

# Will You Be Mine?

## Marriage as a Protective Factor During Coronavirus\*

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### Abstract

Using weekly variation from April 23 to June 23, we exploit the surge in unemployment over the coronavirus pandemic to identify the effects on mental health outcomes and the role of marital status as a protective factor for households. We find that married respondents are 1-2 percentage points less likely, relative to their unmarried counterparts, to experience mental health problems following declines in work-related income since the start of the pandemic. We also find that these mental health “savings” from marriage are associated with increases in the time that parents allocate to teaching their children. Our results suggest that intra-family substitution is a vehicle for partial insurance against the coronavirus shock.

**Keywords:** Coronavirus, Employment, Family, Marriage, Mental Health, Wages

**JEL Codes:** D91, I31, J21

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\*These views are our own and do not reflect those of any affiliated institutions.

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# 1 Introduction

The coronavirus has led to a sharp decline in mental health, which adversely affects both individual life satisfaction and workplace productivity (Bubonya et al., 2017).<sup>1</sup> Yet, there is some preliminary evidence suggesting that marriage is serving as an important protective factor against the increased risk of isolation that resulted from stay-at-home orders (Roth and Wilcox, 2020; Makridis and Wang, 2020). Given that marriage is associated with a wide array of positive outcomes, including income (Ahituv and Lerman, 2007), happiness (Glenn and Weaver, 1981), life expectancy (Lillard and Waite, 1995), physical and mental health (Kiecolt-Glaser and Newton, 2001; Yan and Schoppe-Sullivan, 2020), and economic mobility (Chetty et al., 2014), we provide the first comprehensive assessment about the potentially important role that marriage plays in moderating the adverse effects of labor market disruptions during the coronavirus pandemic.

Unfortunately, empirically identifying the causal effects of marriage is challenging because of selection effects: individuals who get married are systematically different than those who do not get married. In this sense, while much of the existing literature provides a reference point for understanding differences in outcomes between married and unmarried individuals, it is hard to know whether these differences reflect the causal or selection effects of marriage. Using new panel data from the Census Pulse Survey between April 23 and June 23, we exploit the rapid surge in layoffs during the coronavirus pandemic to examine how marriage serves as a protective factor against employment-related income declines. Our identifying variation comes from comparisons of observationally equivalent workers exposed to different degrees of labor market shocks across

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<sup>1</sup><https://news.gallup.com/poll/308420/americans-say-covid-hurting-mental-health.aspx>  
<https://news.gallup.com/poll/310250/worry-stress-fuel-record-drop-life-satisfaction.aspx>

states, which could emerge from differences in their industrial composition and the relative share of sectors that are more exposed to national and state quarantine policies.

We begin by documenting several stylized facts about mental health patterns across the United States. For example, we find that states that had higher shares of respondents reporting worse levels of mental health between April 23 and May 5 exhibited a greater decline in mental health problems between April 23 and June 23. This suggests that the areas that were exposed to more severe labor market and public health shocks may be recovering, at least with respect to mental health, as of June, although admittedly we have seen a recent uptick in the virus. Additional diagnostics suggest that these results hold up until mid-July. Our results build upon a larger literature on the effects of job insecurity and marriage on mental health ([Tumin and Zheng, 2018](#); [Blom et al., 2020](#)) by focusing on a period of unique uncertainty.

We subsequently explore the moderating effects of marital status on mental health arising from declines in work-related income. Not surprisingly, married respondents are much less likely to report mental health problems in not only the raw data, but also in our conditional correlations. For example, they are 8.6 percentage points (pp) and 7.7pp less likely to report depression and anxiety at least three of the days in the past week when examining the raw data, but the correlations only decline to 2.8pp and 2.4pp when we introduce demographic controls (e.g., age and education) and semi-parametric interactions between education and income. Declines in work-related income are associated with roughly an 8-10pp increase in the probability of reporting mental health problems, which is significant given that the share of individuals reporting high anxiety is roughly 30% and the shares reporting high disinterest, depression, or worry are roughly 20%.

Moreover, we find an important moderating role of marital status. In our preferred specifications that control for standard demographic factors, we find that married respondents are 1pp,

1.5pp, 1.4pp, and 1.7pp less likely, relative to their unmarried counterparts, to report mental health problems following declines in work-related income. These results are consistent with an emerging literature on intra-family pooling of income and labor supply in marriage (Eickmeyer et al., 2019), which provide partial insurance against labor market disruptions. We also explore how these relationships by demographic groups, showing that the protective effects of marriage on anxiety are concentrated among white, middle-class males. However, when we look at a broader range of mental health outcomes, especially the incidence of depression, we see that the protective effects are also present for females and higher income earners. Motivated by these mental health “savings,” we quantify the association between marital status and mental health on the time that parents allocated to their children. Given the decline in the market for child care (Ali et al., 2020), we view this as an important indicator for childhood development. Consistent with our earlier results, we find that married respondents with mental health problems allocate more time towards teaching their children and that these effects are also present among blacks and lower income earners. These results are consistent with prior literature that has linked mental health problems among parents with an increased proclivity of behavioral problems among children (Meadows et al., 2007).

This paper contributes to a large literature about marriage and social and economic outcomes. Many papers have shown that marriage is associated with greater income (Ahituv and Lerman, 2007), happiness (Glenn and Weaver, 1981), life expectancy (Lillard and Waite, 1995), overall health (Kiecolt-Glaser and Newton, 2001), and economic mobility (Chetty et al., 2014). However, one of the challenges with all these contributions has been the presence of selection effects. We exploit variation in the surge in unemployment over the pandemic and examine the potential moderating role of marital status. In this sense, we do not require the typical assumption that

selection into marriage is exogenous, conditional on observables: we simply assume that selection into marriage is not correlated with the labor market shocks experienced over the pandemic. By focusing on the role of families, we also contribute to a bigger policy conversation about the determinants of social capital (JEC, 2018) and their effects on stopping the spread and severity of the pandemic (Makridis and Wu, 2020; Barrios et al., 2020; Ding et al., 2020).

Moreover, ever since at least Becker (1981), related research in labor economics shows that families can serve as a vehicle for partial insurance over the business cycle. For example, Ortigueira and Siassi (2013) show that intra-household substitution serves as an important insurance mechanism for households, especially lower income households. Similarly, Blundell et al. (2016) show that family labor supply allows households to smooth against even fairly permanent labor income shocks. These papers generally highlight the ways that spousal labor supply can create a stream of income when one source declines, although there is also additional evidence that pooling income in the family also leads to better search opportunities too (Guler et al., 2012). Moreover, Eickmeyer et al. (2019) show that marriage (not co-habitation) leads to greater income pooling, which enables them to cushion against idiosyncratic shocks more easily. This is also consistent with the fact that mothers and fathers select into more nurturing versus protective occupations (Pakaluk and Price, 2020).

Our paper also contributes to the study of childhood development and the role of parental investments (Todd and Wolpin, 2003; Cunha and Heckman, 2006; Todd and Wolpin, 2007; Cunha and Heckman, 2007; Cunha et al., 2010; Agostinelli and Wiswall, 2019).<sup>2</sup> However, to our knowledge, none of these contributions allow for heterogeneity in marital status to affect the quality or quantity of investments in children. Our results show that one of the ways that marital status

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<sup>2</sup>See Doepke et al. (2019) for a survey on the economics of parenting

raises investment in children is by creating a more stable family environment, manifested in the form of more time allocated towards teaching and lower mental health problems among parents.

Finally, our results are also related with a literature about intra-household bargaining and female labor supply in the market.<sup>3</sup> For example, [Voena \(2015\)](#) finds that the introduction of unilateral divorce laws led to greater asset accumulation and a lower employment rate among females who were already married, which implies that households were able to more credibly threaten to divorce and thereby more likely to resolve conflict. [Eckstein and Lifshitz \(2011\)](#) find that the rise in education level accounts for roughly 33% of the increase in female employment since the 1960s, the rise of female wages accounts for roughly 20%, and the remaining is highly correlated with the cost of child-rearing and other inputs of home production.

The structure of our paper is as follows. Section 2 describes the data and measurement strategy. Section 3 introduces the identification strategy and empirical specification. Section 4 presents the main results and heterogeneous treatment effects. Section 5 concludes.

## 2 Data and Measurement

The Household Pulse Survey ("the Pulse") is a 20-minute online survey designed by the U.S. Census Bureau to rapidly assess how the coronavirus pandemic is impacting households throughout the country. Data collection began on April 23, 2020, with public files released on a weekly basis starting May 20, 2020.<sup>4</sup> Households were selected into a very large sample from the Census Bureau's Master Address File (MAF), accommodating anticipated lower response rates while still producing estimates at the state level as well as for 15 Metropolitan Statistical Areas (MSAs).

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<sup>3</sup>See [Doepke and Tertilt \(2016\)](#) for a survey of applications of family models in macroeconomics.

<sup>4</sup>We refer readers to the full documentation and discussion of the data in [Buffington et al. \(2020\)](#).

The weighting procedure was applied at the state level and contained four parts: 1) adjustment for nonresponse, 2) adjustment to controls weights based on the ACS occupied housing unit estimates, 3) adjustment for the number of adults per household, and 4) adjustment for demographic characteristics. Households were contacted primarily through email, and if an interview was completed, that household remained in sample for up to two additional weekly interviewing periods.

In addition to demographic items, Pulse questions fall under seven content areas: employment, spending and Economic Impact Payments, food sufficiency and food security, physical and mental wellness, health insurance and health access, housing, and education disruptions. We are interested in a few specific questions. First, respondents were asked a broad question about recent household job loss, specifically: "Have you, or has anyone in your household experienced a loss of employment income since March 13, 2020?" While this includes job loss, it also encompasses any loss of job-related income, from fewer hours to unforeseen expenses. Second, we focus on four primary measures of mental health: (i) frequency of feeling depressed over previous 7 days, (ii) frequency of worry over previous 7 days, (iii) frequency of anxiety over previous 7 days, and (iv) frequency of having little interest in things over previous 7 days. We create binary indicators for whether an individual reports "more than half the days" or "nearly every day," denoting those who report "not at all" or "several days" as a zero. While we have experimented with ordered probit models that retain the categorical values, these allow for a more convenient interpretation and, if anything, would simply lead to more attenuated estimates (i.e., biased towards zero).

Figure 1 investigates the spatial heterogeneity in the share of people reporting having anxiety more than half the days in the past 7 days averaged across all the weeks in our sample. Panel A documents substantial heterogeneity with higher rates of anxiety in the Southwest and areas of the Southeast upwards of 33% and much lower rates in the middle of the country downwards of

28%. We see similar patterns for other outcome variables, which we do not report for brevity, but the results for depression rates are even larger in the Southeast.

Panel B subsequently documents equally large variation in the change in the share of respondents who are anxious between weeks 1 and 8 of the survey, which corresponds with April 23 to May 5 (week 1) and June 18-23 (week 8). Interestingly, we see that some areas experienced over a 10% decline in the share of respondents saying that they are anxious, concentrated primarily in the middle of the country and select areas of the Northeast, whereas other states have experienced an even greater increase in the share, concentrated in the Southwest and areas of the Southeast.

[INSERT FIGURE 1 HERE]

To investigate the degree of persistence in mental health outcomes, Figure 2 plots the share of individuals reporting high anxiety between April 23 and May 5 with the growth in the share of these individuals between June 18 and 23. Importantly, we see a correlation of -0.56, suggesting that the areas that had worse mental health outcomes in week 18 experienced lower growth in the share of those experiencing mental health outcomes by week 8. This holds regardless of the way that we measure mental health outcomes, including depression, interest, and worry, which exhibit slightly more negative correlations than for anxiety.

[INSERT FIGURE 2 HERE]

To understand the relationship between marital status and mental health, Figure 3 illustrates differences for our four main measures of mental health for married and non-married respondents. Across each outcome, we see that married respondents are substantially more likely to report that they have no days or only some days of mental health problems. Conversely, we also see that they are less likely to report more frequent experiences with mental health problems.



[INSERT FIGURE 3 HERE]

Finally, we use data on unemployment claims from [Chetty et al. \(2020\)](#), calculated by taking the total unemployment insurance claims from the Department of Labor per 100 persons in the 2019 labor force. To match the Pulse data in which respondents are asked to reflect on their previous week, we have matched Pulse weeks with that previous week of unemployment rates in the individual's state. For example, Week 1 of the Pulse survey results were taken during April 23rd - May 5th and is matched with state unemployment rates from April 18th.

Table 1 documents descriptive statistics for each of our main variables separately by the week of the Pulse survey, ranging from its start in April 23 to May 5 to our current iteration for June 18 to 23. While the core demographics are, not surprisingly, constant across time, with males slightly more likely to participate in the survey (perhaps due to selection into small business employment), we find ample variation in our mental health outcomes. For example, the share of respondents reporting feeling depressed (anxious) at least three of the days in the past week grows from 17.3% (31%) in week 1 of the survey to 19.4% (32.4%) in week 8 of the survey with various oscillations in between. Although much of the variation is cross-sectional, we leverage the state-level time series variation that remains to help identify our treatment effects.

[INSERT TABLE 1 HERE]

### 3 Empirical Strategy

To understand the relationship between losses in wage income and mental health outcomes as moderated by marital status, we estimate linear regressions of the following form:

$$h_{ist} = \gamma IncomeLoss_{ist} + \zeta m_{ist} + \xi(IncomeLoss_{ist} \times m_{ist}) + \beta X_{it} + \phi_s + \lambda_t + \epsilon_{ist} \quad (1)$$

where  $h_{ist}$  denotes an indicator for an individual  $i$ 's mental health outcome in state  $s$  and time  $t$ ,  $IncomeLoss_{ist}$  denotes an indicator for whether the individual experienced any job-related income loss recently,  $m$  denotes whether an individual is married,  $X$  denotes a vector of individual demographic characteristics (e.g., age, gender, race, education, and number of children), and  $\phi$  and  $\lambda$  denote state and time fixed effects. We report heteroskedasticity-robust standard errors.

Although the inclusion of demographic controls, together with the state and time fixed effects, helps mitigate concerns about omitted variables bias, estimates of Equation 1 may still be subject to bias due to cross-sectional heterogeneity across individuals. For example, if individuals with lower probabilities of experiencing mental health outcomes are also more productive, then they are also more likely to select into marriage because they will have an easier time finding a spouse. We address this concern by sequentially introducing control variables to gauge the potential importance of unobserved factors.

Our identification comes from comparisons of observationally equivalent individuals that vary in their marital status and exposure to job loss. While job-related income loss is generally subject to significant self-selection concerns, the sampling frame in our study is unique in that the unemployment rate surged from 3.3% to nearly 20% in the span of two months. The rapid surge in layoffs provides us with plausibly exogenous variation in income loss, which we exploit to identify the impact of labor market fluctuations on mental health moderated through the role of marriage. To validate our intuition, we estimate regressions of the form:

$$IncomeLoss_{ist} = \psi u_{st} + \beta X_{it} + \phi_s + \lambda_t + \epsilon_{ist} \quad (2)$$

where  $u_{st}$  denotes logged unemployment claims in state  $s$  and week  $t$ . Table 2 shows that there is a robust relationship between state unemployment and the probability that an individual has experienced a decline in their work-related income. For example, column 1 shows that a 1% rise in state unemployment is associated with a 2pp rise in the probability the individual has experienced such a decline in income. Column 2 shows that the gradient actually grows to a 2.3pp once demographic and income controls are incorporated. Column 3 introduces state and week fixed effects, exploiting within-state variation. While it is now statistically significant at only a 10% level (instead of the 1% level), the positive association nonetheless holds, illustrating the variation that we are exploiting to identify our treatment effects.

[INSERT TABLE 2 HERE]

Finally, given the collapse of the market for child care (Ali et al., 2020), we also explore the resulting effects of mental health and marital status on investment in children through:

$$c_{ist} = \gamma h_{ist} + \zeta m_{ist} + \xi h_{ist} \times m_{ist} + \beta X_{it} + \phi_s + \lambda_t + \epsilon_{ist} \quad (3)$$

where  $c$  denotes the logged amount of time that the parents allocate towards teaching their children. Of course, we restrict the estimation of Equation 3 to the sample of respondents with children. Given that we have shown how work-related declines in income can affect mental health

outcomes, we now explore how mental health moderated by marital status can also affect the time that parents allocate towards helping their children develop.

## 4 Main Results

Table 3 documents the main results from Equation 1, estimating linear probability models of mental health indicators on marital status, job-related income loss, and their interaction, conditional on controls. Columns 1, 4, 7, and 10 all present the raw differences for married and unmarried respondents: married respondents are 7.7pp less likely to feel anxious at least three days in the past week and those experiencing recent job-related income loss are 14.7pp more likely. These cross-sectional differences are similar across each of the outcome variables. Most importantly, however, the interaction effect is also negative: married respondents are 2.1pp less likely to experience anxiety following job-related income losses, consistent with a protective effect.

Moreover, this is economically important: the interaction effect is 14.3% of the magnitude of the direct effect ( $= 0.147 - .021$ ). We also see similar magnitudes for other outcome variables. For example, married respondents are 2.6pp less likely to experience depression following a job-related income loss, which amounts to 22% of the direct effect of job-related income loss on the probability of experiencing a depression. In this sense, while job-related income loss is still associated with a sharp increase in the probability of experiencing mental health problems, marriage nonetheless serves as a protective factor that reduces the adverse effects of income losses.

However, these results do not preclude an interpretation of partial selection—that is, married households are positively selected and those experiencing job-related income loss are negatively selected, so the estimate on the interaction is downward biased. Columns 2, 5, 7, and 10 sub-

sequently introduce a wide array of demographic characteristics, including: age, gender, race, number of children, and education. We control for education using fixed effects for less than high school, high school, some college, and college or more. While the direct association between marriage and mental health is downward biased, together with the interaction effect, the inclusion of demographic controls reduces the point estimates marginally. Now, we find that married respondents who experience job loss are 1pp less likely to experience anxiety following job-related income loss. Again, that is roughly 10% of the direct effect of job-related income loss on the probability of experiencing anxiety.

Even with these demographic controls, there is a large literature about the relationship between marital status and income that are reinforced over the life cycle ([Ahituv and Lerman, 2007](#)). Columns 3, 6, 9, and 12 control for income fixed effects to purge differences in income that could be correlated with selection into marriage and the propensity of experiencing a mental health problem. We obtain statistically indistinguishable results when we include these controls. In this sense, our strictest specifications suggest that individuals who are married are 1.7pp less likely to be depressed following declines in wage-related income, relative to their unmarried counterparts (0.9pp, 1.5pp, and 1.4pp for anxiety, worry, and disinterest, respectively).

[INSERT TABLE 3 HERE]

We now turn towards heterogeneous treatment effects. In particular, motivated by evidence that the pandemic has been regressive—for example, that lower income workers are less able to adapt through remote work arrangements ([Mongey et al., 2020](#))—we now allow for heterogeneity across gender, age, race, and income. Table 4 presents these results for high anxiety as the outcome variable. Interestingly, we see that the protective effects of marriage arising from declines in work-

related income are concentrated among males, although marital status is associated with twice as large of a direct effect on the decline in the probability of experiencing high anxiety. This is consistent with some prior literature that has found that perceptions of job insecurity are more closely related with mental health outcomes for males (Blom et al., 2020).<sup>5</sup> We also see that the protective effects are concentrated among younger individuals and middle-income earners.

When we look at depression as an outcome variable for mental health problems in Table 5, we find some different sources of heterogeneity. For example, marriage is still associated with a stronger protective effect for males (2.5pp), but now also for females (1.4pp). Moreover, we now see an even stronger protective effect for Whites (2.3pp) and higher income earners (1.9pp) with no statistically significant associations for Blacks, Hispanics, and low income earners. Finally, while younger individuals also exhibit a protective effect (2.2pp), older individuals exhibit an even stronger one (3.2pp). This is consistent with Tumin and Zheng (2018) that there are heterogeneous effects of marriage on mental health moderated by the length of the marriage. Interestingly, these dimensions of heterogeneity align fairly well with evidence about the deteriorating conditions of white, middle-class males (Case and Deaton, 2017, 2020), although the protective effects are not isolated to them.

[INSERT TABLES 4 and 5 HERE]

Why do we not see the presence of protective effects among Blacks or Hispanics? While one potential explanation stems from a lack of statistical variation in our data since Blacks and Hispanics constitute smaller shares of our sample and were more likely to experience adverse effects from the pandemic (Mongey et al., 2020), a broader explanation may stem from the steep

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<sup>5</sup>These results are also related with Pakaluk and Price (2020) who explore differences in occupational choice for mothers and fathers and how those choices propagate to their children.

decline in marriage rates and family stability among the African American community (Ellwood and Crane, 1990; Tucker and Mitchell-Kernan, 1995). For example, Ellwood and Crane (1990) point out that, while 33% of black children were not living with two parents as of 1960, that share surged to over 61% by 1988. There is also evidence of differences in marital abuse and marital quality that differ across race even after controlling for income (Lockhart, 1987; Bulanda and Brown, 2007). Moreover, since relational intimacy in a marriage is closely tied with mental health, specifically depression (Yan and Schoppe-Sullivan, 2020), then differences in the incidence of abuse will propagate into mental health outcomes. Finally, prior research has also pointed out the limitations of traditional measures of family structure, particularly among blacks (Mouzon, 2013).

Given that marriage moderates the response of mental health to income shocks, we now explore how these “savings” in mental health might have additional effects for children and their developmental process. For example, prior research has emphasized that there is a relationship between the mental health of parents and behavioral problems among children (Meadows et al., 2007). We focus on the logged amount of time that parents allocate to teaching their children each week, normalized by the number of children to account for differences in the quality of investment, as our primary outcome variable. Since the market for child care has declined substantially over the pandemic (Ali et al., 2020), we posit that parental investments in children and their education are especially important. Survey evidence from Gallup suggests that 3/10 parents say that their children’s emotional and mental health are suffering now.<sup>6</sup>

Table 6 documents the results associated with Equation 3 when our measure of mental health is depression. Under our preferred specification that includes all of our controls in column 3, married

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<sup>6</sup><https://news.gallup.com/poll/312605/parents-say-covid-harming-child-mental-health.aspx>

respondents allocate 12.9% more time towards teaching their children even after controlling for demographic and income differences.<sup>7</sup> Our primary variable of interest is the interaction between marital status and feeling depressed at least three days in the past week. Under our preferred specification, we find that married respondents allocate 14.2% more time towards their children in teaching activities, relative to those who are divorced or separated, even when they are depressed. The positive interaction effect could reflect intra-temporal substitution within the household such that a parent who is feeling overwhelmed can shift some of the burden to their spouse to carry the load, thereby allowing for a more equitable distribution of tasks and investment in their children. These effects are also present, although less statistically significant, when we use anxiety as our proxy for mental health in Table 7, possibly since anxiety is not as serious.

Are these protective effects of marriage unique to particular demographic brackets, or are they broadly felt throughout the distribution? Columns 4 and 5 show that the married  $\times$  depressed  $\times$  group interactions for Black and low income. Although the coefficients are slightly negative, they are close to zero and very statistically insignificant. However, when we allow for heterogeneity by gender in column 6, we see that married females experiencing depression are 9.1% more likely, relative to their male counterparts, to allocate more time to teaching their children, but the estimate is not statistically significant at the 10% level. Table 7 presents similar results for anxiety as our proxy for mental health, but the married  $\times$  anxiety interactions are not as statistically significant. The decline in statistical significance suggests that certain mental health problems might have more severe consequences for children than others.

[INSERT TABLES 6 AND 7 HERE]

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<sup>7</sup>Perhaps surprisingly, those experiencing depression allocate slightly more time to teaching their children too, but these differences are statistically insignificant and may simply reflect some reverse causality: more time allocated towards children creates greater pressure that increases the propensity to feeling overwhelmed and depressed.



## 5 Conclusion

Mental health outcomes deteriorated over the ongoing COVID-19 pandemic. Motivated by a large literature about the beneficial effects of marriage on income (Ahituv and Lerman, 2007), happiness (Glenn and Weaver, 1981), life expectancy (Lillard and Waite, 1995), overall health (Kiecolt-Glaser and Newton, 2001), and economic mobility (Chetty et al., 2014), we investigate whether marriage also serves as a protective factor against declines in work-related income.

Using individual-level data from the Census Bureau’s recent Pulse survey, we show that married respondents are not only less likely to experience mental health problems, but also less likely to experience these problems following declines in work-related income. Our identification strategy exploits the fact that individuals in different states were exposed to more severe contractions in their local labor markets as states introduced varying intensities of stay-at-home orders and nonessential business closure policies, thereby increasing the probability that some people would experience layoffs or declines in income. We also document heterogeneity across gender, race, age, and income, showing that the greatest effects are concentrated among whites, males, and middle to upper income workers. Finally, improvements in mental health outcomes affect childhood development: the buffer of marital status on mental health is associated with greater time allocated towards teaching children. Given the importance of early childhood investments, we view these results as suggestive evidence that children growing up in strong and resilient families will have better learning and eventual labor market outcomes in the years to come.

Our paper provides the first comprehensive assessment of the effects of labor market disruptions on mental health outcomes over the pandemic moderated by the role of marriage. However,

many questions remain. For example, given evidence of heightened marital abuse, how much do differences in marital quality account for some of our heterogeneous treatment effects? Similarly, given the mental health “savings” that stem from marriage, how will children growing up in families with strong marriages versus a single-parent fare in the years ahead? Moreover, what is the role of public policy in encouraging human flourishing amid a pandemic? Only time will tell over some of these questions, but we hope to have provided meaningful evidence as we begin to recover from the crisis and posed new questions that encourages further inquiry in the literature.

## Tables and Figures

**Table 1:** Summary Statistics: Averages by Week

	<i>Week:</i>							
	1	2	3	4	5	6	7	8
Male	0.38	0.39	0.40	0.41	0.40	0.40	0.39	0.39
Married	0.57	0.57	0.57	0.58	0.57	0.57	0.57	0.57
Age	47.8	48.8	48.2	49.0	48.7	49.0	49.3	48.2
Kids	0.82	0.76	0.78	0.74	0.74	0.73	0.72	0.77
Hours with Kids	13.6	13.2	12.8	11.8	10.3	7.75	7.76	5.76
White	0.81	0.83	0.82	0.83	0.82	0.82	0.82	0.81
Black	0.09	0.08	0.09	0.08	0.09	0.08	0.09	0.09
Hispanic	0.09	0.08	0.09	0.08	0.09	0.09	0.09	0.10
College or More	0.52	0.55	0.55	0.56	0.56	0.56	0.56	0.55
Work Loss	0.42	0.43	0.42	0.42	0.42	0.42	0.42	0.43
Unemployment Rate	12.4%	14.3%	13.8%	14.4%	12.6%	12.2%	12.0%	11.5%
Anxious	0.310	0.298	0.300	0.286	0.297	0.305	0.319	0.324
Worried	0.221	0.221	0.217	0.211	0.221	0.226	0.239	0.242
Losing Interest	0.194	0.201	0.198	0.194	0.197	0.195	0.201	0.206
Depressed	0.173	0.180	0.179	0.177	0.185	0.184	0.187	0.194
Respondents	50,465	27,993	85,133	63,607	66,007	52,199	47,311	71,323

Notes—Sources: Census Pulse Survey and the Opportunity Insights Economic Tracker from [Chetty et al. \(2020\)](#). The table reports the mean of a series of descriptive variables across eight weeks of the Census Pulse Survey. The values of the demographic binary variables (male, married, white, black, hispanic, college or more, and work loss) indicate the share of total respondents that week with that characteristic. Specifically, "College or More" refers to those with a BA or higher, and "Work Loss" refers to respondents who said their household has experienced a loss of income since March 13, 2020. The state unemployment rates are originally from the Department of Labor and are lagged to match respondents' reflections on their previous week. The four mental health variables – anxious, worried, losing interest, and depressed – are indicators of whether or not the individual experienced that negative mental state for "more than half the days" and "nearly every day" (1), or for "several days" and "not at all" (0).

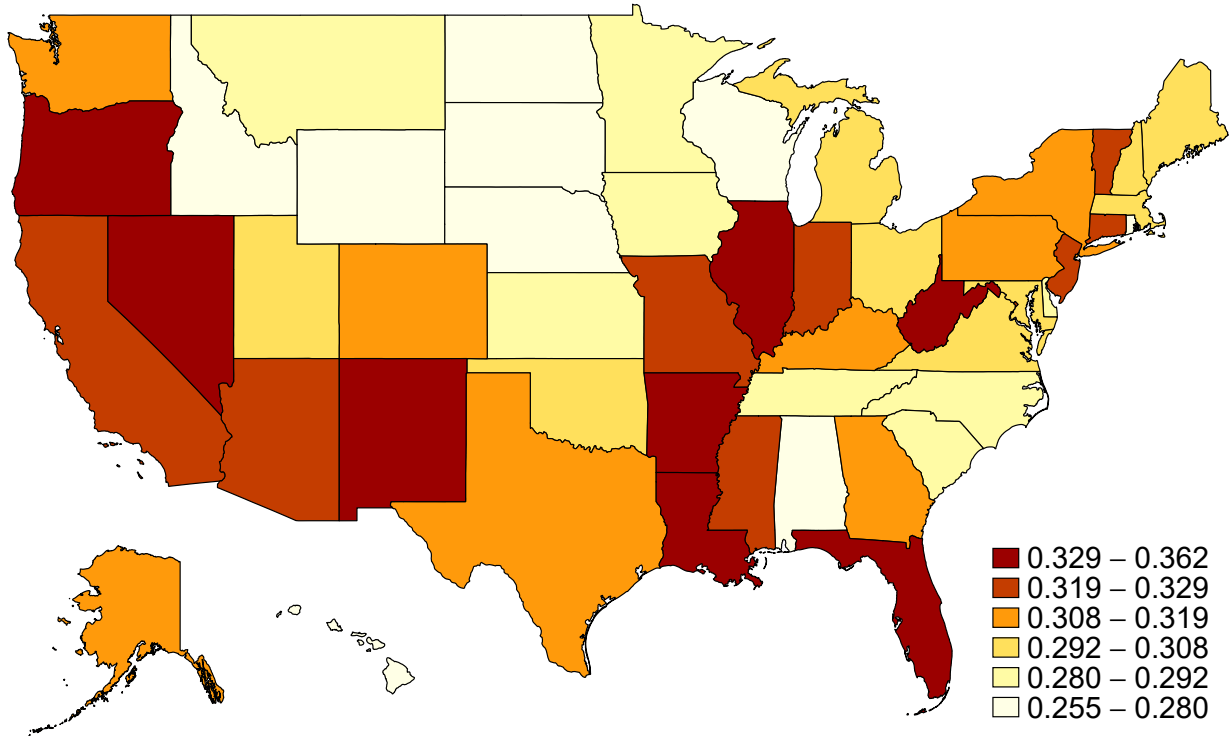
**Table 2:** The Relationship Between State Unemployment and Individual Income Declines

	Household Income Loss		
	(1)	(2)	(3)
Unemployment Claims (log)	0.020*** (0.001)	0.023*** (0.001)	0.010* (0.006)
Demographic/Income Controls		yes	yes
State/Week FE			yes
Observations	463,659	463,659	463,659
Adjusted R <sup>2</sup>	0.002	0.036	0.053

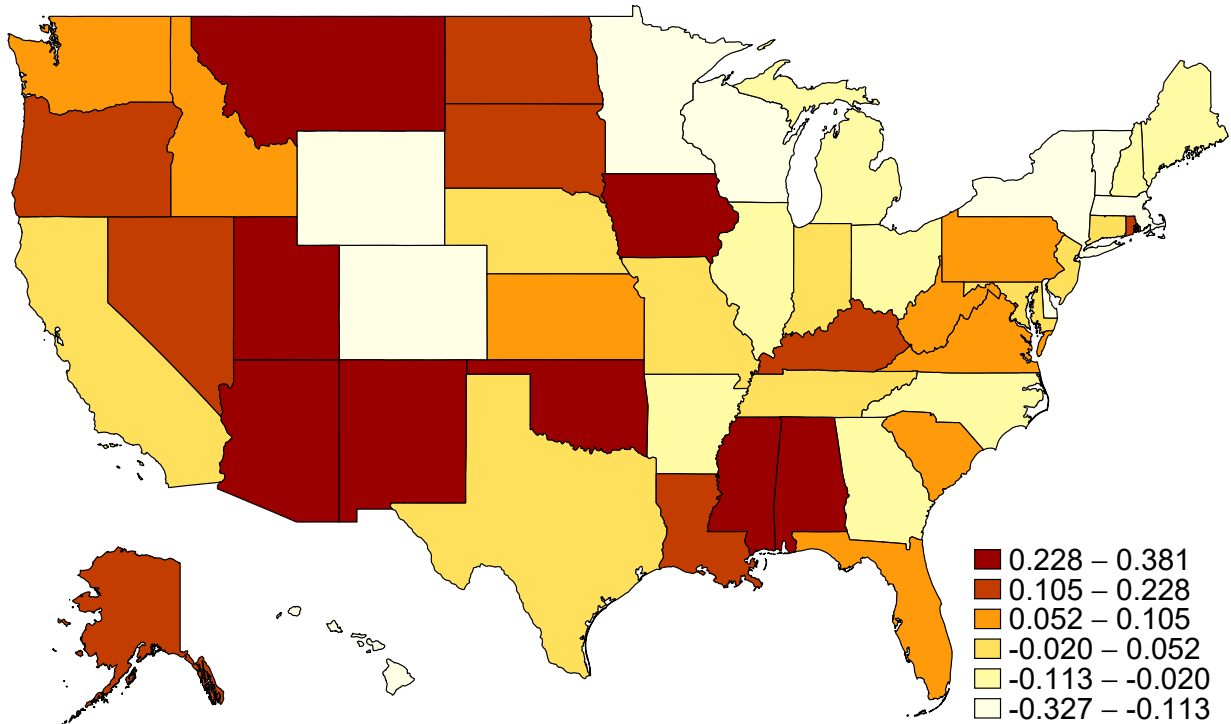
Notes—Sources: Census Pulse Survey and the Opportunity Insights Economic Tracker from [Chetty et al. \(2020\)](#). The table reports the coefficients associated with regressions of an indicator for whether the respondent’s household has experienced work-related income loss since March 13, 2020 on logged total unemployment claims by state. Individual controls include: age, gender, number of children, education, income, and race. Standard errors are heteroskedasticity-robust and observations are weighted by the sample weights.

**Figure 1:** Spatial Heterogeneity in High Anxiety Across States

**Panel A: Average Anxiety (Percent)**

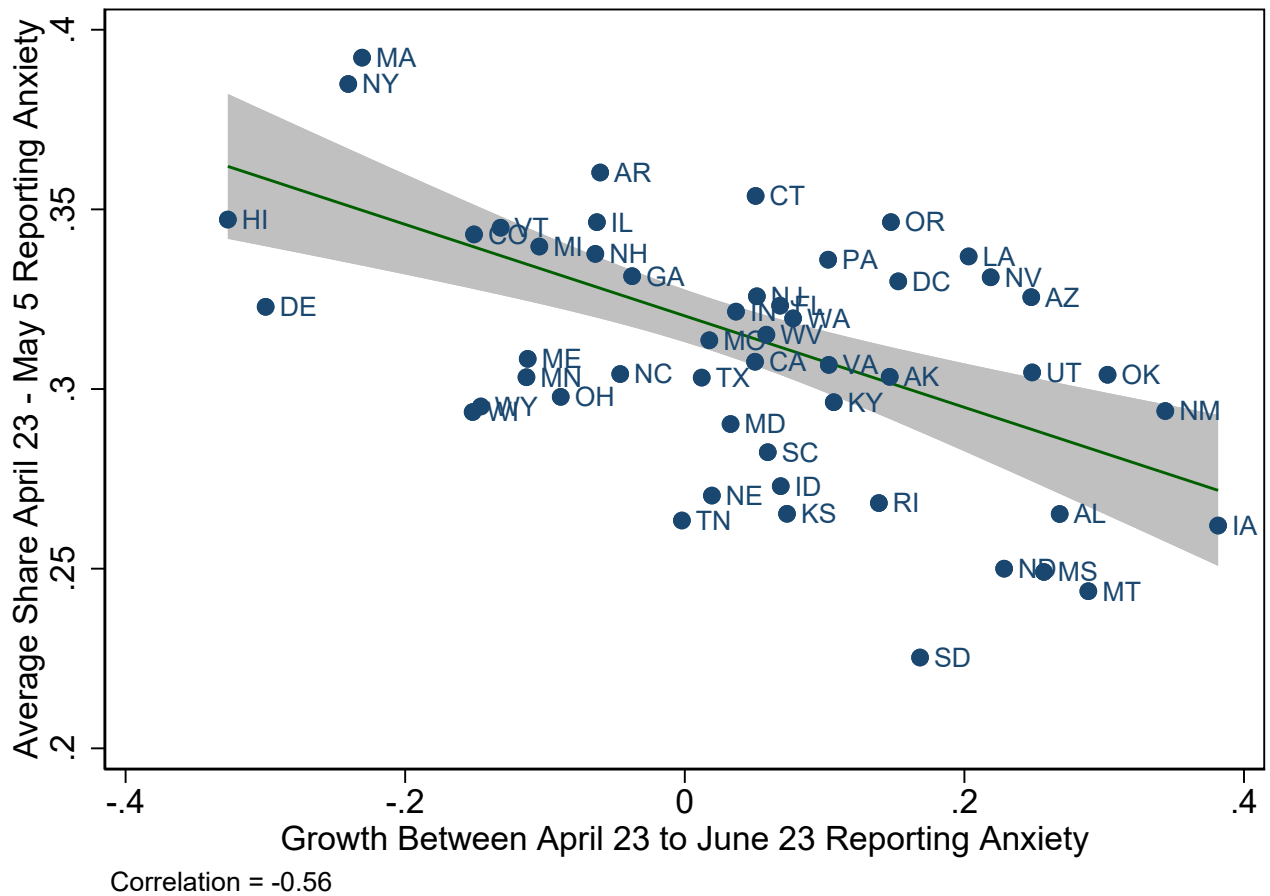


**Panel B: Growth in Anxiety (Percentage)**



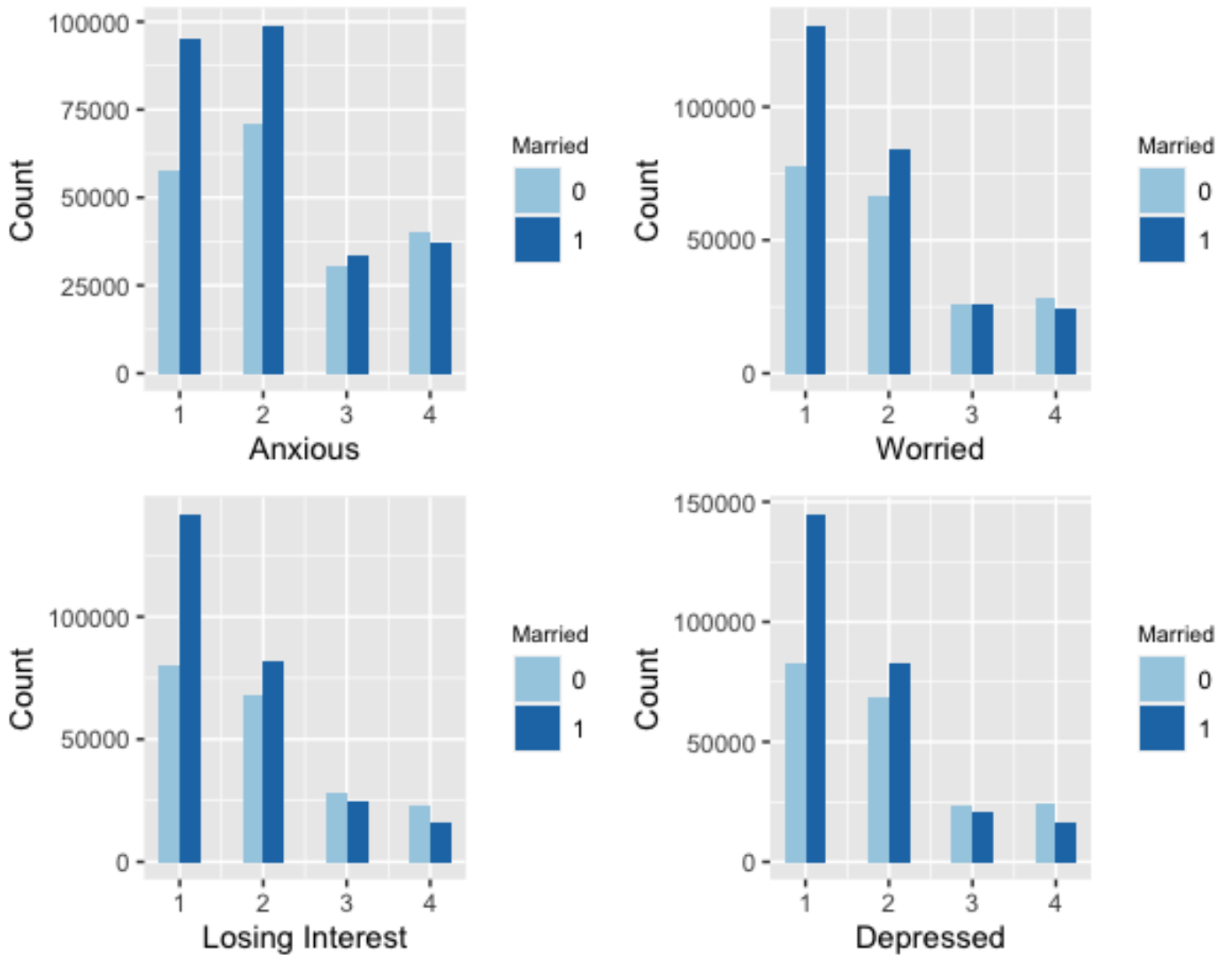
Source: Census Pulse. The figures plot the average share and the growth rate (between April 23-May 5 and June 18-23) in the share at a state-level for those reporting high anxiety at least three days in the past week of the survey.

**Figure 2:** Examining the Persistence in State Mental Health Outcomes



Source: Census Pulse. The figures plot the state share for those reporting high anxiety at least three days in the past week for April 23 to May 5 with the change in the share between the April 23-May 5 and June 18-23 average. Observations are weighted by state employment as of 2018.

**Figure 3:** Mental Health Outcomes for Married and Unmarried Respondents



Source: Census Pulse. The figure plots the share of married and unmarried respondents pooled across the sample waves based on the weekly frequency (1 = “not at all,” 2 = “several days,” 3 = “more than half the days,” and 4 = “nearly every day”) that they report being anxious, worried, losing interest, and feeling depressed.



**Table 3:** The Moderating Effects of Marriage for Income Losses on Mental Health

<i>Dependent variable:</i>												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Is Anxious		Is Worried		Is Losing Interest		Is Depressed					
Married	-0.077*** (0.002)	-0.061*** (0.002)	-0.024*** (0.002)	-0.071*** (0.002)	-0.052*** (0.002)	-0.014*** (0.002)	-0.091*** (0.002)	-0.071*** (0.002)	-0.032*** (0.002)	-0.086*** (0.002)	-0.068*** (0.002)	-0.028*** (0.002)
Work Loss	0.147*** (0.002)	0.126*** (0.002)	0.115*** (0.002)	0.141*** (0.002)	0.120*** (0.002)	0.108*** (0.002)	0.115*** (0.002)	0.096*** (0.002)	0.085*** (0.002)	0.116*** (0.002)	0.098*** (0.002)	0.086*** (0.002)
Married * Work Loss	-0.021*** (0.003)	-0.010*** (0.003)	-0.009*** (0.003)	-0.025*** (0.003)	-0.017*** (0.003)	-0.015*** (0.003)	-0.021*** (0.003)	-0.015*** (0.003)	-0.014*** (0.003)	-0.026*** (0.003)	-0.019*** (0.003)	-0.017*** (0.003)
Demographic Controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Income Controls			yes			yes			yes			yes
State/Time FE			yes			yes			yes			yes
Observations	463,659	463,659	463,659	463,659	463,659	463,659	463,659	463,659	463,659	463,659	463,659	463,659
Average Share	0.30	0.30	0.30	0.22	0.22	0.22	0.19	0.19	0.19	0.18	0.18	0.18
Adjusted R <sup>2</sup>	0.030	0.054	0.064	0.033	0.051	0.063	0.033	0.047	0.060	0.033	0.048	0.062

Notes.—Source: Census Pulse Survey. The table reports the coefficients associated with regressions of an indicator for whether the respondent has been anxious, worried, losing interest, or depressed at least three of the seven past days on an indicator for being married, an indicator for household loss of income since March 13, 2020, and their interaction, conditional on individual controls and state and week-of-the-year fixed effects. Individual controls include: age, gender, number of children, education, income, and race. When controls for income\*education are included, our independent variable of interest, married\*work loss, remains significant across all specifications and only changes to -0.008 (0.003) for anxiety. Standard errors are heteroskedasticity-robust and observations are weighted by the sample weights.

**Table 4: Heterogeneity in the Moderating Effects of Marriage on Anxiety**

	Is Anxious									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Men	Women	White	Black	Hispanic	Young	Old	Low Income	Middle Income	High Income
Married	-0.014*** (0.003)	-0.032*** (0.003)	-0.022*** (0.002)	-0.011 (0.007)	-0.040*** (0.007)	-0.031*** (0.003)	-0.031** (0.013)	-0.030*** (0.008)	-0.020*** (0.005)	-0.035*** (0.005)
Work Loss	0.129*** (0.004)	0.107*** (0.003)	0.121*** (0.003)	0.092*** (0.006)	0.103*** (0.007)	0.119*** (0.004)	0.127*** (0.016)	0.104*** (0.006)	0.125*** (0.005)	0.120*** (0.009)
Married * Work Loss	-0.020*** (0.005)	-0.003 (0.004)	-0.016*** (0.003)	0.011 (0.010)	0.004 (0.009)	-0.010** (0.005)	-0.025 (0.020)	-0.002 (0.011)	-0.015** (0.007)	-0.014 (0.010)
Observations	183,701	279,958	379,282	39,557	41,678	203,411	9,210	44,353	66,618	58,567
Adjusted R <sup>2</sup>	0.059	0.053	0.068	0.034	0.037	0.042	0.046	0.038	0.053	0.048

Notes—Source: Census Pulse Survey. The table reports the coefficients associated with regressions of an indicator for whether the respondent has been anxious at least three of the seven past days on an indicator for being married, an indicator for household loss of income since March 13, 2020 on an indicator for being married, an indicator for household loss of income since March 13, 2020, and their interaction, conditional on individual controls and state and week-of-the-year fixed effects. "Low income" refers to any household with income below \$34,999 (before taxes). "Middle income" refers to household income from \$35,000-99,000. "High income" refers to households with an income above \$100,000. "Young" refers to individuals under the age of 45, and "old" refers to individuals between the ages of 45 and 65. Individual controls include: age, gender, number of children, education, income, and race. State and week FE are included for each column, as well as full controls (adjusted to the subset of data): age, gender, number of children, education, income, and race. Standard errors are heteroskedasticity-robust and observations are weighted by the sample weights.

**Table 5:** Heterogeneity in the Moderating Effects of Marriage on Depression

	Is Depressed									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Men	Women	White	Black	Hispanic	Young	Old	Low Income	Middle Income	High Income
Married	-0.028*** (0.003)	-0.029*** (0.002)	-0.028*** (0.002)	-0.020*** (0.006)	-0.034*** (0.006)	-0.034*** (0.003)	-0.027** (0.011)	-0.040*** (0.007)	-0.034*** (0.004)	-0.036*** (0.004)
Work Loss	0.100*** (0.004)	0.080*** (0.003)	0.089*** (0.002)	0.066*** (0.006)	0.089*** (0.006)	0.094*** (0.003)	0.086*** (0.014)	0.083*** (0.005)	0.091*** (0.005)	0.081*** (0.008)
Married * Work Loss	-0.025*** (0.004)	-0.014*** (0.003)	-0.023*** (0.003)	0.008 (0.008)	-0.007 (0.008)	-0.022*** (0.004)	-0.032* (0.017)	0.002 (0.010)	-0.010 (0.006)	-0.019** (0.008)
Observations	183,701	279,958	379,282	39,557	41,678	203,411	9,210	44,353	66,618	58,567
Adjusted R <sup>2</sup>	0.065	0.056	0.064	0.043	0.040	0.059	0.064	0.026	0.034	0.026

Notes—Source: Census Pulse Survey. The table reports the coefficients associated with regressions of an indicator for whether the respondent has been depressed at least three of the seven past days on an indicator for being married, an indicator for household loss of income since March 13, 2020 on an indicator for being married, an indicator for household loss of income since March 13, 2020, and their interaction, conditional on individual controls and state and week-of-the-year fixed effects. "Low income" refers to any household with income below \$34,999 (before taxes). "Middle income" refers to household income from \$35,000-99,000. "High income" refers to households with an income above \$100,000. "Young" refers to individuals under the age of 45, and "old" refers to individuals between the ages of 45 and 65. Individual controls include: age, gender, number of children, education, income, and race. State and week FE are included for each column, as well as full controls (adjusted to the subset of data): age, gender, number of children, education, income, and race. Standard errors are heteroskedasticity-robust and observations are weighted by the sample weights.

**Table 6:** Implications for Child Development from Marriage and Depression

	Log(Weekly Minutes Spent Teaching per Child)					
	(1)	(2)	(3)	(4)	(5)	(6)
Depressed	-0.020 (0.031)	-0.000 (0.031)	0.017 (0.029)	0.033 (0.033)	0.057* (0.033)	0.069 (0.068)
Married	0.081*** (0.018)	0.023 (0.019)	0.129*** (0.019)	0.137*** (0.020)	0.072*** (0.019)	0.381*** (0.035)
Black				0.373*** (0.036)		
Low Income					0.154*** (0.037)	
Female						-0.041 (0.036)
Depressed * Married	0.138*** (0.039)	0.158*** (0.038)	0.142*** (0.036)	0.135*** (0.040)	0.128*** (0.040)	0.084 (0.077)
Married * Black				-0.045 (0.048)		
Depressed * Black				-0.074 (0.069)		
Depressed * Married * Black				-0.031 (0.106)		
Married * Low Income					-0.016 (0.060)	
Depressed * Low Income					-0.099 (0.068)	
Depressed * Married * Low Income					-0.016 (0.116)	
Married * Female						-0.353*** (0.039)
Depressed * Female						-0.073 (0.075)
Married * Depressed * Female						0.091 (0.087)
Demographic Controls		yes	yes	yes	yes	yes
Income * Education Controls			yes	yes		yes
State/Week FE			yes	yes	yes	yes
Observations	140,407	140,407	140,407	140,407	140,407	140,407
Adjusted R <sup>2</sup>	0.001	0.012	0.154	0.153	0.153	0.154

Notes—Source: Census Pulse Survey. The table reports the coefficients associated with regressions of the number of minutes the respondent spends each week teaching per child (calculated by total teaching hours divided by number of children) on an indicator for being married, an indicator for experiencing depression for more than half the week, and their interaction, conditional on individual controls and state and week-of-the-year fixed effects. "Low income" refers to any household with income below \$34,999 (before taxes). Individual controls include: age, gender, number of children, education, income, and race. Standard errors are heteroskedasticity-robust and observations are weighted by the sample weights.

**Table 7:** Implications for Child Development from Marriage and Anxiety

	Log(Weekly Minutes Spent Teaching Per Child)					
	(1)	(2)	(3)	(4)	(5)	(6)
Anxious	0.155*** (0.027)	0.177*** (0.027)	0.167*** (0.026)	0.195*** (0.029)	0.202*** (0.028)	0.140*** (0.060)
Married	0.105*** (0.020)	0.043** (0.021)	0.145*** (0.021)	0.160*** (0.022)	0.092*** (0.021)	0.392*** (0.037)
Black				0.418*** (0.039)		
Low Income					0.159*** (0.042)	
Female						-0.062 (0.039)
Anxious * Married	0.052 (0.032)	0.066** (0.032)	0.049 (0.030)	0.026 (0.033)	0.033 (0.033)	0.017 (0.065)
Married * Black				-0.081 (0.052)		
Anxious * Black				-0.138** (0.062)		
Anxious * Married * Black				-0.066 (0.089)		
Married * Low Income					0.051 (0.066)	
Anxious * Low Income					-0.103* (0.062)	
Anxious * Married * Low Income					-0.082 (0.104)	
Married * Female						-0.358*** (0.066)
Anxious * Female						-0.022 (0.043)
Anxious * Married * Female						-0.082 (0.074)
Demographic Controls		yes	yes	yes	yes	yes
Income * Education Controls			yes	yes		yes
State/Week FE			yes	yes	yes	yes
Observations	140,407	140,407	140,407	140,407	140,407	140,407
Adjusted R <sup>2</sup>	0.002	0.013	0.155	0.154	0.154	0.155

Notes—Source: Census Pulse Survey. The table reports the coefficients associated with regressions of the number of minutes the respondent spends each week teaching per child (calculated by total teaching hours divided by number of children) on an indicator for being married, an indicator for experiencing anxiety for more than half the week, and their interaction, conditional on individual controls and state and week-of-the-year fixed effects. "Low income" refers to any household with income below \$34,999 (before taxes). Individual controls include: age, gender, number of children, education, income, and race. Standard errors are heteroskedasticity-robust and observations are weighted by the sample weights.

## Online Appendix

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