DISCUSSION PAPER SERIES

Lockdowns, Loneliness and Life Satisfaction

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ABSTRACT

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Using the 2012-13 American Time Use Survey, I find that both who people spend time with and how they spend it affect their happiness, adjusted for numerous demographic and economic variables. Satisfaction among married individuals increases most with additional time spent with spouse. Among singles, satisfaction decreases most as more time is spent alone. Assuming that lockdowns constrain married people to spend time solely with their spouses, simulations show that their happiness may have been increased compared to before the lockdowns; but sufficiently large losses of work time and income reverse this inference. Simulations demonstrate clearly that, assuming lockdowns impose solitude on singles, their happiness was reduced, reductions that are made more severe by income and work losses.

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I. Introduction

By mid-April 2020, due to the coronavirus (CV) crisis over 90 percent of Americans and over 1/3 of the world's population were locked down, spending nearly their entire day in their dwellings with only a spouse (if they have no children at home) or alone (if they lacked both spouse and children).[1] We do not know how their well-being—their happiness—has been affected by the constraint imposed upon them by government restrictions. We can, however, use existing data on the link between well-being and the identity of those with whom people spend their time and how they use their time to simulate the likely impacts of lockdowns on feelings of well-being.

Research on the various impacts of the virus is unsurprisingly already burgeoning. Studies of racial/ethnic differences in the incidence of the illness have been produced (Borjas, 2020), as have estimates of its immediate effect on consumer spending (Baker *et al.*, 2020). The most closely related studies to this one examined the relation between lockdowns and the spread of the virus (Fang *et al.*, 2020, and Friedson *et al.*, 2020) and their potential impact on GDP (Inoue and Todo, 2020); and on the potential magnitude of employment losses due to social distancing (Koren and Peto, 2020). Here I examine the impacts on happiness by first in Section II linking the discussion to consumer theory. Section III describes the data and samples used to study how different relationships to the people with whom one spends time and what one does with time alter happiness. Section IV presents sets of estimates based on these data. In Section V I report the results of simulations of the likely impacts of lockdowns on well-being.

II. A Theoretical Consideration

Neoclassical consumer theory has agents maximizing utility defined over goods/services. Becker's (1965) generalization of the theory re-defined the maximand as being over

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[1] https://www.statista.com/chart/21240/enforced-covid-19-lockdowns-by-people-affected-per-country/

"commodities"—home-produced combinations of purchased goods and the time inputs of household members. The theory was extremely powerful, as differences in the price of time across agents have allowed predictions about behavior that can be linked to observables.

For many commodities one can also imagine that the consumer can choose with whom to produce and consume the commodity. For example, the leisure activity, attending a sporting event, could be produced alone, with one's spouse/partner, with friend(s), or with a relative. Television-watching similarly offers the choice of "who with." In the category of home production, laundry or house-cleaning are typically done alone or with one's spouse/partner. Among other personal activities, although information on whom they are accomplished with is not included in the data set used here, sexual activity might be done alone, with spouse/partner or with a friend.

These considerations suggest that an expansion of the theory might be useful, so that the consumer's maximand becomes:

$$(1)\ U = U\big(Z_1(X_1, T_1, W_1),\ \ldots,\ Z_i(X_i, T_i, W_i),\ldots,\ Z_N(X_N, T_N, W_N)\big),$$

where Z_i is one of N commodities, X_i and T_i are the goods and time inputs into producing Z_i, and W_i is a vector of indicators of the identity(ies) of the individuals, if any, with whom Z_i is produced. I do not try to operationalize the theory here. To make it useful, one would need to identify "prices" of the different choices of "who with" that vary across agents. Such "prices" might usefully be related to some proxies for the closeness or lack thereof of relationships with people with whom one might spend time. My only point here is that thinking about this extension is a reasonable rationalization for the empirical work in this study. Like choices about spending time and purchasing goods and services, "who with" is an outcome of consumer choice.

III.   Data on "Who With" and Life Satisfaction

The basic data used in what follows come from the American Time Use Survey (ATUS) (produced by the U.S. Bureau of Labor Statistics, discussed by Hofferth *et al*., 2018, with more detail presented by Hamermesh *et al*., 2005). Respondents were individuals who had recently (within 2-5 months, averaging 3 months) been included in the 8th wave of the monthly Current Population Survey. In each year of its existence (beginning in 2003), in addition to tabulating the amount of time that respondents had spent during the previous day in a very detailed classification of activities (over 400), the ATUS asked people to record who they were with during many of the activities. (Sleep was excluded from the "who-with" list, as were other personal activities and a number of less frequent/lengthy activities.) While the quantities of time spent in various activities in the ATUS have been analyzed many times (e.g., Hamermesh, 2019), the "who with" information has received very little attention (with Flood and Genadek, 2016, being a rare exception).

In 2012 and 2013 the ATUS fielded a Well-being Module, asking people questions about their feelings, including for the purposes of this study a question asking them to "think about your life in general" and rate their life satisfaction on a 10 (highest, "best possible life") to 0 (lowest, "worst possible life") scale—a Cantril "well-being ladder".[2] The literature on life satisfaction is immense, with Diener *et al*. (2010) a broad compendium of research, and Blanchflower and Oswald (2018) a recent effort by economists. Various terms—life satisfaction, happiness and subjective well-being—appear to be used more or less interchangeably in this literature. In much

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[2]A Well-being Module was also included in the 2010 ATUS, which contained a happiness scale (as did the 2012 and 2013 modules) linked to 3 specific activities undertaken by each individual. That Module did not include the life-satisfaction measure. I prefer to concentrate on life satisfaction, a broader measure based on general feelings, than on happiness linked to single activities. The validity of the measures of "experiential well-being" was analyzed by Stone *et al*. (2018). They were used by Connelly and Kimmel (2015) to examine how "who with"—time spent with children—alters men's and women's happiness differently.

of this study, to save space I refer to this well-being measure as "happiness," recognizing the possible differences between life satisfaction and current happiness.

We know (Abraham *et al.*, 2006) that those included in the ATUS are not observationally different from those who were asked to complete a diary (were in their 8th CPS month). In the 2012 and 2013 rounds of the ATUS 23,657 people kept time diaries. Of these, 21,589 completed the well-being ladder. There is no statistically significant difference between the demographic characteristics of the less than 10 percent of the samples used here who did not complete the well-being ladder and those of the large majority who did.[3]

I classify the usable observations by their marital status, distinguishing between those listing themselves as married with spouse present, and singles—those who list themselves as widow/ers, divorced or never married. Because time use and "who with" differ between those people with children in the home (who may during the CV crisis be locked down with their parents), I focus the analyses on married individuals with no children under age 18.[4] I also restrict the sample to single individuals with no children under 18 who are age 30 or over (to exclude many of those who may be living with roommates or cohabiting, or who are single parents). With these restrictions the married—no children group contains 4,710 respondents, and the singles group includes 6,848 individuals. I am thus examining the behavior of slightly more than half the available sample and implicitly in Section V simulating the average impacts of the lockdowns on around half the U.S. adult population.

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[3]This included the absence of any gender difference in this probability. The main, mechanical difference was that completion rate of the well-being ladder was much lower among respondents in the January waves of the ATUS than in other waves..

[4]Also having children present very likely alters feelings about spending time with a spouse, as https://www.youtube.com/watch?v=A5s433aTy98 suggests.

The information on "who with" is collected in over 20 categories, ranging from spouse through more distant relatives, friends, different types of other people standing in various relationships to the respondent, and being alone. I aggregate this information into 5 categories: Alone; with friends; with other people; with other (non-spouse) relatives, or with spouse, with the last obviously not relevant in the sample of singles.

The distributions of "who with" in the samples are reported in the upper part of Table 1, for each sample and then for sub-samples distinguished by gender.[5] For each category the table lists the minutes spent on a representative day and its standard deviation. Also included is the total amount of time per day for which "who with" is accounted and the age of respondents in each group. In both samples the average respondent is in his/her 50s—among married respondents, because I exclude those with young children, among singles because people under age 30 are excluded. Married individuals classify whom they were with during about 51 percent of the day, about one hour more than is classified by single individuals. In both samples, women classify slightly less of their time as to whom they were with, a larger difference among singles than among married respondents.

Married individuals report about 4-1/2 daily hours together with a spouse (remembering that time sleeping is not included in these reports). That the married men and women are from separate couples (the ATUS includes only one respondent per household) explains the small (and statistically insignificant) gender difference in reported time with spouse. The other major category of "who with" is time spent alone, about 4-1/2 hours per day, with men reporting significantly more such time (about 10 minutes/day) than women. The other categories account for much less

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[5]These descriptive statistics and all the regression estimates use ATUS sampling weights.

time, about 1/2 hour with friends (no gender difference), 2-1/4 hours with other people (significantly more by men) and about 1/2 hour with other relatives (significantly more by women).

Among single individuals ages 30+ time spent alone accounts more than half of the over 11 daily hours for which respondents list with whom they are spending time, with men reporting slightly less time alone. About 2-1/2 hours are spent with other people (more by men), 1-1/2 hours with other relatives (more by women) and 1 hour with friends (more by men). All of these gender differences are statistically significant.

The bottom part of Table 1 displays the distributions of responses on the well-being ladder. As is standard in the literature, the majority of respondents say they are quite satisfied with their lives, with 33 percent (single men) being the largest fraction in any group reporting themselves as being in the bottom part of the ladder (life satisfaction below 6). Married individuals report greater well-being than singles, and within each sample women report greater well-being than men. Neither difference is standardized for other demographic characteristics, and there is at least some disagreement in the literature about the direction of any married-single difference in happiness (e.g., Knabe *et al.*, 2010; Gimenez-Nadal and Molina, 2015).

IV.   Impacts of "Who With" and "How" of Time on Happiness

There are major demographic differences within each sample and sub-sample that are likely to relate to happiness and to how and with whom people spend time. If nothing else we know that there is an inverse-U shaped relationship between age and time spent working for pay; well-known gender and racial/ethnic differences in the allocation of time across activities; differences by educational attainment, geography and day of the week and month of the year (Hamermesh, 2019). I begin to account for these differences by estimating for each sample linear regressions describing the 0-1 variable Happy (score on the well-being ladder of 8 or above, which accounts for 56 percent of the married sample and 42 percent of the sample of singles). Initially I include

only those control variables that were determined long before the day the diary was kept: Age, educational attainment, immigrant status, race/ethnicity, state of residence, and day of the week, month and year. Age is included as a vector of indicators of individual years; educational attainment is specified as a vector of 21 different levels of education; race/ethnicity is divided into five groups, and each state has its own indicator.[6]

A. *Main Results*

I present these initial estimates in Columns (1) and (4) of Table 2. In each case the parameter estimates show the impact of an additional 100 minutes of time spent in the manner indicated. In the married sample (Column 1) time spent alone or with other relatives reduces levels of happiness, while time spent with friends, other people or one's spouse increases happiness. The positive effects of time with spouse are statistically significant; and the impact of time with friends approaches statistical significance.[7] Overall, holding these demographic, geographic and temporal measures constant, people's choices of "who with" are highly significantly related to their happiness.

In the sample of single individuals (Column (4) of Table 2) spending more time alone has a strongly significant negative impact on happiness. Additional time spent with other relatives, friends and other people, the other three possibilities, have positive, albeit not statistically significant effects on happiness. Taken together, the indicators of "who with" significantly affect the happiness of single individuals.

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[6]The vector of single year of age indicators only runs up through 80; in the ATUS anyone older is classified as being age 85, presumably for reasons of confidentiality. Including this large vector is crucial in describing the happiness-age relationship (Blanchflower and Oswald, 2018).

[7]Remembering that total time reported as "who with" differs within each sample, I re-estimated this equation (and subsequent ones) holding total "who with" time constant. This re-specification did not qualitatively alter the results.

One's choices about "who with" depend in part upon "how" one spends time. For examples, with more time working for pay it is likely that one will spend less time with one's spouse; with more time in home production one is less likely to spend time with friends. Given these relationships, however, even if choosing how to spend time precedes with whom to spend it, the choices may still be somewhat independent. Recognizing the endogeneity of the choices about "who with" with respect to spending time, I add the vector of the six aggregates of time use to the equations shown in Columns (1) and (4) (five measures because of the fixed amount of time in the day, treating time spent in other leisure activities as the excluded category). I also add each respondent's usual weekly workhours, the household's annual gross income and a vector of indicators of the person's class of worker (private or public, employed or self-employed). Given that these are decided simultaneously with "who with," I would expect their addition to the specifications to reduce the estimated impacts of "who with" on happiness.

Column (2) of Table 2 presents re-estimates of the equations describing happiness among married individuals. The central conclusion is how little the estimated impacts of "who with" change from Column (1). Except for time spent with other people, the results are quantitatively similar to those produced without these additional covariates: Time with spouse has significant positive impacts on happiness, as (nearly) does time with friends. As a whole the vector of "who with" measures remains highly significant statistically. The estimated impacts are not huge, but not tiny: For example, switching 100 minutes (of an average 276 minutes) from time alone to time with one's spouse raises the probability that one is "happy" (well-being ladder at least 8) by 2.1 percentage points (on a mean of 56.1 percent), adjusting for all the demographic, time use and economic control variables included here.

Column (5) presents the same expanded specifications for the sample of single individuals. Again, the inclusion of all these other controls does not alter the inferences about the impacts of the "who with" measures. Two that had been insignificantly positive (time with friends, or with other people) become insignificantly negative. Time spent with other relatives remains insignificantly positive. Time alone remains highly significantly negative. The overall impact of the "who with" measures on happiness is statistically significant. If one were to shift 63 minutes of time with friends (the average in this sample) to time alone, the likelihood that the respondent would state that s/he is happy drops by 0.7 percentage points (on a mean of 41.8 percent).

The largest and most statistically significant estimated effects on life satisfaction among the "who with" measures are of time spent with spouse in the sample of married people, and of time alone in the sample of singles. Adding a quadratic term in time spent with spouse to the model underlying Column (2) of Table 2, shows, as presented in Column (3), that the estimated effect of the linear term becomes larger, while the quadratic term is negative and nearly significant statistically. While the marginal impact on happiness of an additional minute spent with a spouse does decrease, only for 6 percent of the sample does it become negative.[8]

In the sample of singles, adding a quadratic term in time spent alone increases the (absolute value) of the linear effect, and the quadratic effect is positive but not statistically significant. The maximum time alone in this sample is 720 minutes; but even if it were 1439 minutes, spending the last minute of the day alone would still further reduce life satisfaction (albeit barely). Taken together, these results provide some evidence that, as makes sense for the other arguments in the

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[8]This result belies the greeting of the fictional economists' Valentine's Day card, "The marginal returns of spending time with you will never diminish."

Z_i in (1), the second derivatives with respect to the W_i have signs opposite those of the first derivatives; but the impacts of these nonlinearities on happiness are not large in these samples.

I base the simulations in the next Section on the estimates that include the quadratic terms. Because lockdowns may also alter how people spend time, probably reducing work time for some people; and because they may also reduce some people's incomes, in Columns (1) and (3) Table 3 presents the descriptive statistics of these measures that were also included in the equations. The estimates of their impacts on happiness are shown in Columns (2) and (4). Sleep and TV-watching account for exactly half of all time spent by the married individuals with no children, and over half of the representative day among singles. The estimated impacts of these variables on happiness show that additional time spent in these two activities reduces happiness (in most instances statistically significantly) compared to the excluded activity, time spent in other leisure activities.

While paid work on the diary day has small negative and statistically insignificant impacts on happiness, having a longer usual workweek significantly increases happiness. Moreover, even accounting for all the demographic control variables and for both how and with whom people spend their time, people with higher incomes are significantly happier than those with lower incomes. The estimated effects of differences in income are large: A two standard-deviation increase in income raises the probability that a married person reports being happy by 8.9 percentage points, and it raises a single person's likelihood of reporting being happy by 7.0 percentage points.

Clearly, "with whom" has independent impacts on happiness that in important cases have diminishing effects as more time is spent in the crucial category ("with spouse" among marrieds, "alone" among singles). So too does "how" one allocates one's time across activities; and so too does one's household income. Because all three of these sets of measures alter happiness, and

because each might be affected by a lockdown, I base the simulations in the next Section on the equation for which the results are reported in Column (3) of Table 2 and Column (2) of Table 3 for marrieds, and on the equation described in Column (6) of Table 2 and Column (4) of Table 3 for singles.

B. Robustness Checks

Consider a number of restrictions on the samples for which Tables 2 and 3 list results. People who work in retail trade or some services (e.g., restaurant workers) have faced more severe losses of work time than others because of lockdowns. Using estimates of the relation of their happiness to "who with" for them might be a poor indicator of how they would react to these limitations, since their time allocations have been substantially altered. To examine this potential difficulty, I re-estimate the models in Columns (2) and (5) of Table 2, adding indicators of industry (4-digit SIC) to the estimating equations. These additions hardly change the estimates: In the equation for childless married people the estimated coefficient on time with spouse declines slightly (to 0.0123, s.e. = 0.0047), as does the absolute value of the impact of time alone among singles (to -0.0111, s.e. = 0.0044). Similarly minute changes occur when the equations in Columns (3) and (6) of Table 2 are re-estimated adding indicators of industry affiliation.

In the sample of marrieds (singles), 1.9 (1.5) percent of the diaries were collected on holidays, clearly atypical since the respondents' choices about both time-use and "who with" are constrained to differ from those on non-holidays. Excluding these small fractions of respondents from the estimation hardly changes the results shown in Columns (3) and (6) of Table 2.

One might also think that those individuals whose leisure time includes more time spent emailing would be making different choices from those not spending (addicted to) time in this way. The models that include how people spend time, and their incomes, almost certainly account

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for any effects of internet access on "who with" and how time is spent, as they control for what have been shown the be the major determinants of access to the internet: Income, education and age (Chaudhuri *et al.*, 2005). Nonetheless, examining this issue directly by adding measures of daily time use spent emailing for non-work purposes barely alters the estimated impacts of choices about "who with" or "how" on happiness. It may be that such people can mitigate the negative effects of a lockdown on themselves through electronic contacts; but there is no evidence here that such mitigation alters differences in the measured impacts of "who with" or "how."

The estimates are all based on collapsing the life satisfaction measure into two categories—happy or not. To use all the information provided by the respondents in these ATUS modules, I re-estimate the equations in Table 2 using ordered probit analysis describing all 11 choices available on the Cantril ladder about the individual's life satisfaction. Re-estimating the model in Column (3) of Table 2 strengthens the results shown. The estimates on time alone and with friends become statistically significantly negative and positive respectively; time with spouse remains statistically significantly positive, its quadratic is nearly statistically significant and the overall vector of "who with" measures remains highly significant. Re-estimating the model in Column (6) of Table 2 yields similar inferences: Time alone remains significantly negative, its quadratic remains negative but not statistically significant, time with other relatives becomes significantly positive and the overall vector remains significant statistically. While in what follows I concentrate on the bivariate results for expositional and computational simplicity, one should note that they slightly understate the statistical significance of the findings.

Roughly half of the time diaries in the ATUS are kept on Saturdays and Sundays. "How" time is spent and "who with" differ between weekdays and weekends in both samples. Paid work is much less on weekends, as is well known, while time spent in all other aggregates of time use

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increases. Also unsurprisingly, married individuals spend more time with spouse and less time alone on weekends. Singles' "who with" behavior varies less from weekday to weekend, except that they spend more time with friends on weekends. Despite these daily differences in the kinds of activities undertaken and in "who with," estimating the models underlying Table 2 separately for weekdays and weekends produces remarkably similar results to those shown in Table 2.

It is unlikely that reverse causation characterizes these estimates, as it is difficult to imagine that individuals who are inherently happier are those who choose to spend more time with spouse, or alone, or that they spend more time in paid work or home production. It is, however, reasonable to be concerned that those individuals who have been married longer become happier as a result and choose to spend more time with their spouse. The underlying effect may work through marital duration. The ATUS does not measure the duration of respondents' marriages; but assuming, as the evidence shows, that most married individuals age 55+ have been married for many years, we can at least hint at the importance of this potential difficulty by re-estimating the quadratic model over these individuals (who account for 70 percent of the married sample).[9] This reduction of the sample hardly changes the results: Comparing the estimated impacts of "with spouse" to those shown in Column (3) of Table 2, the linear effect becomes 0.0328 (s.e. = 0.0011), and the quadratic term becomes -0.000019 (s.e. = 0.000013). This similarity suggests, but does not demonstrate, that this particular problem of selectivity is minor.

There are numerous other factors that might alter the impacts of a lockdown on happiness. But unless they are also correlated with "who with" or "how" or with income, they will not affect the simulations of a lockdown's impacts. They need to be considered to infer how the impact of a

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[9]In the American Community Surveys for 2013-17 the average duration of marriages of married individuals ages 55 or more was 35 years; and only 7 percent of them had been married fewer than 10 years.

lockdown will differ across the population, but they will not alter the average impacts generated by the simulations.[10]

The samples remain usably large if we disaggregate the estimation by gender. Estimates of the model with the "who with" variables entering linearly, separately for men and women, are shown in Table 4. (The results for the quadratic models are similar.) Being alone bothers married men more than married women, being with friends raises married women's happiness more. Most important, the positive impacts of additional time with spouse are nearly identical between men and women; and there are no significant differences in the impacts of any of the other "who with" measures by gender. That is not true among singles: The negative impact of time spent alone shown in Table 2 results almost entirely from women being very much less satisfied with life as time spent alone increases. This negative effect is significantly different from the small negative effect among men. On the other hand, the small positive effect on life satisfaction among all singles of time spent with other relatives arises because men's satisfaction increases significantly while women's rises, but not significantly and much less than men's.

V. **Simulating the Impact of a Lockdown on Happiness**

With lockdowns people lose whatever freedom they had to maximize (1). Because they are confined to their residences during most of the day, they are limited to contact with many fewer people than if they could choose freely. Among married individuals with no children, I assume that the lockdown means that the only person with whom they associate face-to-face is their spouse. Among singles I assume that a lockdown restricts them to remaining alone. While in both

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[10]One possibility is that those who have access to open spaces and can freely exercise during a lockdown may be happier as a result. The sample has no information on this kind of access. As a weak proxy, we can re-estimate the model over the 21 percent of marrieds (31 percent of singles) living in central cities. While the standard errors of the estimated impacts of "who with" increase using these sub-samples, the parameter estimates hardly change from those shown in Tables 2 and 3. Another is that time spent traveling, likely to be zero under a lockdown, may be correlated with the "who with" measures and may also affect happiness. Adding a measure of total travel time to the quadratic models also hardly alters the estimated impacts of time with spouse (time alone) or how the "how" variables.

groups people might maintain electronic contacts with others (teleconferences, "skype dinners" and the like), they have no face-to-face contact with other people: They are isolated.

I undertake three groups of simulations. The assumption underlying Group I is that there is no loss of work time and no loss of income. Those assumptions seem highly unrealistic. Many people have lost their jobs, and others have seen reductions in their workhours. We cannot know how large these losses are, but 1/3 of aggregate work time is probably an upper-bound estimate of the time that is lost. Accordingly, in Group II of the simulations I assume that 1/3 of work time is lost and that it is spent watching television.[11] With the loss of work time, incomes will almost certainly also drop. It seems unlikely that the average decrease in incomes will exceed 1/3, so in Group III I assume that income decreases in each sample by 1/3. Moving from Simulations I to II to III assumes increasingly negative effects of the lockdown on the real economy.

Underlying the simulations in Sub-group A is the assumption that all the time that a married person had previously spent with friends, other relatives, other people or alone is now spent with his/her spouse. It similarly assumes that all of the time that a single person had previously spent with others is now spent alone. The assumptions underlying the simulations in this Sub-group seem reasonable, but it is possible that the total time for which a respondent would list who s/he was with might increase when people must remain in one place. Simulations in Sub-group B thus proceed on the assumption that each person, if asked about her/his time under a lockdown, would report spending all non-sleep time with spouse (if married) or alone (if single) (remembering that "who with" is not listed for time spent sleeping). Simulations in Sub-group C are extreme: They

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[11]If I assume that the time lost was instead shifted in whole or in part to sleeping, the results from the simulations would show larger negative effects on happiness, given the sizes of the estimates in Table 3. With a lockdown it seems highly unlikely that this time could be shifted to other leisure; but it might in part go to increased time spent in home production or to other personal care (as implied in a recent tweet: "Prediction: There will be a minor baby boom in 9 months, and then one day in 2033, we shall witness the rise of THE QUARANTEENS" https://www.france24.com/en/20200318-viral-humour-helps-europe-deal-with-fear-boredom-of-lockdown).

take the maximum time anyone in the sample lists as being with spouse (alone), 1410 (720) minutes, and impute that to all sample respondents.

The results of these 9 simulations (3 sets of 3) are shown in Table 5. With sufficiently extreme assumptions about the extent of lost work time and income, among married individuals we do see a substantial drop in the probability of reporting being happy with one's life. With more moderate assumptions about losses in work time and income, and with all non-sleep time listed as being with one's spouse (Group II.B), the simulations suggest that the happiness of married individuals could have been increased slightly by the lockdown. This is not true among singles: Even under fairly conservative assumptions (Group IA), their happiness decreases; and with more extreme assumptions the decrease is quite substantial. Taken together, the most likely impacts are those in the simulation Group IIB—a small increase in happiness among marrieds, a larger decrease in happiness among singles.

VI.   Conclusions and Implications

The results here use two years of data from the American Time Use Survey to demonstrate that, after adjusting for numerous covariates including the activities on which people spend their time, the identities of people with whom they associate affect their expressed life satisfaction. Married people's happiness rises with additional time spent with a spouse, while singles' happiness falls as they spend more time alone. In simulations I assume that lockdowns force married people without young children to spend time solely with their spouse and force singles to spend time alone. Based on the regression estimates, they show that imposing these spatial constraints might have improved the well-being of married people, although sufficiently large losses of work time and of income more than offset these gains. The results suggest that imposed isolation reduces the

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life satisfaction of singles, a loss that is exacerbated by any direct economic losses that they experience.

The simulations rely on the underlying notion that utility depends not only on goods and services purchased and time spent, but also upon the identities of whom, if anyone, the time is spent with. Given the assumption that people choose along these three dimensions, how can it be that married people could be better off when they cannot make these choices freely because they are locked down? A possible explanation is that when not locked down they are not totally free to choose "who with," because their favorite choice—their spouse—is for most of them unavailable during time spent in paid work, a major chunk of time in the typical day. With lockdowns and imposed work from home, married individuals are constrained to spend time with their most utility-enhancing person. The constraint reduces the well-being of singles compared to the unconstrained situation, because it imposes more time alone, their most utility-reducing "who with" choice.

The regression results make sense and show the importance of the utility-based approach to the "who with" considerations that are implicit in Equation (1). They are quite robust to a variety of changes in sample and specification with which I have experimented. One must stress, however, that they apply only to the average individual. The effect of the CV crisis on the well-being of different groups might differ for reasons other than the "who with" or "how" of time use. Work time and income losses clearly are not homogeneous across the population, and similarly for the risk of contracting and dying from the illness (Borjas, 2020). Results might differ between majority and minority citizens for these reasons. All I have shown here is that average married couple's well-being might have increased because of the lockdown *per se*, while that of the average single individual has clearly been reduced.

REFERENCES

Katharine Abraham, Aaron Maitland and Suzanne Bianchi, "Non-response in the American Time Use Survey," *Public Opinion Quarterly*, 70 (2006): 676-703.

Scott Baker, R.A. Farrokhnia, Steffen Meyer, Michaela Pagel and Constantine Yannelis, "How Does Household Spending Respond to an Epidemic: Consumption During the 2020 COVID-19 Pandemic," NBER Working Paper No. 26949, April 2020.

Gary Becker, "A Theory of the Allocation of Time," *Economic Journal*, 75 (Sept. 1965): 493-517.

David Blanchflower and Andrew Oswald, "Do Humans Suffer a Psychological Low in Midlife? Two Approaches (With and Without Controls) in Seven Data Sets," NBER Working Paper No. 23724, Aug. 2017.

George Borjas, "Demographic Determinants of Testing Incidence and COVID-19 Infections in New York City Neighborhoods," IZA Discussion Paper Number 13109, April 2020.

Anindya Chaudhuri, Kenneth Flamm and John Horrigan, "An Analysis of the Determinants of Internet Access," *Telecommunications Policy*, 29 (2005): 731-55.

Rachel Connelly and Jean Kimmel, "If You're Happy and You Know It: How Do Mothers and Fathers in the US Really Feel About Caring for Their Children?" *Feminist Economics*, 21 (2015): 1-34.

Ed Diener, Daniel Kahneman and John Helliwell, eds., *International Differences in Well-Being*. New York: Oxford University Press, 2010.

Hanming Fang, Long Wang and Yang Yang, "Human Mobility Restrictions and the Spread of the Novel Coronavirus (2019-nCoV) in China," NBER Working Paper No. 26906, April 2020.

Sarah Flood and Katie Genadek, "Time for Each Other: Work and Family Constraints among Couples," *Journal of Marriage and the Family*, 78 (Feb. 2016): 142-64.

Andrew Friedson, Drew McNichols, Joseph Sabia and Dhaval Dave, "Did California's Shelter in Place Order Work? Early Evidence on Corona-Related Health Benefits," San Diego State University, Center for Health Economics and Policy Studies, Working Paper No. 2020401, 2020.

J. Ignacio Gimenez-Nadal and José Alberto Molina, "Voluntary Activities and Daily Happiness in the United States," *Economic Inquiry*, 53 (Oct. 2015): 1735-50.

Daniel Hamermesh, *Spending Time*. New York: Oxford University Press, 2019.

Daniel Hamermesh, Harley Frazis and Jay Stewart, "Data Watch: The American Time Use Survey," *Journal of Economic Perspectives*, 19 (Winter 2005): 221-32.

Sandra Hofferth, Sarah Flood and Matthew Sobek. *American Time Use Survey Data Extract Builder: Version 2.7* [dataset]. College Park, MD: University of Maryland and Minneapolis, MN: IPUMS, 2018.

Hiroyasu Inoue and Yasuyuki Todo, "The Propagation of the Economic Impact Through Supply Chains: The Case of a Mega-city Lockdown to Contain the Spread of Covid-19," *Covid Economics*, 2 (April 2020): 43-59.

Andreas Knabe, Steffen Rätzel, Ronnie Schöb and Joachim Weimann, "Dissatisfied with Life but Having a Good Day: Time-Use and Well-Being of the Unemployed," *Economic Journal*, 120 (Sept. 2010): 867-89.

Miklós Koren and Rita Peto, "Business Disruptions from Social Distancing," *Covid Economics*, 2 (April 2020): 13-31.

Arthur Stone, Stefan Schneider, Alan Krueger, Joseph Schwartz and Angus Deaton, "Experiential Wellbeing Data from the American Time Use Survey: Comparisons with Other Methods and Analytic Illustrations with Age and Income," *Social Indicators Research*, 136 (2018): 359-78.

Table 1. Descriptive Statistics, Time Spent Alone and with Others (Minutes/day), and Life Satisfaction, ATUS 2012-13*

	Married, No Children			Single, ≥30, No Children		
	All	**Men**	**Women**	**All**	**Men**	**Women**
Alone	275.9	281.5	270.3	371.8	367.6	375.1
	(178.0)	(180.4)	(175.5)	(178.9)	(180.4)	(177.7)
With friends	27.7	28.4	27.0	62.6	73.1	54.3
	(80.1)	(80.3)	(80.0)	(136.2)	(147.8)	(125.8)
With other people	135.2	143.2	127.2	154.6	174.9	138.6
	(221.8)	(230.7)	(212.2)	(238.1)	(250.6)	(226.6)
With other relatives	33.0	25.1	40.9	85.0	73.9	93.7
	(103.6)	(90.2)	(115.1)	(178.2)	(169.1)	(184.6)
With spouse	267.0	268.9	265.0	------	------	------
	(238.0)	(242.0)	(233.9)			
Total time with others	738.8	747.0	730.4	673.9	689.5	661.7
	(195.4)	(197.3)	(193.2)	(212.0)	(215.2)	(208.7)
Age	58.1	59.0	57.2	56.2	51.6	59.9
	(13.7)	(13.9)	(13.4)	(15.4)	(14.5)	(15.0)

Life Satisfaction (percent distributions)

10 (highest)	17.0	13.8	20.4	14.7	12.3	6.6
9	11.9	11.0	12.8	6.1	4.7	7.3
8	27.2	27.9	26.5	21.0	19.7	22.0
7	16.1	18.4	13.7	16.6	18.0	15.6
6	9.2	9.8	8.6	10.9	12.5	9.6
5	12.3	12.0	12.6	17.5	17.6	17.4
1-4 (lowest)	6.3	7.1	5.4	13.2	15.2	11.5
N =	4,710	2,332	2,378	6,848	2,825	4,023

*Standard deviations in parentheses below means of age and "who with".

Table 2. Estimates of the Relation of Different Ways Time is Spent—Alone and with Others—to Happiness, Men and Women Pooled, ATUS 2012-13*

Ind. Var. (in 100 minutes/day):	Married, No Children			Single, ≥30, No Children		
	(1)	(2)	(3)	(4)	(5)	(6)
Alone	-0.0070	-0.0065	-0.0078	-0.0145	-0.0121	-0.0134
	(0.0056)	(0.0059)	(0.0060)	(0.0044)	(0.0044)	(0.0046)
$(Alone)^2$	---------	--------	--------	---------	--------	0.0000040
						(0.0000035)
With friends	0.0149	0.0140	0.0142	0.0028	-0.0004	0.0022
	(0.0094)	(0.0095)	(0.0095)	(0.0047)	(0.0048)	(0.0054)
With other people	0.0089	0.0021	0.0016	0.0010	-0.0039	-0.0010
	(0.0045)	(0.0059)	(0.0059)	(0.0033)	(0.0041)	(0.0049)
With other relatives	-0.0045	-0.0062	-0.0055	0.0056	0.0044	0.0070
	(0.0079)	(0.0080)	(0.0080)	(0.0039)	(0.0039)	(0.0045)
With spouse	0.0107	0.0144	0.0287	---------	---------	---------
	(0.0044)	(0.0046)	(0.0094)			
$(With\ spouse)^2$	--------	---------	-0.0000195	----------	----------	---------
			(0.00000113)			
p on F-statistic of "who with" vector	0.0001	<0.0001	<0.0001	< 0.0001	0.004	0.006
Adj. R^2	0.047	0.059	0.059	0.075	0.088	0.088
N =		4,710			6,848	

*Standard errors in parentheses. Additional covariates in the estimates in Columns (1) and (4) are: Vectors of age indicators, years of educational attainment, racial/ethnic identity, state of residence, day of week, month of year, and year, and an indicator of immigrant status. The estimates in Columns (2), (3), (5) and (6) add: Household income; distribution of time spent on the diary day among work, home production, sleep, other personal care and TV-watching (with other leisure activities the excluded category); usual weekly hours of paid work, and indicators of class of worker.

Table 3. Descriptive Statistics, and Parameter Estimates of the Impacts of Time Spent in Different Activities, of Usual Hours and of Family Income on Happiness, ATUS 2012-13*

Ind. Var.:	Married, No Children (N = 4,710)		Single, ≥30, No Children (N = 6,848)	
	(1)	(2)	(3)	(4)
	Mean (s.d.)	(*)	Mean (s.d.)	(**)
In 100 minutes/day:				
Home production	190.1	0.0046	167.0	0.0028
	(172.5)	(0.0054)	(165.4)	(0.0044)
Sleep	512.9	-0.0174	525.1	-0.0102
	(117.1)	(0.0072)	(139.4)	(0.0061)
Other personal care	129.6	-0.0004	120.2	-0.0007
	(84.4)	(0.0093)	(90.6)	(0.0070)
TV-watching	187.2	-0.0145	217.2	-0.0076
	(175.5)	(0.0054)	(224.1)	(0.0038)
Other leisure	216.4	--------	224.1	--------
	(197.8)			
Paid work	203.3	-0.0003	186.4	-0.0078
	(274.3)	(0.0057)	(269.6)	(0.0045)
Usual weekly work (hours)	21.2	00012	20.0	0.0019
	(22.2)	(0.0006)	(22.4)	(0.0005)
Family income (in 000$)	79.021	0.00074	48.252	0.00079
	(59.917)	(0.00014)	(46.115)	(0.00015)

*From the equation underlying Column (3) of Table 2. Time spent in other leisure activities is the excluded category, and standard errors are in parentheses below the parameter estimates, here and in Column (4).

**From the equation underlying Column (6) of Table 2.

Table 4. Estimates of the Relation of Different Ways Time is Spent, Alone and with Others, to Happiness, by Gender, ATUS 2012-13*

| | Married, No Children | | Single, ≥30, No Children | |
| | Men | Women | Men | Women |
Ind. Var. (in 100 minutes/day):	(1)	(2)	(3)	(4)
Alone	-0.0094	-0.0035	-0.0030	-0.0199
	(0.0086)	(0.0084)	(0.0069)	(0.0058)
With friends	0.0054	0.0170	-0.0026	0.0023
	(0.0139)	(0.0136)	(0.0070)	(0.0068)
With other people	0.0053	-0.0069	-0.0066	-0.0021
	(0.0081)	(0.0094)	(0.0059)	(0.0059)
With other relatives	-0.0049	-0.0088	0.0142	0.0001
	(0.0129)	(0.0106)	(0.0064)	(0.0051)
With spouse	0.0153	0.0164	---------	--------
	(0.0066)	(0.0068)		
p on F-statistic of "who with" vector	0.002	0.004	0.044	0.002
Adj. R^2	0.070	0.061	0.098	0.094
N =	2,332	2,378	2,825	4,023

**Standard errors in parentheses. Additional covariates are: Vectors indicators of age, years of educational attainment, racial/ethnic identity, state of residence, day of week, month of year, and year, an indicator of immigrant status; household income; distribution of time spent on the diary day among work, home production, sleep, other personal care and TV-watching (with other leisure activities the excluded category); usual weekly hours of paid work, and indicators of class of worker.

Table 5. Simulations of the Impact of Changing Time Use During a Lockdown, Based on Estimates in Columns (3) and (6) of Table 2, and Columns (2) and (4) of Table 3

Change in Probability of Being Happy (≥8 Life Satisfaction)

Simulation:	Married, No Children	Single, ≥30, No Children
	(1)	(2)
I. Changes in "who with":		
A. Reported time shifted to spouse (alone)	0.060	-0.034
B. All non-sleep time shifted to with spouse (alone)	0.053	-0.051
C. Maximum sample time with spouse (alone) by all respondents	-0.029	-0.045
II. Adds 1/3 cut in work time, shifted to TV-watching		
A. Reported time shifted to spouse (alone)	0.042	-0.047
B. All non-sleep time with spouse (alone)	0.035	-0.064
C. Maximum sample time with spouse (alone) by all respondents	-0.047	-0.058
III. Adds 1/3 cut in income		
A. Reported time shifted to spouse (alone)	0.022	-0.060
B. All non-sleep time with spouse (alone)	0.015	-0.077
C. Maximum sample time with spouse (alone) by all respondents	-0.067	-0.070