

School Re-Openings, Educational Arrangements, and Labor Outcomes During COVID-19

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Workshop on the Economic Challenges of Demographic Inequalities

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The COVID-19 pandemic has had a big impact in American households' functioning, especially those with children

- Childcare needs soared, as schools and daycare centers closed across the U.S. in March 2020 and remained mostly closed until the Fall



Gema Zamarro and her daughter work together at the kitchen table during the COVID-19 pandemic

- The economic crisis (she-cession) had a large effect on more female dominated sectors of the service industry (Mongey and Weinberg 2020)
- Work conditions for those who remained employed changed abruptly, with many being forced to work from home
- In the Fall of 2020 schools started to re-open resulting in a combination of in-person, fully remote learning and hybrid models

Our Research Agenda

- How did households adjust? How are they facing the recovery?
- Have men and women been affected differently?
- Has the childcare crisis affected household labor supply? Did School reopenings help?

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**Gender differences in couples' division of childcare,
work and mental health during COVID-19**

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This paper

- **Objective:** To understand and measure the middle-term impact of the COVID-19 crisis in household labor market outcomes as schools started reopening in Fall 2020
- **Data:** USC Understanding America Study COVID-19 tracking survey merged with school-district information about school re-openings at the census tract level and contextual data about COVID-19 incidence, restrictions, and policies
- **Methods:** Use difference-in-differences and triple difference methods to estimate the effect of public schools' re-openings for in-person learning on the dynamics of employment, recovery from employment loss and hours worked (between Spring/Summer 2020 and Fall/Winter 2020)

This paper

- **Overview of Results:**

- Increased childcare responsibilities for mothers during the Fall of 2020, regardless of their work status
- For parents employed before the beginning of the pandemic, we find a significant effect of school re-openings on the extensive margin of labor outcomes
- Gender effects: School re-openings are more helpful for fathers than mothers
- No effect on working hours

Outline

- ➔ • (Growing) Literature
 - Understanding Coronavirus in America Study (UAS)
 - School re-openings, learning modality choices, and employment outcomes
 - Empirical Approach to study the effect of school re-openings
 - Results
 - Threats to internal validity and Robustness Checks
 - Conclusions

Growing Literature: Gender Effects of the COVID-19 crisis

- Our paper contributes to the emerging literature on the economic effects of the COVID pandemic
 - **Households' response to the childcare crisis:**
 - Gender differences in childcare arrangements with women more likely to be the main ones responsible for childcare during the Spring of 2020 (Adams-Prassl et al., 2020; Zamarro & Prados, 2021)
 - Zamarro & Prados (2021) using UAS data from March-July 2020:
 - 44% of mothers were the sole provider of childcare (v. 14% of fathers)
 - Working mothers 27pp more likely to be only providers of childcare than working fathers
 - Working mothers more likely to become the sole provider of care (even if not at the beginning of the crisis)

Growing Literature: Gender Effects of the COVID-19 crisis

- **Labor outcomes impact of the pandemic:**
 - Early gender gap in work hours (Collins et al. 2020) and employment, linked to childcare (Zamarro & Prados, 2021)
 - Reduction of working hours (20pp)
 - Increased probability of transitioning out of employment (5pp)
 - Working mothers 17pp more likely to reduce working hours than working women w/o children and than working fathers
- **School closures and re-openings**
 - School closures during the spring of 2020 differentially affected the labor status of women (Heggeness, 2020; Amuedo-Dorantes et al., 2020; Garcia & Cowan, 2022; Hansen et al., 2022)
 - **Garcia and Cowan (2022)** and **Hansen et al. (2022)** study the effect of school re-openings on employment outcomes using the information in smartphones pings tracked in schools to proxy for schools' in-person instruction

Growing Literature: Gender Effects of the COVID-19 crisis

- **School re-openings**

- **Garcia and Cowan (2022)** look at the effect of school closures after the summer 2020 using monthly individual data from the Current Population Survey (CPS) from August 2020 to April 2021
 - No significant effect of school closures on overall employment of those living with school-age children in the household but statistically lower probability of working full-time and an increased probability of working part-time. They also find a significant reduction of hours work of about 1.3 hours per week
- **Hansen et al. (2022)** use aggregated data at the census tract or region level throughout the pandemic from March 2020 to September 2021 to study the effects of school reopenings on married women's labor supply
 - They find that school reopenings were associated with increased employment of working mothers by 3 percentage points and a small increase in weekly hours

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Understanding Coronavirus in America



- We use data from the USC **Understanding Coronavirus in America** tracking survey (<https://covid19pulse.usc.edu/>)
 - Rich data set tracking how households are coping with the current COVID-19 crisis March 2020-July 2021 +follow ups
 - Participants in this study are members of the Understanding America Study:
 - A probability-based household internet panel, comprising a nationally representative sample of approximately 9,000 US respondent
 - We focus the analysis on respondents between 18 and 65 years old, who reported being employed in March 2020 and being married or living together with their partners in the same household
 - 2,551 unique respondents
 - 20 waves of data from March 2020 to December 2020

Sample Statistics- Coupled Respondents, Employed in March



Table 1. Descriptive statistics

	<i>Mean</i>	<i>Standard Deviation</i>
<i>Female</i>	0.53	0.50
<i>Age</i>	46.20	10.55
<i>College</i>	0.55	0.50
<i>White</i>	0.73	0.45
<i>Black</i>	0.05	0.23
<i>Hispanic/Latino</i>	0.16	0.37
<i>Not Employed</i>	0.15	0.36
<i>K12 Kids</i>	0.43	0.50
<i>School not fully remote</i>	0.64	0.48
<i>In Person/ Hybrid schooling</i>	0.39	0.49

Covid-19 Restrictions and Incidence Rates

- Our models control for **COVID incidence rates**, measured as cases per capita at the state level, using data from The New York Times and U.S Census Bureau state population data
- **COVID Restrictions:** A measure of the intensity of COVID-19 related actions and mitigating restrictions implemented by states over time
 - Data from the Kaiser Family Foundation State COVID-19 Data and Policy Actions dataset
 - Mitigation measures: stay-at-home orders, non-essential business closures, bans on large gatherings, limitations placed on restaurant services, bar closures, and face covering requirements
 - Code each policy measure as not being implemented, being partially implemented, or being fully implemented as of the first day of a survey wave
 - Factor analysis to construct a single measure of restrictions intensity

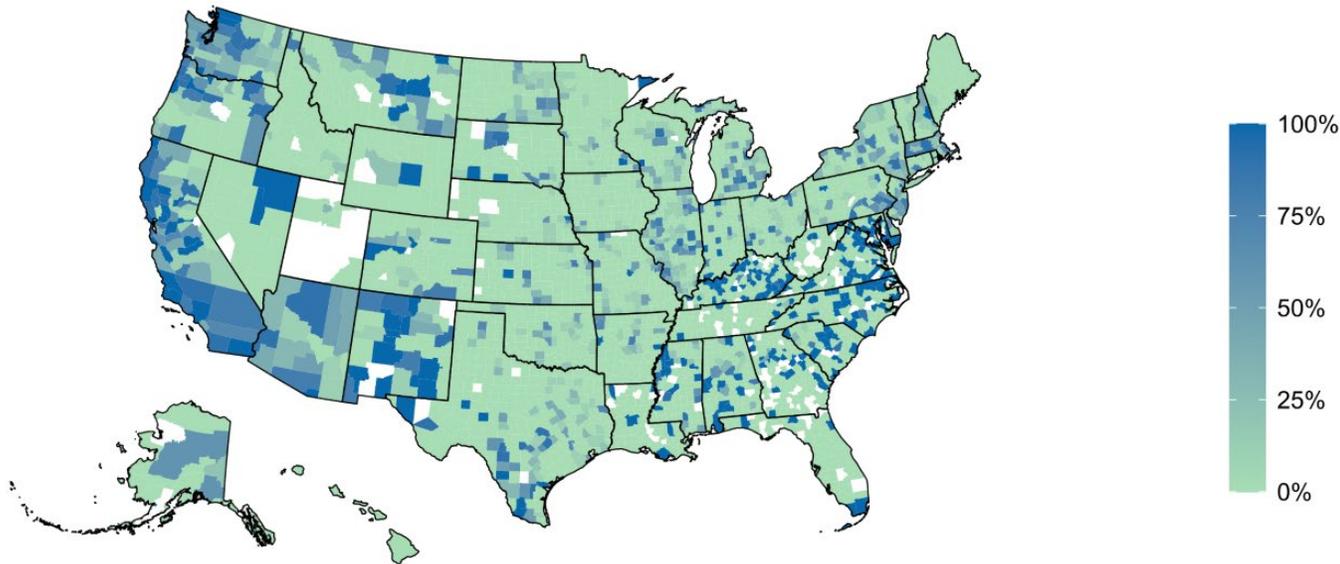
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School Re-openings in the Fall of 2020

- Discretionary school re-openings in Fall 2020 resulted in a combination of in-person, fully remote learning and hybrid models
- Most schools (81%) remained with their provided learning modes during the Fall (Gross, Opalka, and Gundapaneni , 2020). A second wave of re-openings occurred in February/March 2021

Remote Only Learning- By County, October 2020



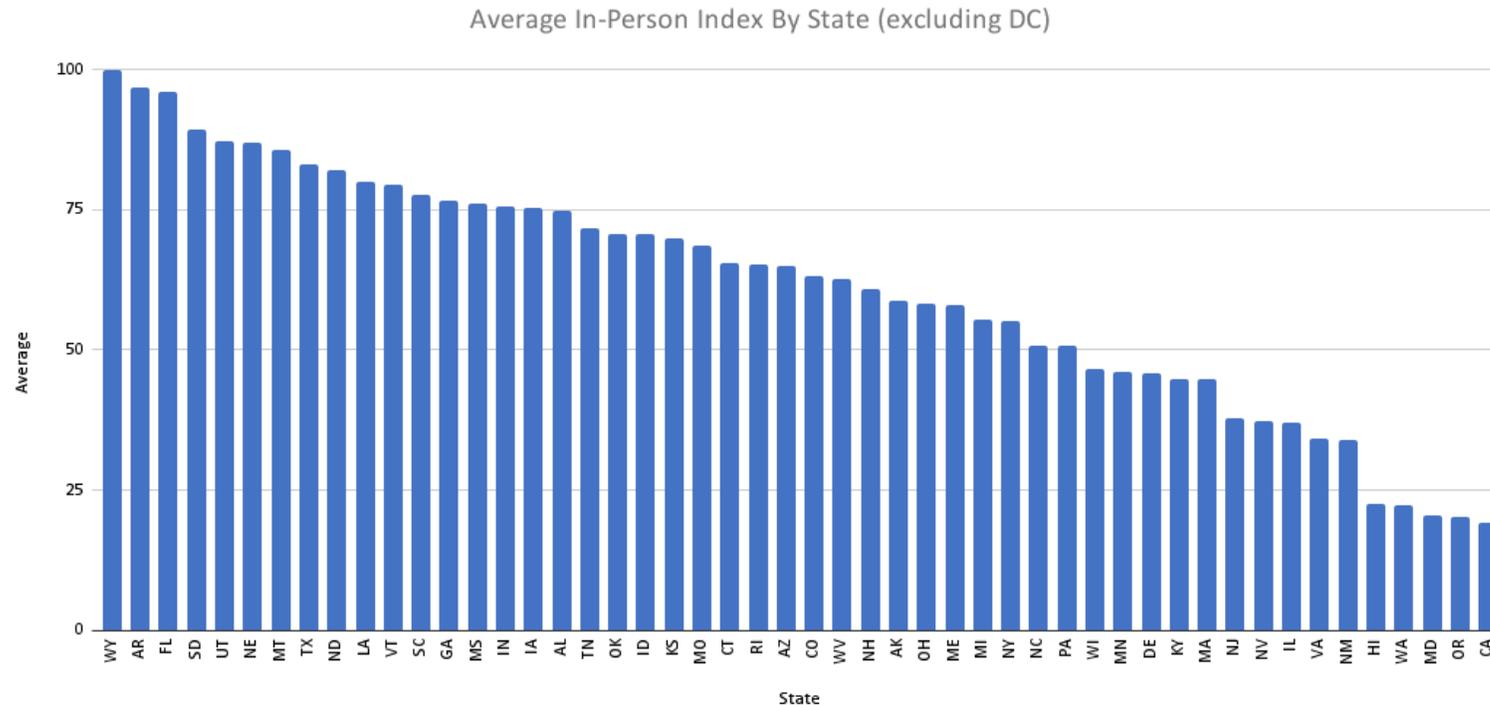
Source: MCH Strategic data

(<https://www.mchdata.com/covid19/schoolclosings>)

- We use school districts' information on instruction modalities during the Fall of 2020 from MCH strategic data
- We merge this data with the UAS sample at the census tract or county level
- We then create an indicator for the respondent living in a census tract/county whose public schools offered some in-person learning (fully in-person or hybrid)

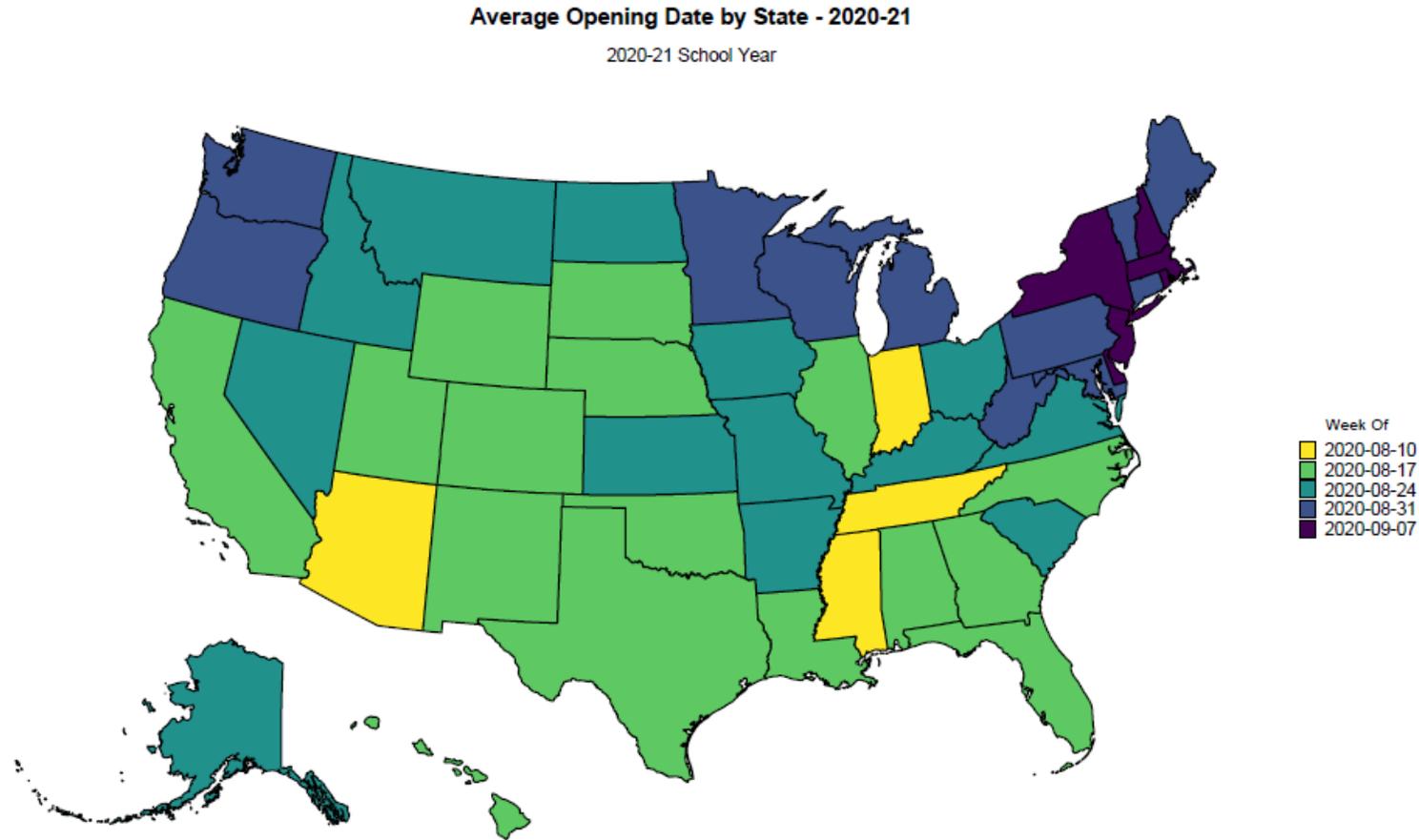
School Re-openings in the Fall of 2020

- School districts fully remote were more low-income, urban, and served more diverse populations (Belsha et al., 2020; Smith & Reeves, 2020)
- Local COVID-19 incidence rates appear to have had little impact on opening for in-person learning (Henderson et al., 2020)
 - Re-openings associated with political leanings (Harvey & Finger, 2020; Grossmann et al., 2021)



Source: Burbio data (<http://cai.burbio.com/school-opening-tracker/>)

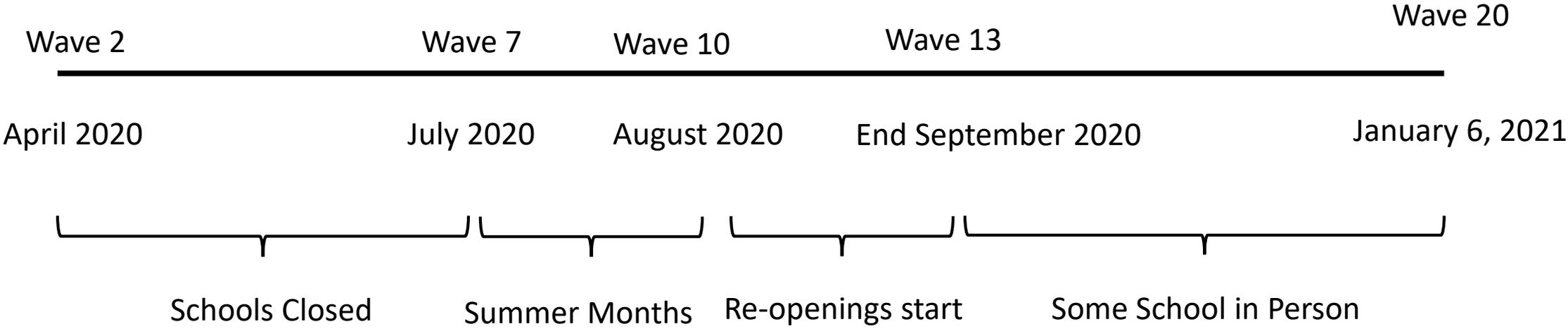
School Re-openings in the Fall of 2020- Timing



- Schools in the U.S start the academic year sometime between early August and early September
- Re-openings during three waves of data (Waves 10, 11, 12)
- 13% Wave 10, 77% Wave 11 and 9% Wave 12

Source: MCH Strategic data
(<https://www.mchdata.com/covid19/schoolclosings>)

School Re-openings in the Fall of 2020-Timeline

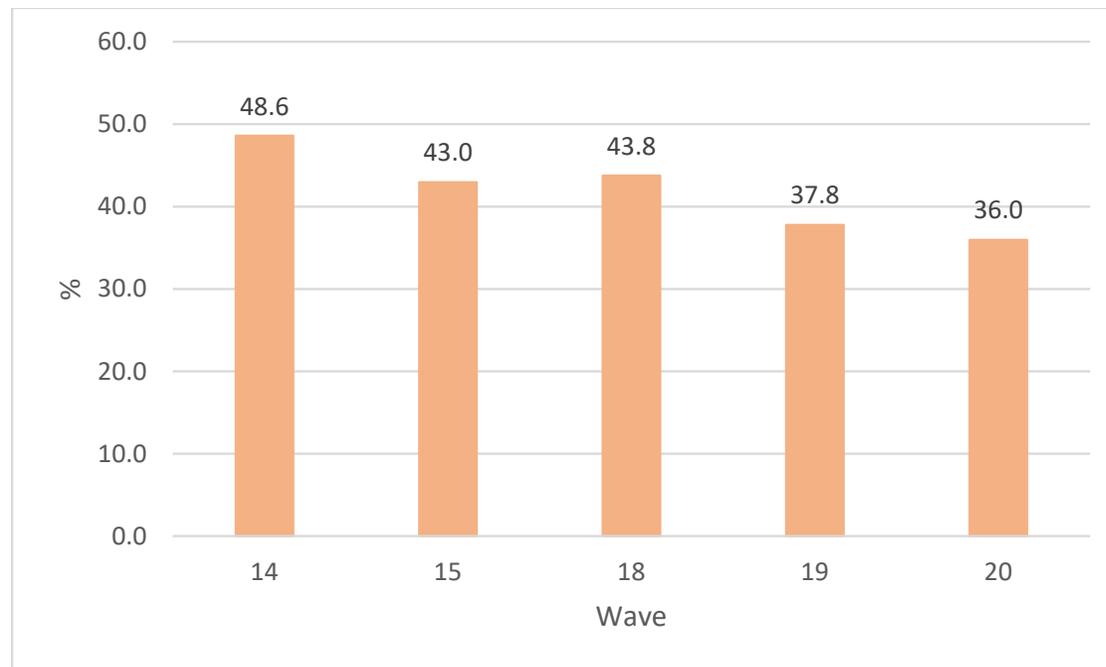


Treatment: Waves after average date of school reopening in the state if local public schools re-opened for some in-person learning (fully in-person or hybrid)

Learning Modality Choices- Fall 2020

- Childcare responsibilities continued to be high, as only about 50% of families at most sent their kids to school for some in-person education

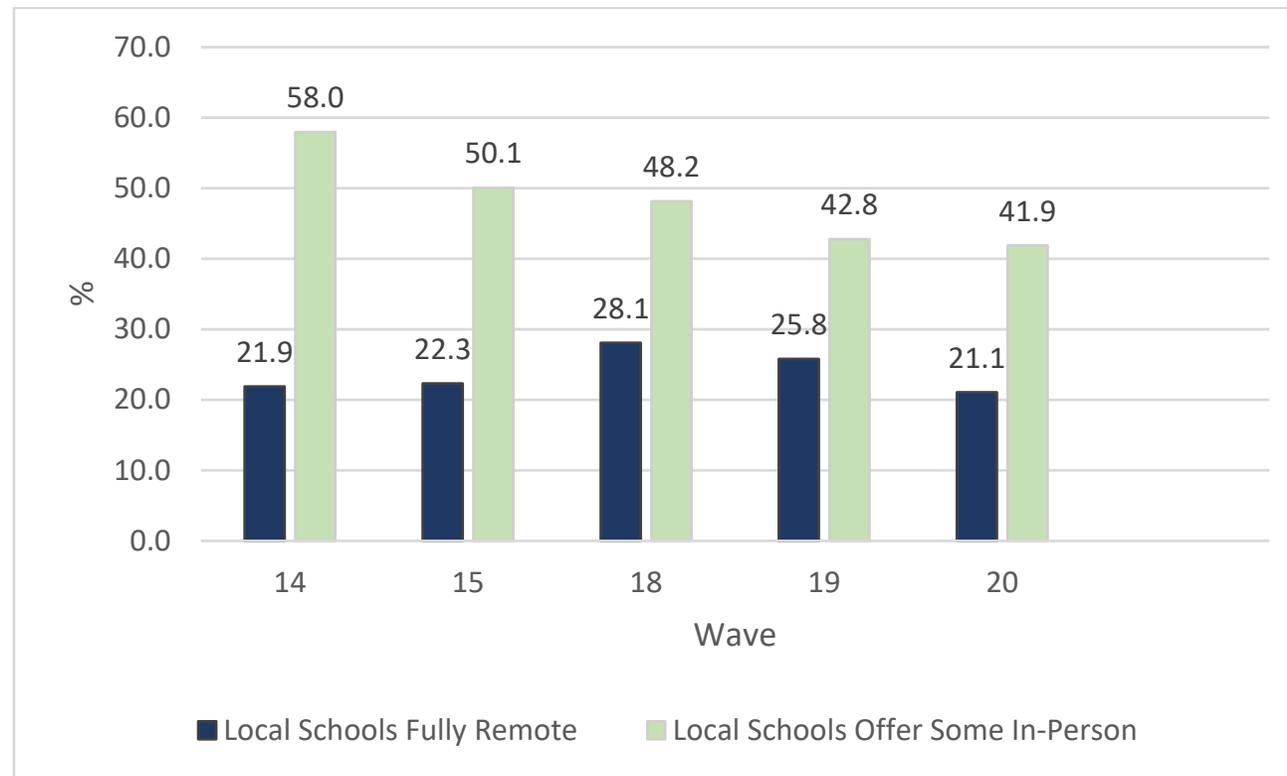
Figure 3. Percentage of Parents declaring their school-age child is attending school either fully in-person or in a hybrid option



Learning Modality Choices- Fall 2020

- Public school districts' offerings are a significant predictor of school learning modality attendance

Figure 6. Percentage of Parents declaring their school-age child is attending school either fully in-person or in a hybrid option, by local public schools re-opening status



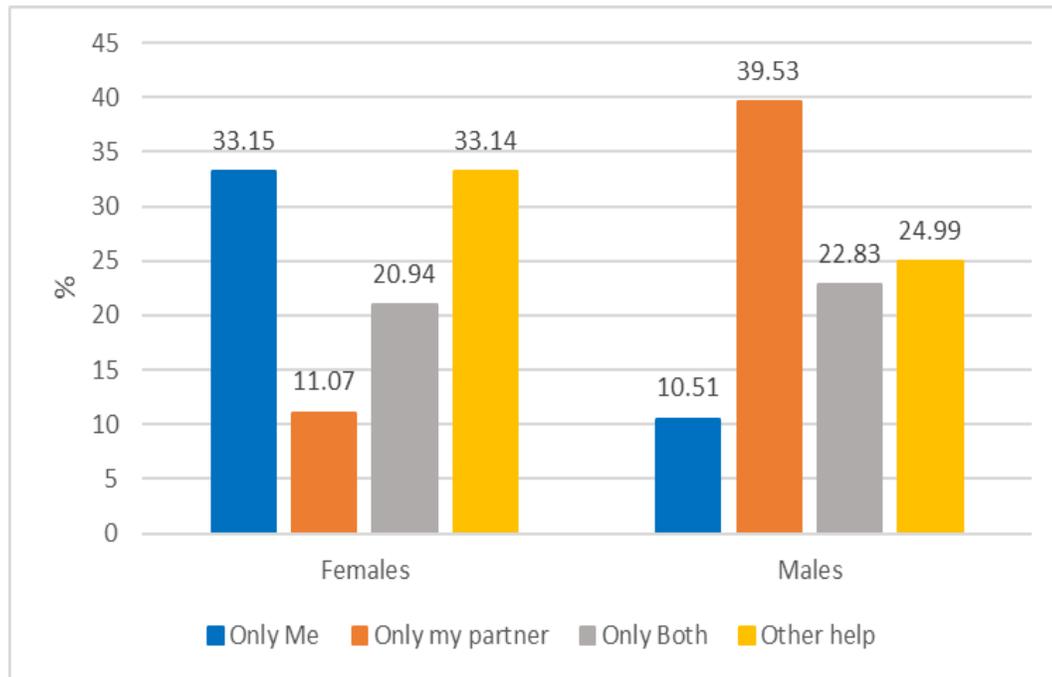
Gender Differences in Childcare Provision

- Respondents living with school-age children were asked in four waves (early April, April, early May, October) about childcare responsibilities within the household

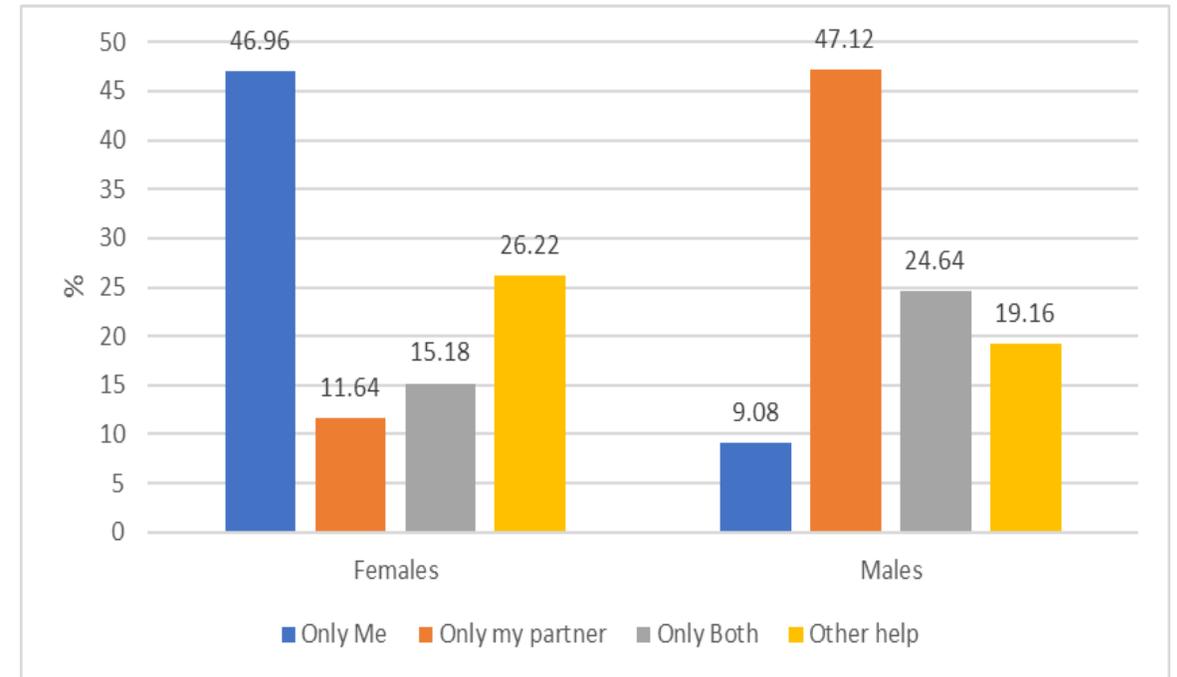
Who is Primary Responsible for Providing Childcare and Help with Homework?

Working Parents

April 2020



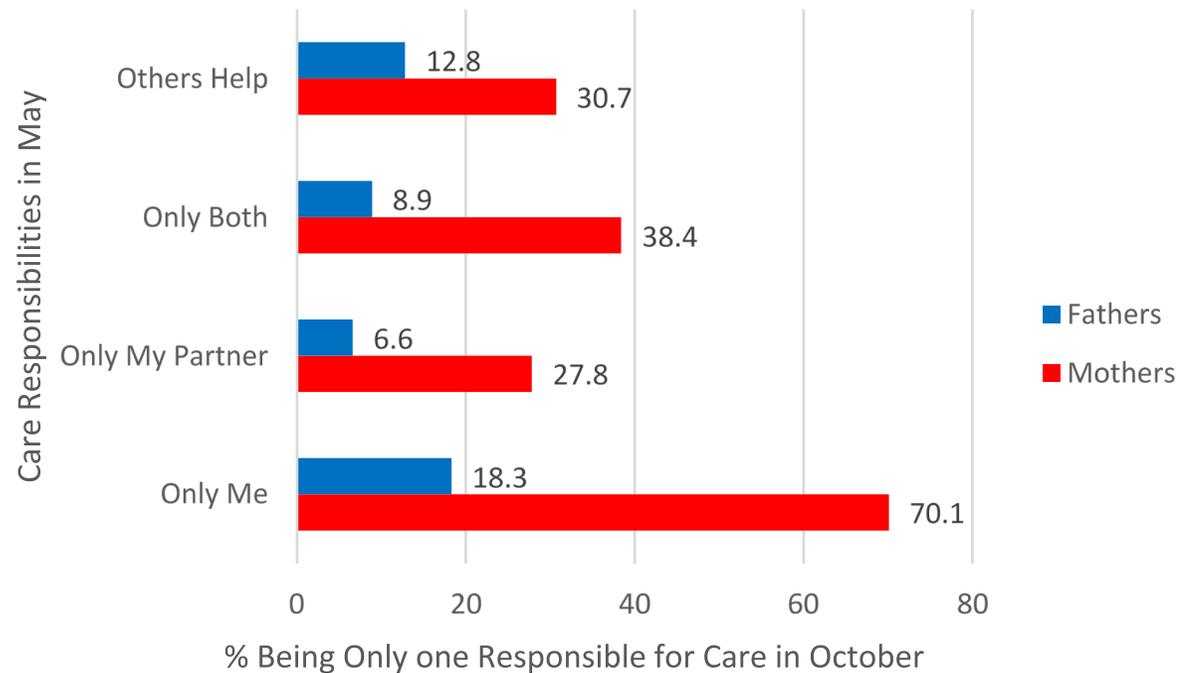
October 2020



Gender Differences in Childcare Provision-Fall 2020

Percentage of Parents with Differing Care Responsibilities in May 2020 Who Became Primarily Responsible for Care and Help with Schoolwork in October 2020

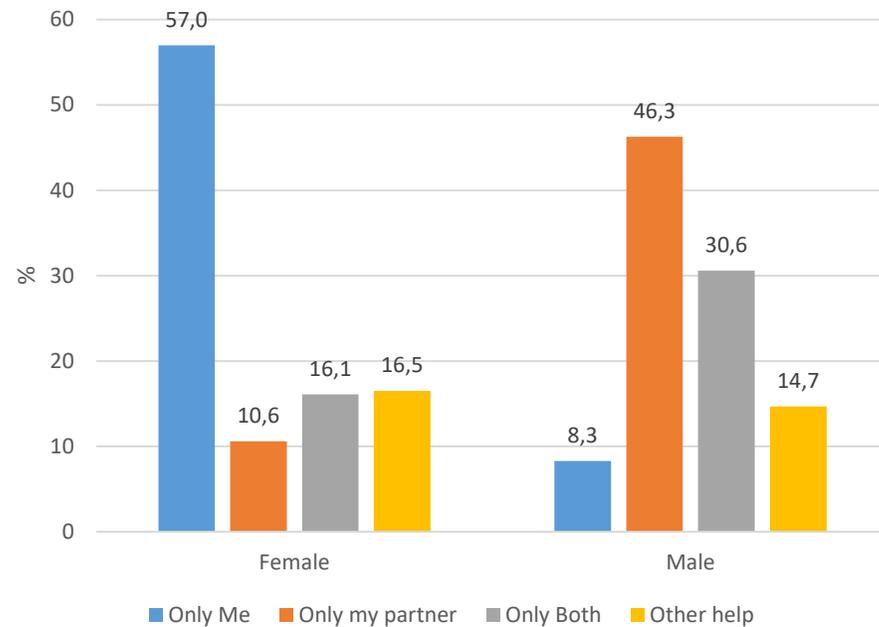
Self-reports of respondents living with a spouse or partner



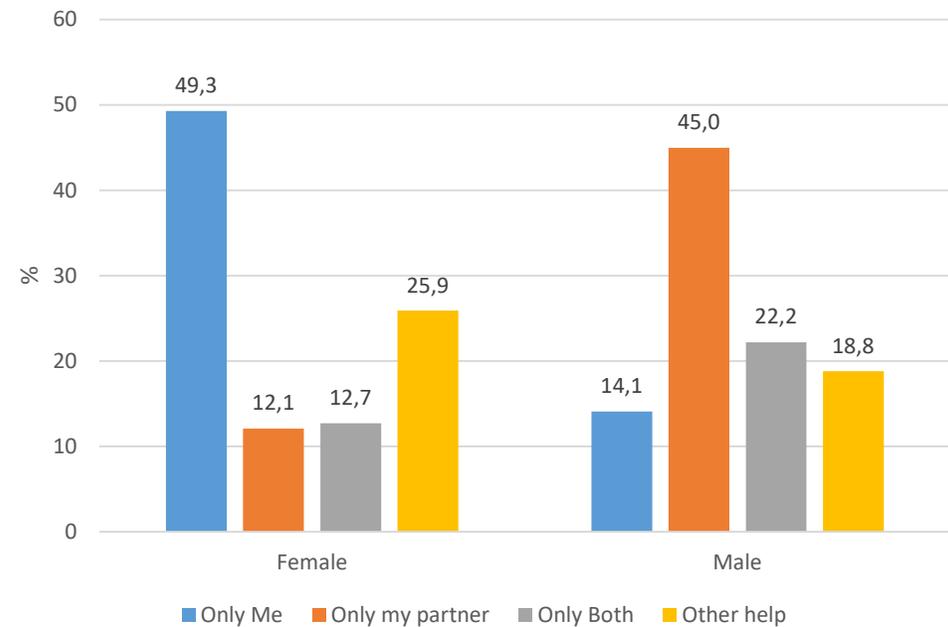
- The proportion of working mothers who are the sole providers of care to children increased to 47% as of October 2020, while the proportion of working fathers remained at 9%
- Moms were much more likely to remain the sole provider of care than dads, even while still working

Gender Differences in Childcare Provision-Fall 2020

Figure 3. Percentage of Parents within Each Category of Childcare Responsibilities in October 2020, by Children Learning Modality



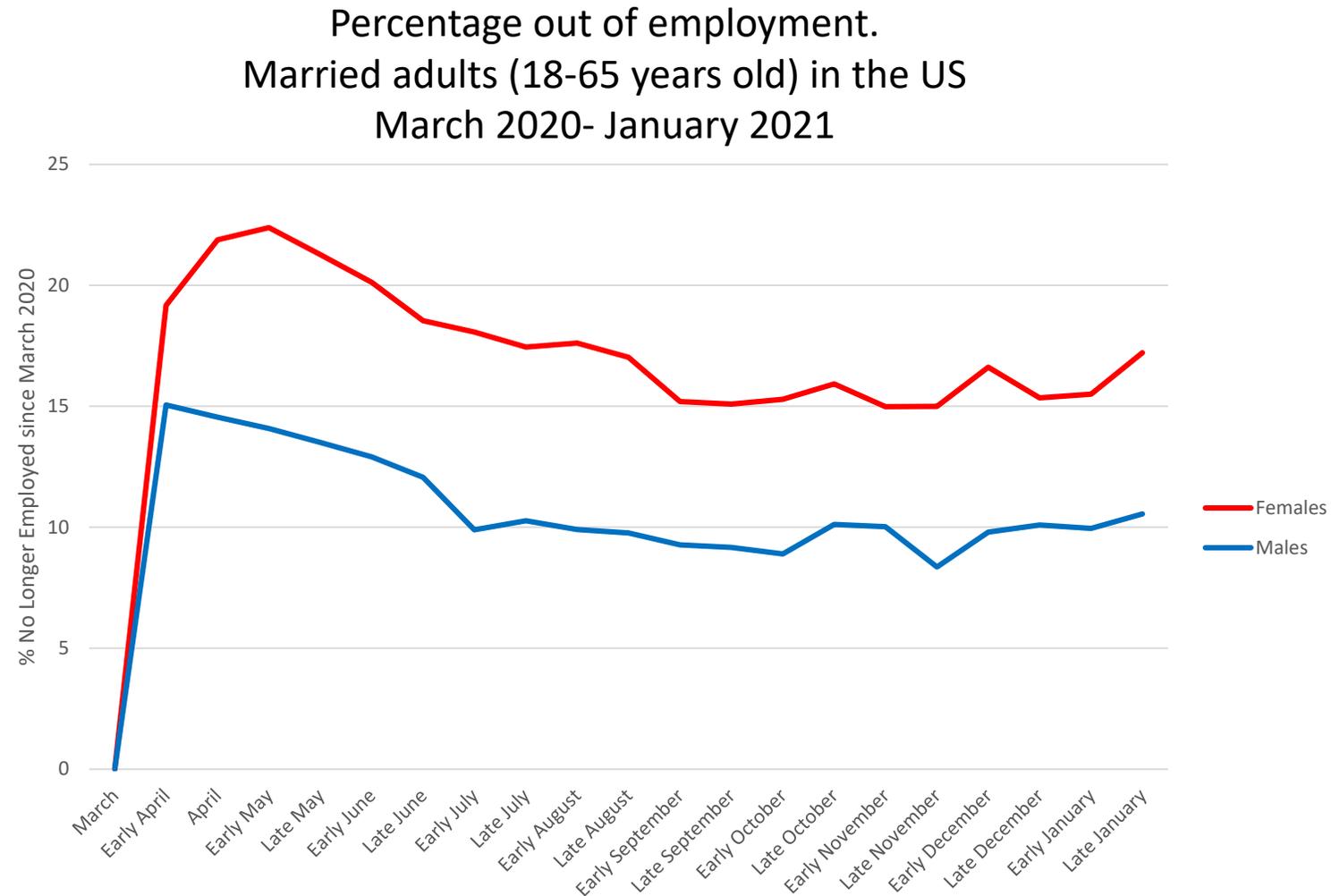
(a) In person or hybrid schooling



(b) Fully remote schooling

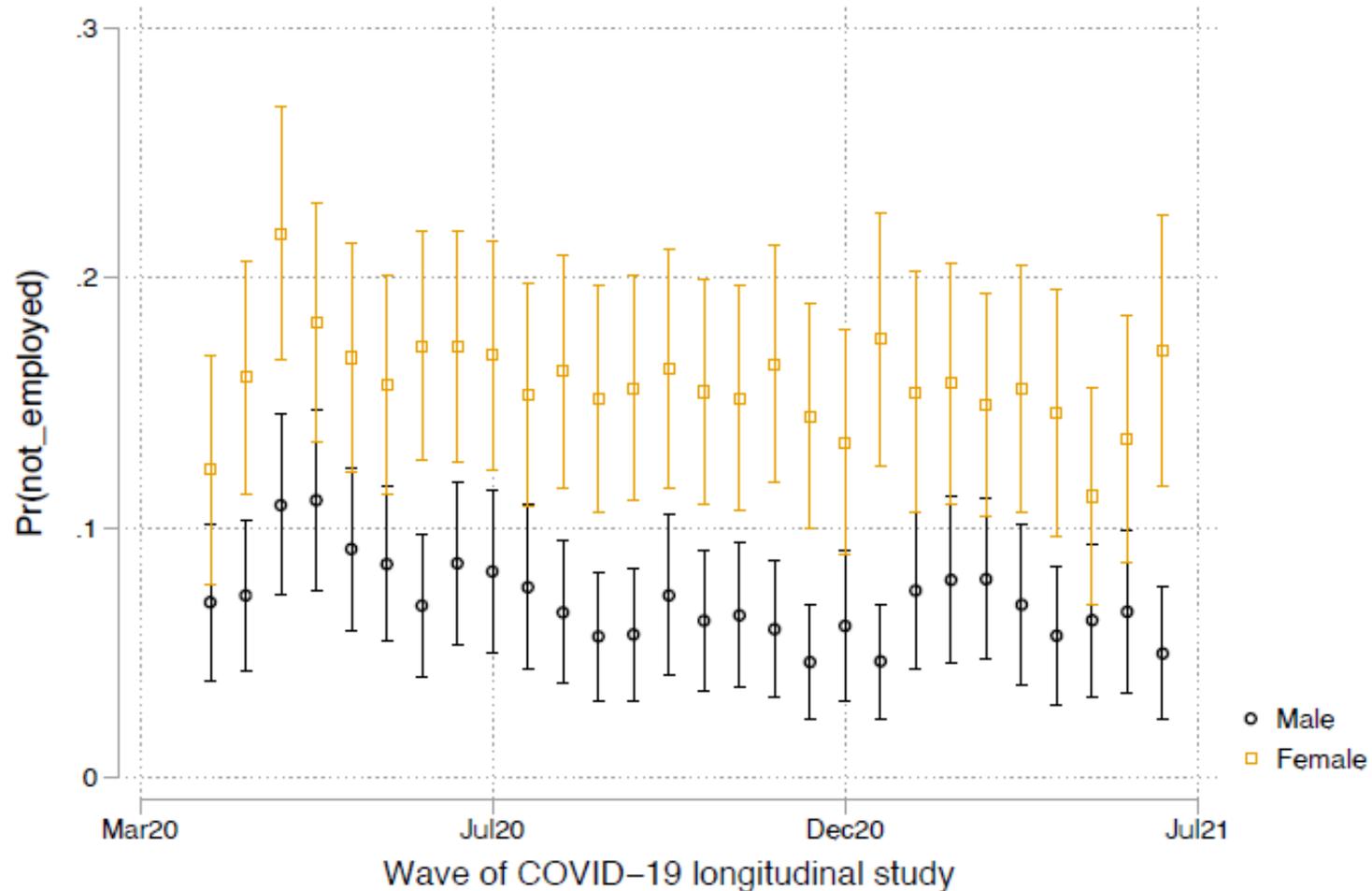
Gender Differences in Transitions Out of Employment

- Women lost jobs at a higher rate than men, and twice as many remained unemployed



Gender Differences in Transitions Out of Employment

- Among those employed in March 2020 married mothers were more likely to remain out of employment



Increases in Childcare Responsibilities and Labor Outcomes- Parents working in March 2020

$$\text{logit}(Y_{it}) = \alpha_i + \gamma_t + \beta_1 Y_{it-1} + \beta_2 X_{it} + \beta_3 \text{MoreChildCare}_{it} + \varepsilon_{it}$$

	<i>Out of employment</i>	<i>Remaining not employed after non-employment in April 2020</i>	<i>Reduced hours worked</i>
	(1)	(2)	(3)
MoreChildCare	0.016* (0.009)	0.014 (0.035)	0.014 (0.029)
Female	0.030*** (0.009)	0.073 (0.050)	0.063** (0.026)
Number of observations	2,079	455	1,746

Note: *** p<0.01, ** p<0.05, * p<0.1

This table reports the estimated marginal effects from the logit regressions in (1). Wave fixed effects not shown. Estimates for age, race and educational attainment not shown.

In Person Learning and Labor Outcomes- Parents FE estimates

$$Y_{it} = \alpha_i + \gamma_t + \beta_1 Incidence_{it} + \beta_2 Restrictions_{it} + \beta_3 InPerson \times AfterReopening_{it} + \varepsilon_{it}$$

VARIABLES	Out of Employment		Remaining out of Employment after Unemployment in April	
	(1)	(2)	(3)	(4)
School In Person/ Hybrid	0.000 (0.007)	0.013 (0.009)	-0.025 (0.022)	-0.060* (0.031)
School In Person/Hybrid* Female		-0.024** (0.011)		0.061 (0.039)
Constant	0.166*** (0.008)	0.166*** (0.008)	0.736*** (0.022)	0.736*** (0.022)
Observations	14,285	14,285	2,387	2,387
R- squared	0.013	0.013	0.169	0.170

Wave, COVID restrictions factor and incidence rates per capita are also included. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

In Person Learning and Labor Outcomes- Parents FE estimates

VARIABLES	<i>Hours Worked</i>		<i>Reduced Working Hours</i>	
	(1)	(2)	(3)	(4)
School In Person/ Hybrid	1.314*** (0.400)	0.124 (0.525)	-0.017** (0.008)	-0.010 (0.010)
School In Person/Hybrid* Female		2.264*** (0.645)		-0.013 (0.013)
Constant	35.272*** (0.474)	35.264*** (0.474)	0.239*** (0.009)	0.240*** (0.009)
Observations	12,209	12,209	12,215	12,215
R- squared	0.027	0.028	0.169	0.060

Wave, COVID restrictions factor and incidence rates per capita are also included. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

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Estimating the Effects of school re-openings on Employment outcomes

- We use a **Triple Difference (DDD)** approach with individual fixed effects to study the effect of school re-opening for in-person learning in the Fall of 2020 on employment outcomes:

$$Y_{it} = \alpha_i + \gamma_t + \beta_1 Incidence_{it} + \beta_2 SinPerson \times AfterReopening_{it} + \beta_3 Kids \times AfterReopening_{it} + \beta_4 Kids \times SinPerson \times AfterSummer_{it} + \beta_5 Restrictions_{it} + \varepsilon_{it}$$

- Y_{it} include employment outcomes of those employed in early March 2020:
 - Employment status
 - Employment recovery if not employed in April 2020
 - Working hours/ Reduction in working hours
- α_i : individual fixed effects; γ_t : Time (Survey Wave) dummies
- $SinPerson_i$: Dummy for the respondent's census tract or county public school districts offering some sort of in-person learning (i.e. fully in person or hybrid options)
- $AfterReopening_i$: dummy that takes value 1 after public schools started the academic year
- $Kids_i$: dummy indicating the presence of school-age children in the household

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School Re-openings, Transitions Out of Employment and Recovery from Unemployment- DDD FE Estimates

<i>VARIABLES</i>	<i>Out of Employment</i>		<i>Remaining out of Employment after Nor. Employment in April 2020</i>	
	(1)	(2)	(3)	(4)
School In Person x After Summer	0.005 (0.006)	0.017** (0.008)	0.034* (0.020)	0.121*** (0.026)
Kids x After Summer	0.002 (0.007)	0.035*** (0.010)	0.005 (0.024)	0.042 (0.036)
Kids x After Summer x School In Person	-0.005 (0.010)	-0.030** (0.014)	-0.016 (0.033)	-0.212*** (0.052)
School In Person x After Summer x Female		-0.022** (0.009)		-0.159*** (0.030)
Kids x After Summer x Female		-0.061*** (0.012)		-0.056 (0.041)
Kids x After Summer x School In Person x Female		0.045** (0.018)		0.321*** (0.063)
Constant	0.178*** (0.006)	0.178*** (0.006)	0.731*** (0.016)	0.731*** (0.016)
Number of observations	27,800	27,800	4,982	4,982
Robust R Square	0.010	0.012	0.154	0.161

Wave, COVID incidence rates and restrictions also included. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

School Re-openings, Transitions Out of Employment and Recovery from Unemployment- DDD FE Estimates

<i>VARIABLES</i>	<i>Hours Worked</i>		<i>Reduced Working Hours</i>	
	(5)	(6)	(7)	(8)
School In Person x After Summer	0.530 (0.387)	0.513 (0.492)	0.007 (0.008)	-0.001 (0.010)
Kids x After Summer	2.525*** (0.452)	2.427*** (0.579)	-0.010 (0.009)	0.009 (0.012)
Kids x After Summer x School In Person	-0.661 (0.606)	-1.272 (0.829)	0.004 (0.012)	0.005 (0.017)
School In Person x After Summer x Female		0.036 (0.543)		0.015 (0.011)
Kids x After Summer x Female		0.196 (0.710)		-0.038*** (0.014)
Kids x After Summer x School In Person x Female		1.182 (1.077)		-0.001 (0.022)
Constant	35.657*** (0.343)	35.649*** (0.343)	0.216*** (0.007)	0.216*** (0.007)
Number of observations	23,546	23,546	23,565	23,565
Robust R Square	0.019	0.019	0.054	0.054

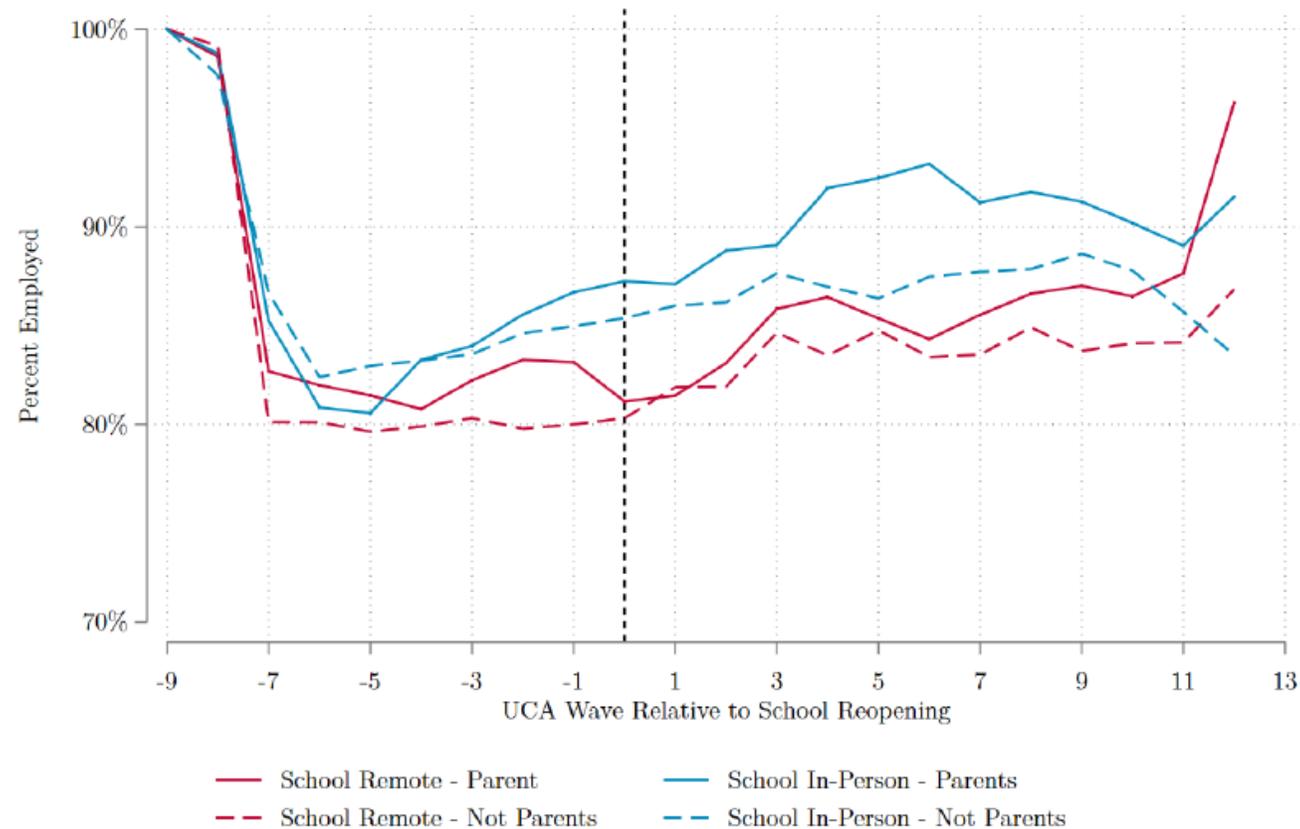
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Threats to Internal Validity and Robustness Checks

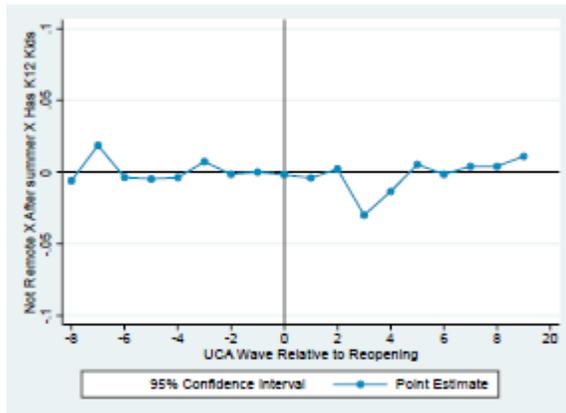
- **Other policies in place that correlate with school re-openings leading to violation of parallel trends**
 - DDD analysis should be less affected



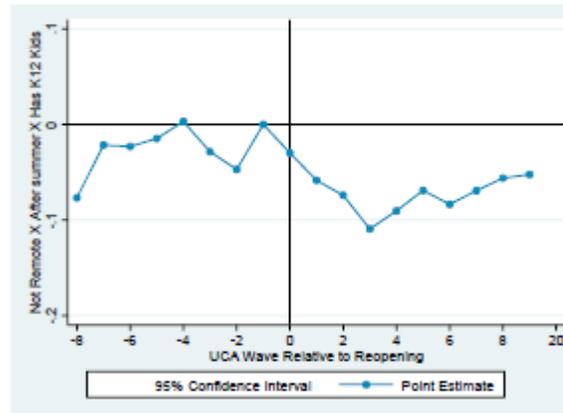
Threats to Internal Validity and Robustness Checks

- **Other policies in place that correlate with school re-openings**
 - DDD analysis should be less affected
 - Event-study analysis

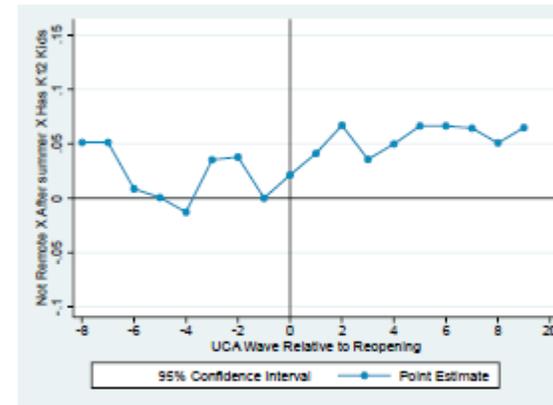
Figure 10. Event Study Regression Results using a Triple Differences Approach. Transitions out of Employment.



A. General



B. Men

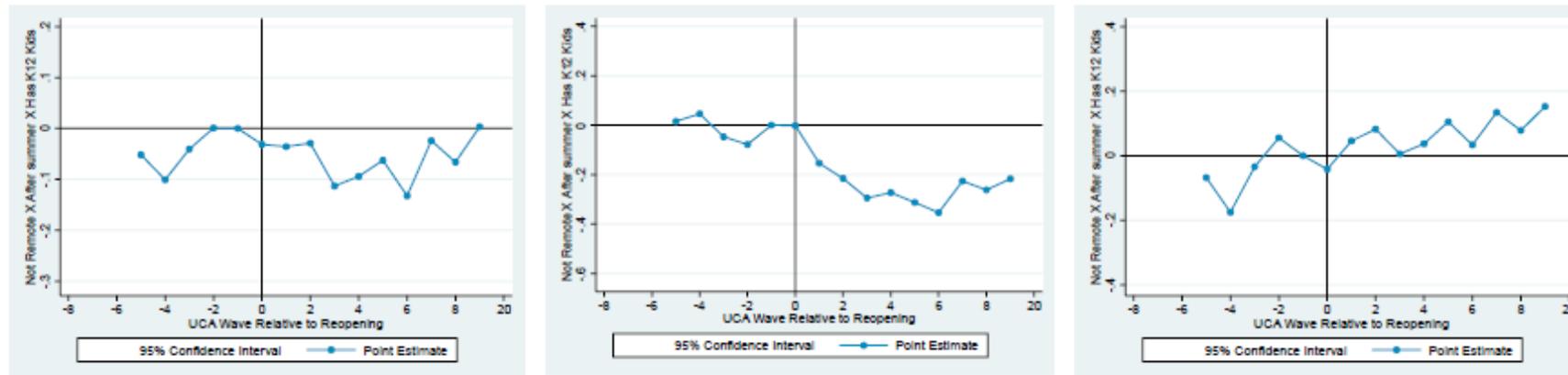


C. Women

Threats to Internal Validity and Robustness Checks

- **Other policies in place that correlate with school re-openings**
 - DDD analysis should be less affected
 - Event-study analysis

Figure 11. Event Study Regression Results using a Triple Differences Approach. Transitions out of Employment, Subsample Employed in March 2020 but Not Employed in April or May 2020.



A. General

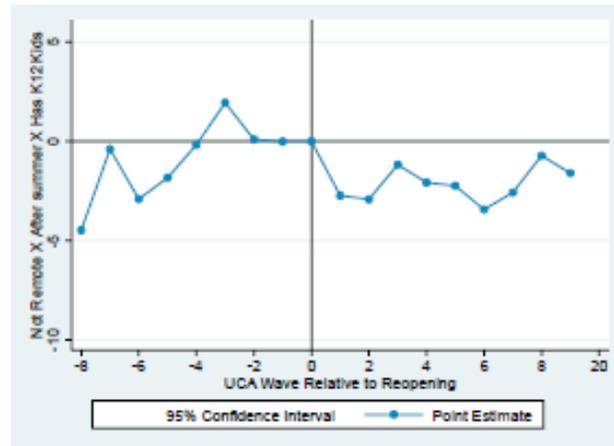
B. Men

C. Women

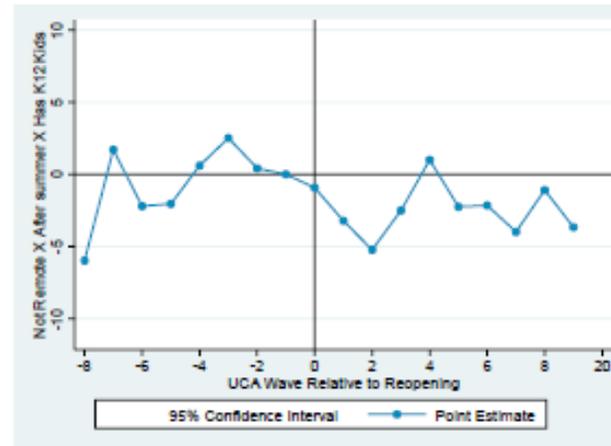
Threats to Internal Validity and Robustness Checks

- **Other policies in place that correlate with school re-openings**
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 - Event-study analysis

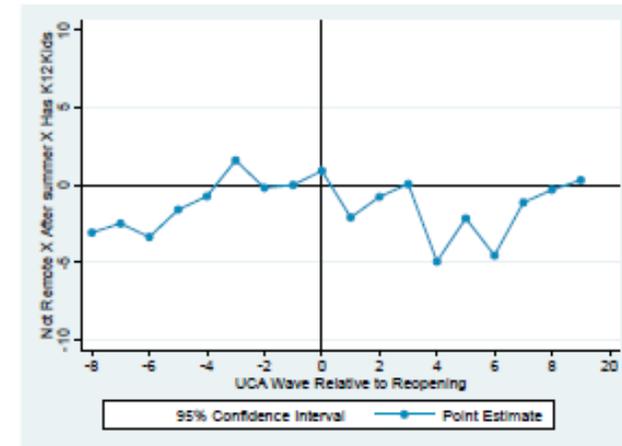
Figure 12. Event Study Regression Results using a Triple Differences Approach. Hours Worked.



A. General



B. Men



C. Women

Threats to Internal Validity and Robustness Checks

- **Other policies in place that correlate with school re-openings**
 - Event study analysis
 - DDD analysis should be less affected
 - Control for COVID-19 incidence rates and restrictions
- **Potential Endogeneity of school re-opening decisions**
 - We control for COVID incidence rates and restrictions
 - School re-openings not so much driven by COVID-19 cases
- **Anticipation effects**
 - Our results are robust to sensitivity tests considering removing July waves or removing July and re-opening waves

Threats to Internal Validity and Robustness Checks

- **Changes of re-opening plans over time**

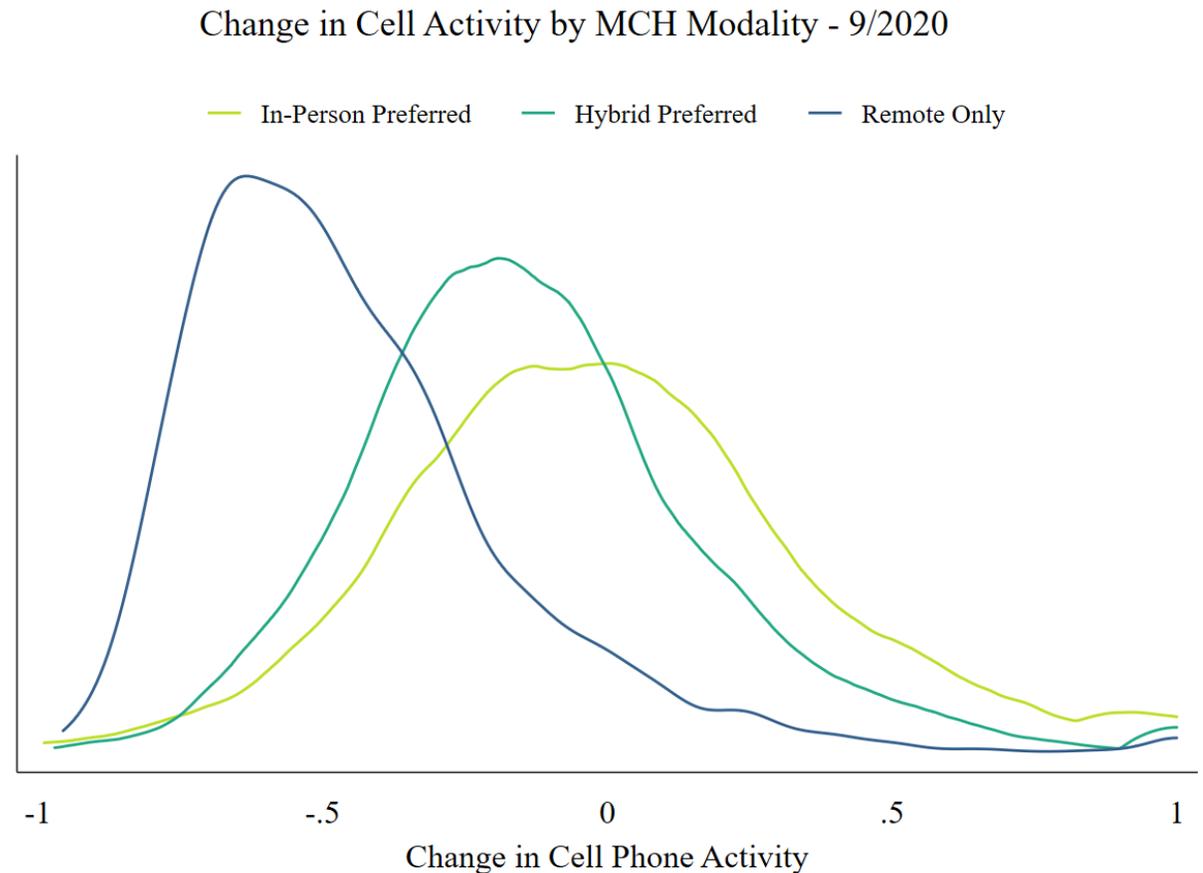
- Gross, Opalka, and Gundapaneni (2020) document that a majority of school districts (81%) remained with their offered learning model between early November and December 2020
- About 15% of school districts moved to more remote learning and only 3.6% moved to more in person

- **Imperfect take-up rates by parents**

- Public school districts' offerings are a significant predictor of school learning modality attendance (Camp & Zamarro, 2021)
- But only about 50% of parents declared their kids attended some in-person schooling in areas where local schools offered it
- School interruptions and quarantines
 - About 8% of school districts in our data declared they had to close for between 1 to 14 days during the Fall
- Our estimates can be interpreted as an **intent-to-treat effect**

Validation of Learning Options Exposure Data

- We use mobile phone data (Parolin & Lee, 2020) measuring in-person school attendance to validate districts' reported learning options through MCH data (<https://www.mchdata.com/covid19/schoolclosings>)
- Decline should be greatest for “remote” schools and least for in-person schools



Threats to Internal Validity and Robustness Checks

- **Definition of School Re-openings**

- Our results are robust to the use of mobile phone data by Parolin and Lee (2021) to define school close as at least 50% year-over-year decline in the number of in-person visits to school
 - But with cellphone data we do find an overall significant reduction in the probability of transitioning out of employment of about 3 percentage points and similar for mothers and fathers when using cell phone data
 - We plan to test the robustness of our results to newly developed measures of effective in-person learning (Kurmann & Lalé, 2021)

- **Definition of parents**

- Our results are less precise but also robust to an alternative definition of parents using additional information on household relationships from my household survey

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Conclusions

- Mothers have continued to carry a heavier load of childcare responsibilities than fathers during the pandemic
 - Mothers were more likely than fathers to increase childcare responsibilities in the second half of 2020 and this is weakly associated with increased transitions out of employment
 - Descriptively, sending kids for in-person learning is associated with better labor outcomes for mothers
- However, we do not find strong evidence of a significant effect of school re-openings on transitions out of employment
- But school re-openings in the Fall of 2020 appear to have helped fathers' labor participation

Conclusions

- It could be that our results derive from the uncertainty surrounding school reopenings in the Fall of 2020
 - Our estimates are measuring an intent-to-treat effect and only about 50% of parents sent their kids for in-person learning when available at their local schools
 - Uncertainty due to school closures and quarantines
- Overall, our estimates help illustrate how the lack of reliable childcare, through in-person school, makes it harder for mothers to remain employed
- The slow employment recovery can be concerning for the future career of mothers as there are wage penalties for career interruptions

THANK YOU!



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Attending online conferences at home during the COVID-19 pandemic