Trajectories of U.S. Parents' Remote Work During the COVID-19 Pandemic

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Author Biographies
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Daniel L. Carlson is an associate professor of family, health, and policy in the Department of Family and Consumer Studies at the University of Utah. His scholarship focuses on understanding variation in individuals' family experiences and circumstances and the consequences of this variation for well-being and inequality. To date, this general interest has resulted in two streams of research. The first stream involves understanding the health consequences of life-course transitions (e.g., sexual debut, childbearing, marrying) for the health of adolescents and adults. The second examines the causes and consequences of the gendered division of labor in families. He is currently the co–principal investigator of a National Science Foundation–funded study examining parents' divisions of paid labor during and after the COVID-19 pandemic.

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Abstract

The COVID-19 pandemic had numerous consequences for work and family, but one of the most important was the substantial increase in remote work. Despite interest in changes to remote work and questions about whether the new environment of remote work will persist long-term, we know little about variation in workers' experiences with remote work since the beginning of the pandemic. In this data visualization, we use longitudinal data on U.S. working parents from 2020-2023 and group-based trajectory models to illustrate varying patterns of remote work for partnered parents. The heterogeneity of parents' experiences with remote work throughout the pandemic reveal important nuances not previously identified in tracking polls, and highlight important gender differences that likely had implications for mothers' and fathers' well-being and gender equality.

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The COVID-19 pandemic dramatically changed the nature of work. Due to lockdowns and concerns about virus transmission, remote work proliferated (Fan and Moen 2022; Parker, Horowitz, and Minkin 2020). For example, the percentage of eligible workers working remotely jumped from 10% to nearly 70% in Spring 2020 (Wigert and Agrawal 2022). The share of workers working remotely declined as the pandemic persisted, but remains elevated today compared to pre-pandemic (Palarino, Burrows, & McKenzie, 2023; Parker, Horowitz, and Minkin 2022; U.S. Bureau of Labor Statistics 2022). Yet, many workers did not have the option to work from home, particularly those in essential or frontline industries (U.S. Bureau of Labor Statistics, 2021).

Data from polling firms suggest three general trends: (1) there is a large group of workers who began working remotely in Spring 2020, many of whom have begun to return to the office, (2) there is a group of workers who have never been able to work remotely, and (3) there is an increasing group of workers who split their time between home and office (Parker et al. 2020; Wigert and Agrawal 2022). Yet, little is known about heterogeneity in remote work patterns, especially for mothers and fathers. Variations in mothers' and fathers' remote work experiences are important given the consequences of remote work for work-family justice, parents' well-being, and gender equality (Carlson et al. 2022; Collins 2019; Chung 2022; Montazer et al. 2022). Using longitudinal data on partnered U.S. parents from pre-pandemic (March 2020) to post-pandemic (October 2023) and group-based trajectory models, this data visualization illustrates the heterogeneity in partnered mothers' and fathers' remote work experiences.

Figure 1 displays trajectories of remote work for U.S. partnered parents. Results show that approximately half of employed mothers and fathers have not changed their work location

since the COVID-19 pandemic; thirty-one percent of mothers and 41% of fathers have never worked from home while one-in-seven fathers and one-in-six mothers have worked from home exclusively. Interestingly, while mothers in the consistent exclusively group appear to have always been exclusively remote, fathers in this group worked from home frequently, but not exclusively, pre-pandemic, suggesting a permanent shift to exclusive remote work after lockdowns.

Among the half of parents with fluctuating remote work experiences, the figure shows substantial variability by parents' gender with two trajectories of change for fathers and three for mothers. Nine percent of fathers transitioned temporarily to remote work in Spring 2020 before returning exclusively to the office by Fall 2021. A much larger proportion of fathers (36%) who worked from home occasionally pre-pandemic (i.e., once a month) began working from home more frequently when the pandemic started and have sustained more frequent remote work (i.e., once a week).

Among mothers we also observe a temporary first-year group of remote workers (9%) who follow a similar pattern as the group for fathers. We also observe a group of mothers who have become regular remote workers (35%). This trajectory is similar to the sustained regularly trajectory for fathers, but compared to fathers, mothers who became regular remote workers work from home more frequently.[1] We also find one additional pattern that is unique to mothers: a group of late adopting mothers (8%) who did not work remotely pre-pandemic but who have increased their frequency of remote work over time. Additional analyses (not shown) suggest that a sizeable portion of the latter group were essential workers in 2020, some of whom transitioned out of essential work.

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[1] Differences in frequency of remote work between mothers and fathers are statistically significant at $p < .05$ in Fall 2020, but fall short of conventional standards of statistical significance at other time points.

Conclusion

There is great variability in parents' experiences of remote work since the start of the COVID-19 pandemic. Half of partnered mothers and fathers transitioned to remote work during the pandemic. Although this transition was temporary for some, the majority continue to work remotely at least once a week, with mothers working from home more frequently than fathers. Among temporary remote workers, all returned to in-person work by Fall 2021. A small group of mothers have also recently just begun working remotely, and with increasing frequency.
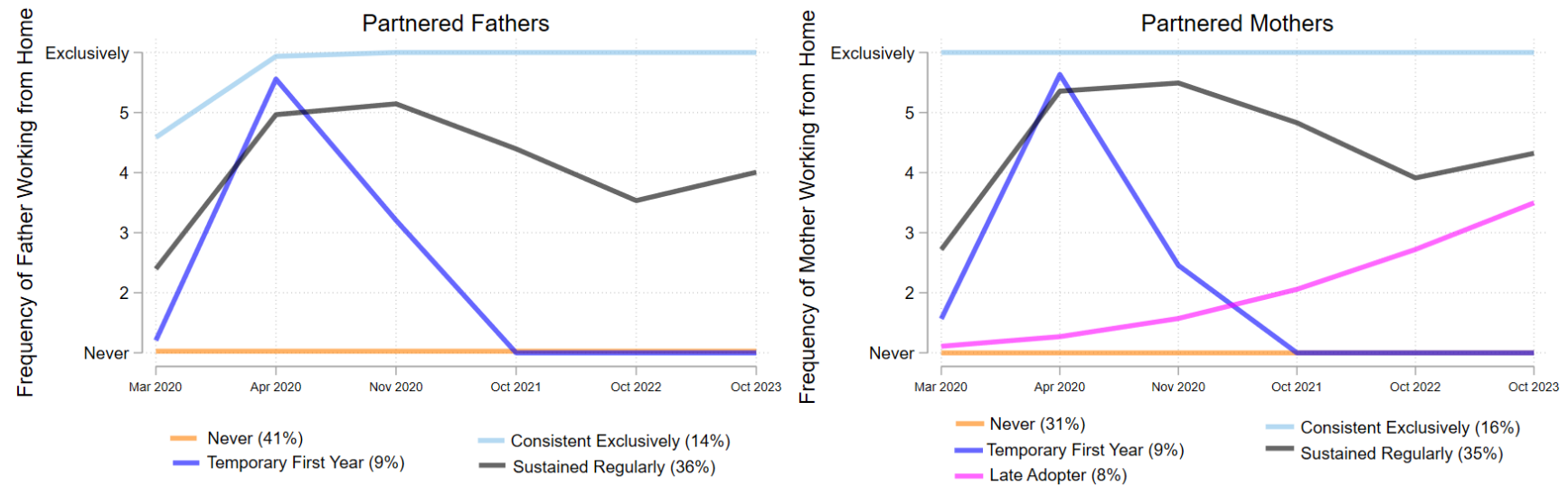
These gendered patterns of remote work likely have consequences for gender equality and parental well-being. Workplace flexibility can help working parents manage work-family conflict (Chung 2022), promoting greater well-being (Fan and Moen 2023). This was especially the case during the pandemic (Carlson et al. 2022; Carlson and Milkie 2023). At the same time, it may also undermine well-being by blurring boundaries between work and family – particularly for mothers (Chung 2022). Moreover, remote work may stigmatize workers (especially mothers), inhibiting career advancement (Chung 2022). Post-COVID, increased remote work appears here to stay, and it is mothers who will likely incur both the benefits and costs of this new reality.

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Figure 1. Trajectories of U.S. Partnered Parents' Remote Work During the COVID-19 Pandemic

Note: Using longitudinal data from the Study on Parents' Divisions of Labor During COVID-19 (SPDLC), the figure depicts estimates from group-based trajectory models which identify distinct trajectories of employed parents' frequency of working from home throughout the COVID-19 pandemic. Group-based trajectory models use maximum likelihood techniques to identify groups of individuals (i.e., parents) that follow similar patterns of behavior (i.e., trajectories) over time, estimate these trajectories, and estimate the probability of following each trajectory (Nagin 2005). Censored normal models are used (responses range from 1=never to 6=exclusively), with separate models estimating trajectories for mothers and fathers. All models were estimated using the post-stratification weight in the SPDLC such that results are nationally representative of U.S. parents with resident children by parent gender, age, and race/ethnicity. The lines in the graph represent the parameter estimates generated by the group-based trajectory model (Jones and Nagin 2013). Percentages (in parentheses) indicate the percentage of mothers and fathers within each trajectory group. $N = 1,248$ fathers and 835 mothers.

SUPPLEMENTARY INFORMATION

Data

Data for this visualization is taken from the Study on Parents' Divisions of Labor During COVID-19 (SPDLC). The SPDLC is a longitudinal study of parents in the United States who reside with a spouse or partner and biological child at the time they enter the study. Surveys were conducted using Prolific's online opt-in panel. The first survey (W1) was conducted in April 2020, and parents reported on both their pre-pandemic (March 2020) and current situation (April 2020). Additional surveys were conducted in November 2020 (W2), October 2021 (W3), October 2022 (W4), and October 2023 (W5). The SPDLC includes both a panel and repeated cross-sectional design; all previous participants are invited to participate in each follow-up survey, and a new cohort of parents is also recruited to participate at each wave (see Carlson and Petts 2023 for full details on study design).

Because participants are recruited from Prolific, the SPDLC is not a nationally representative sample. However, Prolific does have a large and diverse pool of participants, and their policies ensure high quality data (Peer et al. 2017). Men, Black individuals, individuals who did not complete college, and individuals who identified as politically conservative were also oversampled to increase sample diversity and better approximate the U.S. population of resident parents. Indeed, characteristics of the original sample were similar to nationally representative samples of partnered parents residing with children on a variety of factors (Carlson and Petts 2023). Even so, the SPDLC is over-representative of highly educated and nonreligious parents. Regardless, estimates from online samples tend to be representative of those with internet access (Tourangeau, Conrad, and Cooper 2013), and in contrast to polling firms that often rely on repeated cross-sectional samples (which are not able to track individual-level changes), the

longitudinal panel design enables us to identify long-term patterns in parents' frequency of

working from home throughout the pandemic to illustrate the various patterns that U.S. parents

experienced.

A total of 4,551 unique parents participated in the first four waves of the SPDLC, with

66% participating in at least one follow-up survey. To construct our analytic sample, we focus on

parents in different-gender partnerships who were employed in at least three of the six time

points captured in the SPDLC longitudinal panel (as recommended for group-based trajectory

models; see Nagin 2005). After these restrictions, our analytic sample includes 1,248 fathers (M

= 3.89 data points) and 835 mothers (M = 3.84 data points).

Remote Work

At each wave of the SPDLC (and separately for prior to the pandemic and currently in the

Wave 1 survey), employed parents were asked two questions about remote work for both

themselves and their partners. Parents were first asked: "Are you (your partner) currently able to

work from home?" (yes/no). Those who indicated an ability to work from home were then asked:

"How often do you (your partner) work from home?" (1 = never; 2 = less than once a month; 3 =

1-3 times a month; 4 = once a week; 5 = more than once a week; 6 = work from home

exclusively). We use information on parents' and partners' gender as well as responses to these

questions to create our indicators of fathers' and mothers' frequency of working from home.

Analytic Strategy

We use group-based trajectory models to identify the different patterns of working from

home that mothers and fathers experienced during the pandemic. Group-based trajectory

modeling assumes that there are groups of individuals (i.e., parents) that follow similar patterns

of behavior (i.e., trajectories) over time. Using maximum likelihood techniques, this method

estimates the various trajectories as well as the probability of following each trajectory (Nagin 2005). Although estimates from group-based trajectory models are approximations (and do not identify distinct groups within a population), they are useful ways to visualize the various patterns of remote work that parents likely experienced throughout the pandemic.

We used censored normal models to estimate trajectories of the frequency with which parents worked from home, and estimated separate models for fathers and mothers. All models were estimated using the post-stratification weight available in the SPDLC such that results are nationally representative of U.S. parents with resident children by parent gender, age, and race/ethnicity (Carlson and Petts 2023). We then used BIC (Bayesian Information Criterion) statistics, average posterior probabilities for each group (i.e., the average probability that individuals assigned to that group actually demonstrate patterns consistent with that group based on their data), and researcher judgement to identify the best fitting model with the optimal number of groups and form (e.g., linear, quadratic). Recommendations suggest that good fitting models have the highest BIC statistic, average posterior probabilities all above .70, and convey all the important features within the data while remaining parsimonious (Nagin 2005). Using these guidelines, a four-group model emerged as the best fitting model for fathers, and a five-group model emerged as the best fitting group for mothers (see Table A1 for model fit statistics).[1]

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[1] The difference between the five- and six-group models for mothers (see bottom of Table A1) is that there were two variations of the temporary first year trajectory for mothers in the six-group model. Although the six-group model has a better BIC statistic than the six-group model, the sixth group was relatively small in size (5% of sample; N = 43 mothers) and the average posterior probability for the "never" trajectory for falls below the recommended .70 (.68). Thus, the five-group model was chosen because all the average posterior probabilities are at or above the recommended .70 and it is a more parsimonious model while still conveying the various patterns of remote work that mothers experienced.

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Table A1. Group-Based Trajectory Model Fit Statistics

Number of Groups	Parameters	BIC	Model Convergence	Model Errors	Average Posterior Probabilities
			Fathers		
2	0 2	-6474	YES	YES	1.00, .95
3	0 2 2	-5691	YES	YES	.97, .96, .85
4	0 2 2 2	-5647	YES	YES	.82, .94, .87, .85
5	0 2 2 2 2	-5650	NO	YES	-
6	0 2 2 2 2 2 2	-5459	NO	YES	-
4	2 3 2 2	-5522	NO	YES	-
4	**0 2 2 3**	**-5385**	**YES**	**NO**	**.89, .92, .89, .93**
			Mothers		
2	0 2	-3912	YES	NO	.95, .97
3	0 2 2	-3798	YES	YES	.95 .94, .89
4	0 2 2 2	-3653	YES	YES	.77, .86, .93, .91
5	2 2 2 2 2	-3622	YES	YES	.73, .85, .79, .95, .90
6	0 2 2 2 2 2	-3591	NO	YES	-
7	0 2 2 2 2 2 2	-3605	NO	YES	-
5	0 2 2 3 2	-3594	YES	YES	.74, .86, .80, .92, .89
5	0 2 2 3 1	-3590	YES	YES	.74, .86, .80, .92, .89
5	0 2 2 3 2	-3603	YES	NO	.73, .87, .81, .91, .91
6	0 2 2 3 1 0	-3525	YES	NO	.68, .91, .87, .90, .88, .90
5	**0 2 3 1 0**	**-3562**	**YES**	**NO**	**.70, .91, .93, .86, .90**

Note: Final models are bolded. Parameters indicate the shape of each trajectory; 0 = constant; 1 = linear; 2 = quadratic; 3 = cubic; 4 = quartic.