Slide 2: Social connections are a key determinant in the development of human capital and social capital. At the individual level, for instance, research in public health finds that social isolation causes greater mortality and morbidity. At a more aggregate level, social connections – especially those across households, and especially those across households of differing income levels – foster economic mobility. With this as motivation, this presentation will re-assess trends social isolation, both on average and as they vary with individuals' demographic and economic backgrounds.

Slides 3-4: In particular, in this presentation I apply data from the American Time Use Survey to measure trends in time alone and with others. I assess which individuals had the greatest increase in alone time, what types of interactions became less prevalent, then assess the implications of these trends for well-being inequality. To give you some numbers, at the beginning of the sample, individuals spent approximately 44 percent of their free time alone. This increased by 4 percentage points over the sample period. But this increase was also unevenly distributed, with less educated, lower income individuals having a greater increase in time spent alone. For instance, while college graduates alone time increased by 2 percentage points, this increase was 7 percentage points for those with only a high school education. In the latter part of the talk, using a well-being module of the ATUS, I will try to provide rough magnitudes for this 5 percentage point increase in alone time inequality.

Slide 5: Within the economics literature are articles that try to re-examine inequality using time use data. Two key articles are the work of Aguiar and Hurst and Boerma and Karabarbounis. The contribution of my paper is to re-examine trends in well-being inequality using information not only on the activities individuals pursue (as in the existing literature) but also on who they pursue those activities with. Second, there are a number of public health, sociology, political science, and economics articles documenting the consequences and scope of increased social isolation. The contribution relative to this second literature is to provide new measures of social isolation – based on trends in a lone time over the last two decades – to document that social isolation has been increasingly concentrated on individuals from low socioeconomic groups (a fact which I believe to be new to the literature) and to examine the implications of this fact for trends in well-being inequality.

Slides 6-7: Here is an outline for the rest of the talk. In the first part, I'll show you that individuals have been spending more time alone, with higher educated, higher-income non-Hispanic whites having the smallest increases in alone time. In the latter half of the talk, I try to benchmark the importance of the changes in alone time, trying to place the alone-time increases in income-equivalent terms.

<u>Slide 8</u>: We use the American Time Use Survey for this project. I'm sure you're all aware but this dataset asks survey respondents to reconstruct the previous day, describing what activities they performed and where those activities took place. In addition, for non-work, non-sleep, non-personal care activities, individuals are asked who those activities were performed with. For this presentation, we'll group activities as taking place alone, with individuals from the same household or with individuals from other households. In addition, later on, it will be useful to group activities based on the activity and where they took place. Our main analysis, to begin, will sum up all activities for which individuals are asked about whether they were performed alone. We relate the fraction of time that individual i spent alone to year fixed effects, \beta{a,t}, and other controls. These other controls include things like the day-of-the-week and the month-of-the-year that the survey took place.The day-of-the-week controls are necessary as time use patterns differ considerably between weekdays and weekends. Likewise, month-of-year controls account for the fact that alone time tends to have a slight seasonal pattern, higher in the late fall and lower in the summer. In addition, we control for other observable characteristics of individual i, to make sure that the trends we identify don't simply reflect changes in the types of individuals who are sampled.

<u>Slides 9-12</u>: In this figure, we plot the coefficient estimates of the beta_{a,t} with different sets of controls. The beta_{a,t} depict the difference in the share of alone time relative to 2003, at the beginning of the sample. The vertical lines give 95 percent confidence intervals for this coefficient estimate. In this first regression, we begin with the minimal set of controls for the day-of-the-week and for the month-of-the-year in which the survey took place. At the beginning of the sample, individuals spent 43.5% of their time alone. By 2019, this increased by 5.2 percentage points to 48.7%, then increased even further during the covid pandemic to 50.5% by 2021. Most of the increases occur in the last half of the sample.

Now, as I mentioned, some of these increases could reflect compositional shifts within the sample period. For example, the sample is increasingly weighted towards older, non-white individuals. To assess whether our trends simply reflect these demographic shifts, we amend our regression to additionally include controls for sex, age groups, and race. We find, that our estimates of the increase in time alone decrease modestly, by 4.0 percentage points to 2019 instead of the 5.2 percentage points on the previous slide. We continue to add controls for other observable characteristics—for employment and metropolitan status, employment and household size. Our results are essentially unchanged. So, the fact that we observe increasing share of time spent alone does not reflect, for example, a decrease in household sizes or labor force participation.

Slide 13: So far we have documented that, holding fixed sociodemographic characteristics -- alone time has increased by about 4 percentage points between 2003 and 2019 and an additional 2 percentage points during the covid pandemic. But which groups had the largest increases. Here, we consider three ways to cut our sample: by race and ethnicity, by income group, or by education. For each of these three categorizations, we apply this regression separately for each of the subsamples. Again, our coefficients of interest are the beta_{a,t}. Going forward we're going to include the most exhaustive set of controls in X_{i,t}.

Slide 14: Here, we plot three sets of coefficients, one which correspond to each of three sets of ethnic and racial groups. The orange plots, for instance, describes growth in the share of free time that is spent alone for non-White individuals, controlling for shifts in age, education, household size etc… that we had been controlling for before. We find, that alone time increased more for non-White relative to non-Hispanic white individuals, by almost 5 percentage points between 2003 and 2019, though this gap narrowed during the pandemic.

Slide 15: We perform a similar comparison in the trends of alone time for individuals in low, medium, and high-income households. Between 2003 and 2019, alone time increased less for individuals in high income households. This gap widened further during the pandemic.

Slide 16: Finally, alone time increased the least for individuals with a college education.

Slide 17: The next step in the analysis is to identify the types of interactions that led to an increase in alone time. Instead of considering trends in time alone, we consider the fraction of time that is spent (a) alone and (b) on leisure at home. The takeaway here is that it mirrors closely the patterns in the previously slide, meaning that time alone has increased primarily because individuals are spending more time alone, at home, and on leisure.

Slide 18: What are individuals spending less time doing. Here, we compute trends in leisure, with others, outside of the house. This declined by about 2 percentage points to 2019, 4 percentage points to 2021, with the smallest declines for college educated individuals. So, there is a substitution in the types of leisure over the sample period.

Slide 19: In the final two slides, we consider who individuals spend their time with. Either with individuals from the same household or with individuals with other households. We know that alone time increased, so either or both must have declined. We see first that time spent with individuals from other households declined considerably. By the end of the sample, the declines were similar for individuals with a college degree as for individuals with a college education.

Slide 20: In contrast, on average, there are no trends in time spent with individuals from the survey respondent's household. However, here, college educated individuals have slightly increased the amount of time spent with those from their own household, while high school educated individuals have a slightly declined by 2021. Though, there is considerable noise from year to year.

Slide 21: To recap alone time has increased, with accelerated increases in the last couple years. Alone time increased mostly for those with low socioeconomic status, reflects changes in the composition of leisure time. In the second part of this presentation, we ask whether these trends are important in any quantitative sense.

Slide 22-23: In the final part of this presentation, we consider the implications of these trends for wellbeing. We do so using we well-being module in the 2012 and 2013 American Time Use Survey. In these years, individuals were asked two sets of questions. First, they were asked to evaluate their overall life satisfaction. Second, for three randomly chosen activities from their time diary, individuals were asked to assess different emotions, the extent to which they were happy, tired, etc… From these questions, for each individual we compute what is called a U-index, the fraction of the individual's day in which the respondent reported a higher score for an unpleasant emotion than for the happiness question.

We use these data to benchmark the importance of alone time trends. Specifically, we start by computing, for each individual, the well-being measures, income, and alone time that are unexplained by individual's race, education, age, metro status etc… We compute the slope of the relationship between well-being measures and household income, then compare the two measures. How this works will be clearer in a couple slides.

Slide 24-25:

Slide 26: This figure compares well-being and lone time. In the green line, we plot the relationship between life satisfaction and the fraction of the individual's time that is spent alone. For both measures, we have taken the residual from observable characteristics like age, race, education, and so forth. Taking the average slope of this line, we find that a 5 percentage point movement in the horizontal direction corresponds to a 0.017 standard deviation movement in the vertical direction. Likewise, the blue line indicates that greater time alone corresponds lower emotional well-being, a greater fraction of time that the individual reports feeling an unhappy emotion more than happiness. The slope here is of similar magnitude.

Slide 27: This figure is perhaps a little more familiar. In it, we plot the relationship between household income and wellbeing measures. Again, both of these measures are residualized, so we are conditioning on individuals' household

size, education levels, race, age and so on. The slope of this green line is approximately 0.17 and that of the blue line is -0.10, meaning that a 10 log point increase in household income corresponds roughly to a 0.017 standard deviation increase in the life satisfaction measures and a 0.010 standard deviation decrease in the unhappiness index.

Slide 28: In this slide, we combine information from the previous two. In particular, we know from the previous slide that a 10 log point increase in household income has a 0.017 standard deviation increase in the life satisfaction measure. Similarly, a 5 percentage point increase in alone time is associated with a 0.017 standard deviation decrease in the life satisfaction measure. Putting these together, a 10 log point increase in income has the same association with wellbeing as a 5 percentage point decrease in alone time. This 5 percent is how much alone time inequality has increased over the sample. So the conclusion is that alone time inequality increases are roughly equivalent to a 10% increase in income inequality. We could do the same calculations but with a second measure of well-being, the U-index measure of emotional well-being instead. Here we would conclude that the increase in alone time inequality corresponds roughly to a 18% increase in income inequality.

Slide 29: That's it for the talk. The main points are that time alone has increased, and especially so for lower-income less educated individuals. These trends imply that overall well-being has increased slower than we might have previously thought, without considering who individuals spend their time with, and that well-being inequality as increased faster than previously thought.