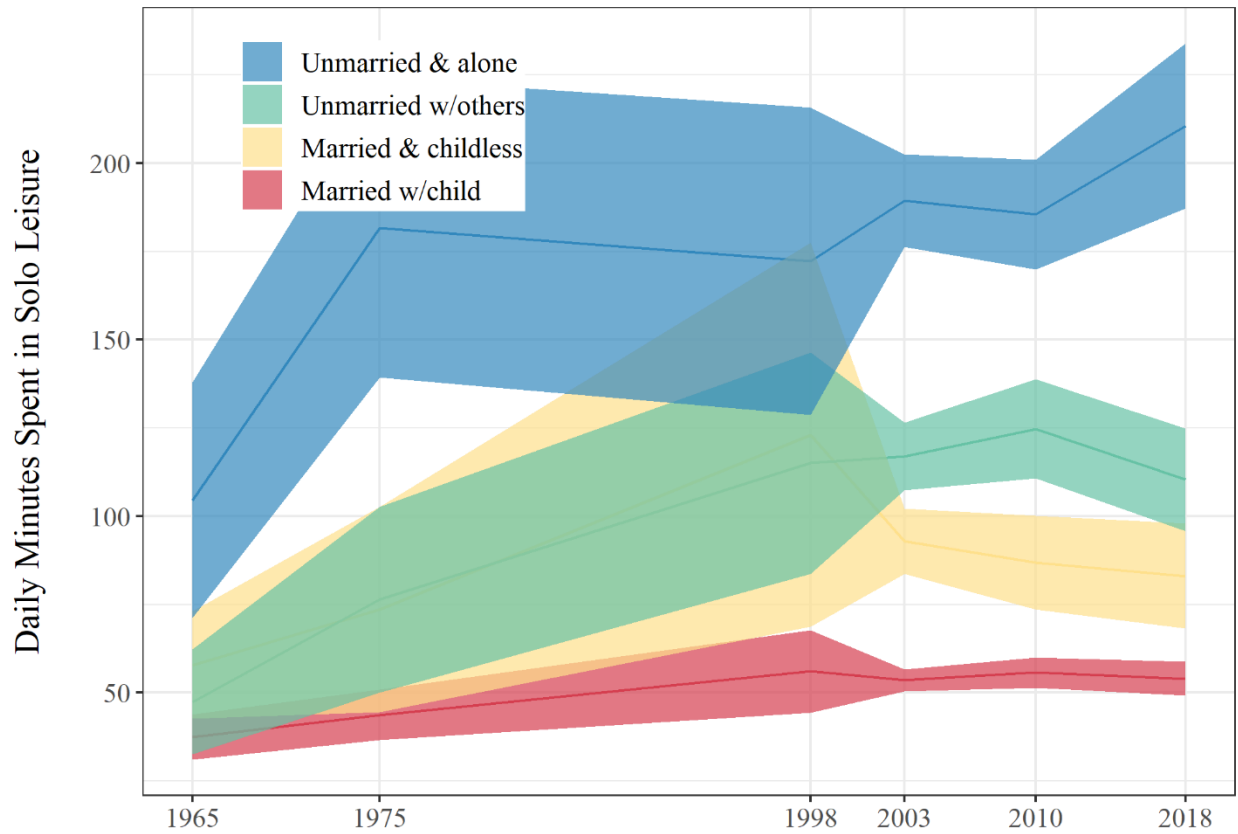


Figure SE.2. Predicted changes in solo leisure by household composition category among respondents aged 35-49. Bands are 95% CIs. Values are predicted based on the 35-49 Model in Table SE.1.

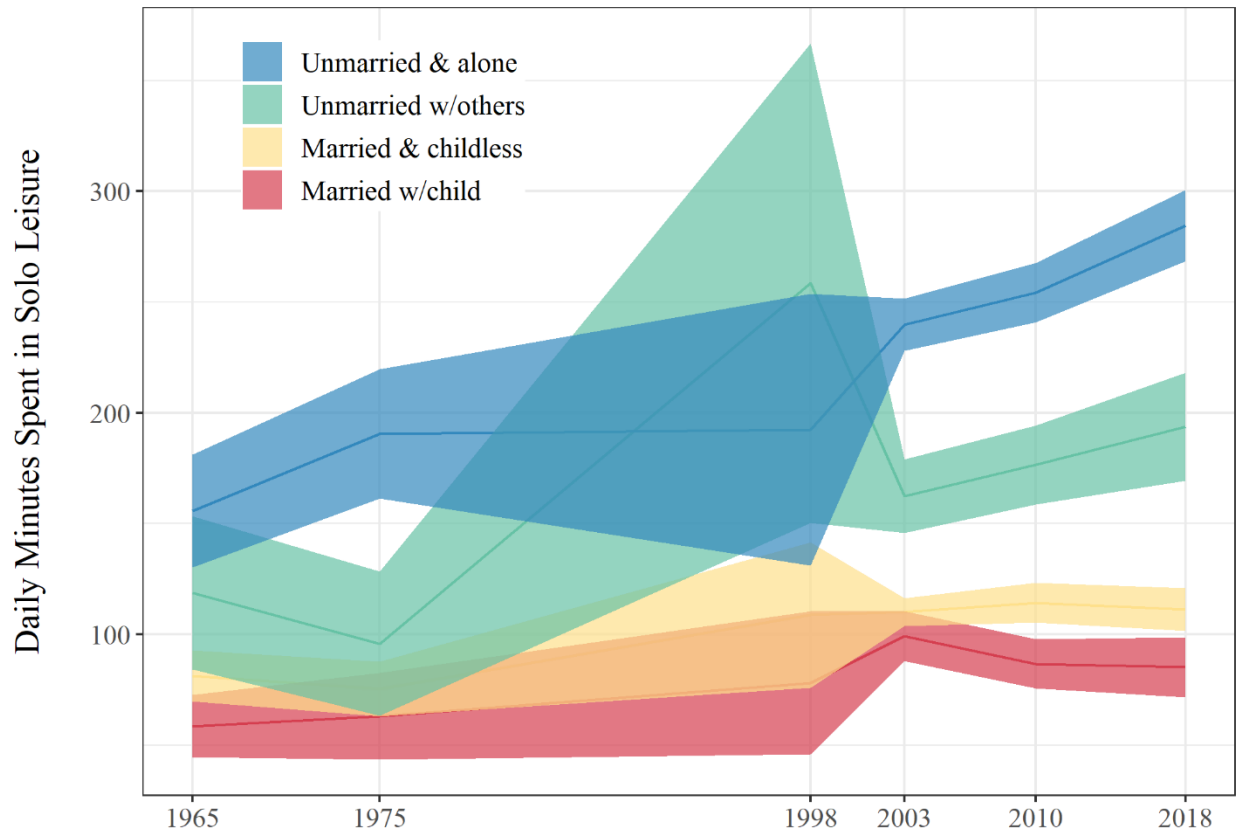


Figure SE.3. Predicted changes in solo leisure by household composition category among respondents aged 50-65. Bands are 95% CIs. Values are predicted based on the 50-65 Model in Table SE.1.

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