



A cross-sectional analysis of work schedule notice and depressive symptoms in the United States

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ABSTRACT

The implementation of last-minute work scheduling practices, including fluctuations in work hours, shift cancellations, and short notice, reflects a new norm in employment in the United States. This study aimed to investigate whether work schedule notice of ≤ 2 weeks was associated with high depressive symptoms. We used data from the 2019 cycle of the National Longitudinal Survey of Youth 1997 (N = 4963 adults aged 37–42 years). Using adjusted gender-stratified modified Poisson models, we tested the association between schedule notice (≤ 2 weeks, > 2 weeks, consistent scheduling) and high depressive symptoms. Presence of high depressive symptoms was assessed using the 7-item Center for Epidemiologic Studies Depression (CES-D) Short-Form scale and defined as CES-D-SF ≥ 8 . Respondents reporting > 2 weeks schedule notice (versus ≤ 2 weeks) were disproportionately non-Hispanic Black or Hispanic and resided in the South and/or in a rural area. High depressive symptoms were 39% more prevalent among women with schedule notice of ≤ 2 weeks compared to those with > 2 weeks notice (Prevalence Ratio [PR]: 1.39, 95% Confidence Interval (CI): 1.07, 1.80). We did not observe an association among men (PR: 1.06, 95% CI: 0.75, 1.50). Schedule notice of ≤ 2 weeks was associated with a greater burden of high depressive symptoms among US women. Policies to reduce precarious work scheduling practices should be further evaluated for their impacts on mental health.

1. Introduction

The United States (US) labor force has faced the continual erosion of high-quality employment over the last several decades (Kalleberg, 2009); stable and sufficient wages, schedule and job security, opportunities for advancement and essential benefits, such as retirement savings and health insurance, have become increasingly inaccessible to a growing proportion of US workers. The implementation of last-minute work scheduling practices, in particular, reflects a new norm in employment with two-thirds of retail and food service workers at the 120 largest employers reporting that they receive their schedules with less than two weeks notice, many of whom also report fluctuation in work hours week-to-week, experience shift cancellations at the last minute, and are expected to keep their schedules open to accommodate additional shifts on demand (Harknett & Schneider, 2019). Such

precarious scheduling practices may have consequences for the health of the American workforce.

Lack of advanced work schedule notice could negatively impact mental health. Unpredictable schedules leave people with less time to manage their non-working lives, reduced time spent with family, and a reduction in personal agency (Schneider & Harknett, 2019). Importantly, racism, sexism, classism, and other systems of oppression contribute to the inequitable distribution of opportunities and resources through society, including work and the employer-worker relationship (Fujishiro et al., 2022; Homan et al., 2021). In the context of work scheduling notice, occupational segregation may contribute to the overrepresentation of marginalized workers in occupations that are more likely to employ last-minute scheduling practices, such as food preparation and serving occupations (Boushey & Ansel, 2016). However, even within the same occupation, firm segregation and racial

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discordance between workers and managers can contribute to inequitable exposure to advanced work schedule notice (Storer et al., 2019). As such, disparities in access to advanced work scheduling practices may contribute to mental health inequities. Additionally, working women are potentially more susceptible to the negative impacts of precarious scheduling on mental health than men, since women are exposed to precarious scheduling practices at higher rates than men (Harknett & Schneider, 2019), are held to higher performance standards in the workplace (van Dijk et al., 2020), carry out a disproportionate share of childcare and housework (Del Boca et al., 2020), and are more likely to take on elder care within the family (Smith, 2004).

Laws requiring at least two weeks advance scheduling notice within certain industries have been implemented for the state of Oregon and individual cities in California, Illinois, New York, Pennsylvania, and Washington (Harknett et al., 2021; Hartman, 2022). Recent studies suggest that workers with advance notice of at least two weeks have better sleep quality, less psychological distress, and are less likely to experience acute economic hardship (Harknett et al., 2021; Schneider & Harknett, 2019). However, the association between advance schedule notice and depressive symptoms has not been examined in a nationally representative sample of the US population. This study aims to fill that gap by describing how work schedule notice is distributed by socio-demographic characteristics in a nationally representative sample and testing the association between work schedule notice and past-week prevalence of high depressive symptoms.

2. Methods

2.1. Data

We used data from the National Longitudinal Survey of Youth 1997 cohort (NLSY97), an ongoing nationally representative longitudinal study of US residents who were born between 1980 and 1984. The cohort was initially composed of 8984 individuals aged 12 to 17 sampled in 1997. Among this initial cohort, 6748 individuals constituted a cross-sectional sample of the general US population, and 2236 individuals were part of a designed oversample of Hispanic and Black Americans. All respondents were interviewed annually until 2011 and biennially thereafter, resulting in a total of 19 cycles conducted to date (NLS User Services & National Longitudinal Surveys, n.d.).

This study uses data from the 19th interview round collected in 2019–2020, when respondents were 37–42 years of age, which are prime working years ($N = 6947$). Analyses were restricted to 5562 individuals who were eligible to be asked about their work schedule notice ($N = 82$ members of the armed forces and $N = 564$ individuals not working at the time of the interview were excluded). The final analytic sample included 4963 respondents with complete data on all variables included in the analysis ($N = 599$ excluded for missing one or more key variables, Fig. 1).

2.2. Key variables of interest

2.2.1. Work schedule notice

Work schedule notice served as our primary exposure. Respondents were asked to choose how far in advance their employer informed them of their upcoming work schedule from the following response options: <3 days, 4–7 days, 1–2 weeks, >2 weeks, or “always works same schedule”. To align our exposure of interest with policies recently enacted in New York, NY, San Francisco, CA, Chicago, IL, and the state of Washington that stipulate employers provide employees with 14 days of advanced notice of their schedule (Hartman, 2022), we operationalized work schedule notice in three categories: “≤2 weeks”, “>2 weeks”, and “Consistent”.

2.2.2. High depressive symptoms

Depressive symptoms served as our primary outcome variable. We

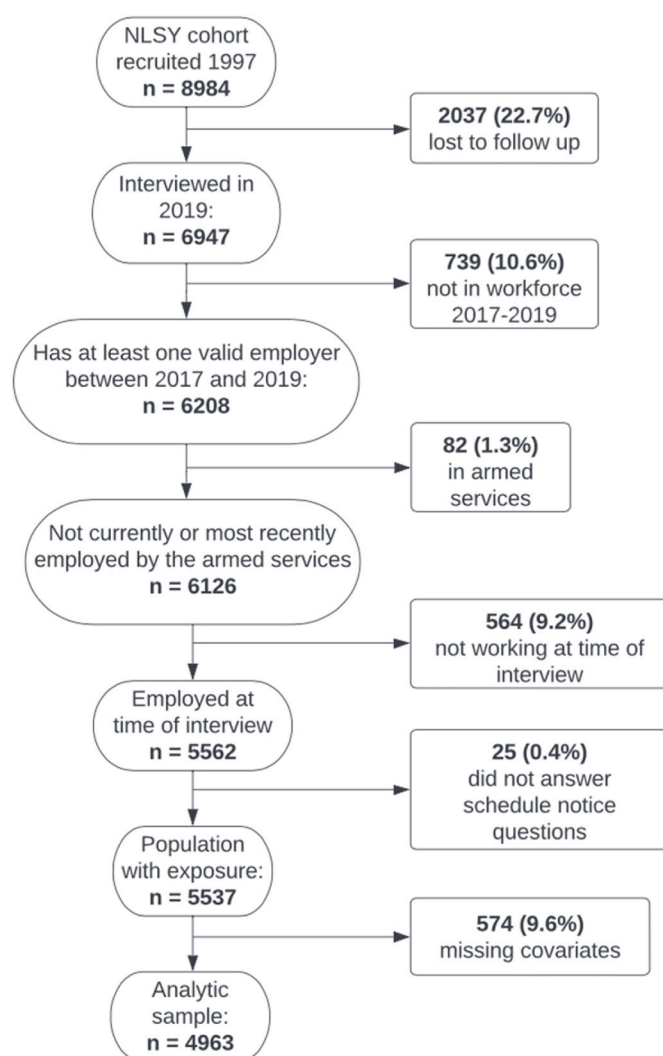


Fig. 1. Derivation of analytic sample^a

^a Counts and weighted proportions for respondents meeting each exclusion criteria from the final analytic sample. Those represented in Table 1 ($n = 5537$) were missing household composition ($n = 43$), instability ratio ($n = 49$), CES-D-F score ($n = 45$), parental education ($n = 341$), respondents' education ($n = 4$), urbanicity ($n = 114$), census region ($n = 55$), and/or race and ethnicity ($n = 14$).

assessed depressive symptoms using the 7-item Center for Epidemiologic Studies Depression Short-Form (CES-D-SF) scale, which has been validated against the larger 20-item CES-D scale developed to screen for clinically elevated depressive symptoms (Levine, 2013). Respondents were asked to rate their level of agreement from disagree to agree on a scale of 0–3 with the following statements: I did not feel like eating, my appetite was poor; I had trouble keeping my mind on what I was doing; I felt depressed; I felt that everything was an effort; My sleep was restless; I felt sad; I could not get “going”. Scores ranged from 0 to 21 with higher scores indicating higher levels of depressive symptoms. As in prior research using this instrument, we operationalized high depressive symptoms as a binary variable with a cut-off on the CES-D-SF of ≥ 8 in these analyses (Levine, 2013).

2.2.3. Effect measure modifiers

Women are exposed to precarious scheduling practices at higher rates than men (Harknett & Schneider, 2019); gender influences the distribution of opportunities and rewards in the workplace (van Dijk et al., 2020); and working women carry a disproportionate share of

childcare, elder care, and housework compared to working men (Del Boca et al., 2020; Smith, 2004). Therefore, we employed gender-stratified models as our primary specification (detailed in section 3.1). Additionally, we tested for effect modification by fluctuations in hours. While fluctuations in hours worked may also reflect desirable flexibility of hours for those with control over their schedules, fluctuation among those with less control over their hours has implications for income stability and consequently psychological well-being (Harknett & Schneider, 2019). Respondents who reported being currently employed at the time of the interview were asked the most and fewest number of hours per week they worked at their main job in the previous month. We quantified fluctuations in hours ratios as the difference between the most hours and fewest hours worked divided by the usual number of hours worked, as was done in previous studies (Lambert et al., 2014).

2.2.4. Confounders

A variable is a confounder if it is a common cause of both the exposure and outcome under investigation and is not on their causal pathway. Confounders were identified using a directed acyclic graph (Greenland et al., 1999), created to reflect our assumed causal model and included age in years, self-classified race and ethnicity (Hispanic, non-Hispanic [NH] White, non-Hispanic Black, or other race), region (North Central, Northeast, South, or West), 2010 US census standards of urbanicity (rural or urban), parental and respondent educational attainment (less than high school, high school or equivalent, some college, and four-year college degree or above), household composition (unmarried without kids, unmarried with kids, married without kids, married with kids), and pay rate (hourly and non-hourly, where non-hourly includes salaried, piecework, and all other non-hourly pay rates). In the present analysis, we do not purport that individual-level characteristics like one's race and gender cause the level of scheduling notice that one is exposed to, rather that these attributes represent proxies for systemic drivers (e.g., racist and sexist policies and practices) that shape the disproportionate allocation of opportunities throughout the life course.

2.2.5. Additional descriptive variables

Some variables presented in the descriptive analysis do not meet the definition of a confounder. The ratio of respondents' household income relative to the poverty line in 2019 and at recruitment in 1997, the prevalence of shift work, the occupation and industry of each respondent's main job, and the components of fluctuations in hours (the difference between most hours and fewest hours worked in a given week for the month prior to interview and the usual number of hours worked per week) were included in the descriptive analyses to provide additional context.

3. Calculation

3.1. Descriptive statistics

Descriptive statistics (unweighted counts and weighted proportions for categorical variables or weighted means and standard deviations for continuous variables) were presented overall and stratified by gender; these estimates were calculated using the primary sampling units, variance stratum at baseline, and year-specific cross-sectional sampling weights. We also evaluated missingness for each key variable by gender and exposure status among those eligible for exposure ascertainment.

We used gender-stratified modified Poisson models to examine the association between work schedule notice and high depressive symptoms. Model coefficients were interpreted as prevalence ratios (PR). All confounders above were included in our fully adjusted model. We subsequently evaluated additional effect measure modification by fluctuations in hours with a likelihood ratio test comparing the fully adjusted model with and without an interaction term for the potential modifier at the 0.10 level of significance. Effect measure modification was evaluated

both for the continuous fluctuations in hours ratio and using the categorization scheme used in previous studies (Lambert et al., 2014).

3.2. Sensitivity analyses

Because the optimal cutoff for high depressive symptoms is not established in the NLSY97 cohort and is known to vary based on age and other aspects of cohort composition, we tested the robustness of our results when using the continuous CES-D-SF score as the outcome in covariate-adjusted negative binomial models.

Analyses were conducted in R version 4.0.2. The University of Illinois Chicago institutional review board determined this secondary data analysis to be non-human subjects research.

4. Results

4.1. Descriptive

Overall, when compared with respondents who reported receiving >2 weeks notice, respondents with ≤2 weeks of scheduling notice disproportionately had parents with lower educational attainment, had lower educational attainment themselves, were unmarried (with and without children), and were people of color (Table 1). Among women, fewer respondents reporting ≤2 weeks notice were married with children (36.3% vs. 50.5% with >2 weeks) or had a college degree (34.2% vs. 52.0% with >2 weeks). They more often resided in the South (46.0% vs. 36.4% with >2 weeks) and reported being either Hispanic (14.8% vs. 9.8% with >2 weeks) or NH-Black (18.5% vs. 13.3% with >2 weeks). Similar trends were observed among men. Men with ≤2 weeks notice less often reported being married with children (36.7% vs. 49.9% with >2 weeks) or held a college degree (22.5% vs. 44.5% with >2 weeks). More male respondents reporting ≤2 weeks notice reported being either Hispanic (15.2% vs. 12.0% with >2 weeks) or NH-Black (17.1% vs. 10.5%) and had an hourly (versus non-hourly) payrate (53.1% vs. 40.3% with >2 weeks). Among women, the prevalence of high depressive symptoms was 10.5%, compared to 6.3% for men.

Among those eligible for exposure ascertainment, 599 (10.7% unweighted) of respondents were missing information for at least one key study variable and were excluded from the analytic sample. Those excluded were more often of a race other than NH-White, received a non-hourly pay rate, and had lower levels of educational attainment (Supplemental Table 1).

Some proportion of respondents reported being given ≤2 weeks of work schedule notice across all occupations and industries. However, occupational segregation by gender, race, and ethnicity, as well as differential distribution of exposure status by occupation and industry, are evident in the study population (Table 2). For instance, a greater number of women worked in the health, education, and social services sector than men. Further, respondents working in the entertainment, accommodations, and food services industry more often reported ≤2 weeks schedule notice than >2 weeks or consistent schedule notice (Table 2); a greater proportion of NH-Black women as well as Hispanic men and women reported working in these occupations and industries (Supplemental Table 2).

4.2. Association between schedule notice and depressive symptoms

The prevalence of high depressive symptoms was 39% higher among women reporting ≤2 weeks notice compared to those with >2 weeks notice, after adjusting for measured confounders (PR: 1.39, 95% CI: 1.07, 1.80; Table 3). Among men, we did not observe an association between work schedule notice and high depressive symptoms (PR: 1.06, 95% CI: 0.75, 1.50). The association between work schedule notice and depressive symptoms was not significantly modified by the hour instability ratio (p for women = 0.51, p for men = 0.21). As such, results in Table 3 are presented without stratification by hour instability, but

Table 1
Characteristics of young adults working for pay in the US stratified by gender and work schedule notice, 2019^a.

	Total (n = 5537)	Women (n = 2718)			Men (n = 2819)		
		≤2 weeks (n = 697)	>2 weeks (n = 1408)	Consistent (n = 613)	≤2 weeks (n = 1021)	>2 weeks (n = 1222)	Consistent (n = 576)
Respondent's Education							
≥ Four year college degree	2001 (40.2%)	34.2%	52.0%	48.0%	22.5%	44.5%	30.8%
Some College	732 (13.1%)	14.1%	15.4%	13.1%	11.0%	10.5%	16.3%
High School or Equivalent	2472 (41.8%)	43.2%	30.4%	34.8%	57.7%	41.1%	48.7%
Less than High School	328 (4.8%)	8.3%	2.2%	4.1%	8.8%	3.7%	4.2%
Missing	4 (0.1%)	0.3%	NA	NA	NA	0.2%	NA
Parental Education							
≥ Four year college degree	1510 (32.4%)	25.4%	35.4%	24.9%	28.3%	40.3%	28.8%
Some College	619 (11.4%)	12.0%	12.1%	14.5%	8.2%	11.4%	11.7%
High School or Equivalent	2494 (43.2%)	45.7%	43.3%	45.8%	45.7%	38.1%	45.2%
Less than High School	573 (7.3%)	10.5%	4.8%	9.0%	11.5%	4.8%	7.2%
Missing	341 (5.6%)	6.4%	4.4%	5.8%	6.3%	5.4%	7.2%
Household Composition							
Unmarried without children	1392 (24.4%)	20.9%	17.0%	16.6%	36.2%	24.4%	33.3%
Unmarried with children	1429 (22.1%)	34.9%	23.9%	34.8%	17.9%	13.6%	19.0%
Married without children	461 (9.1%)	7.4%	8.1%	9.2%	8.4%	11.4%	9.1%
Married with Children	2212 (43.8%)	36.3%	50.5%	39.1%	36.7%	49.9%	38.2%
Missing	43 (0.6%)	0.6%	0.6%	0.3%	0.8%	0.8%	0.4%
Pay Rate							
Hourly	2733 (47.0%)	50.4%	45.5%	48.7%	53.1%	40.3%	49.7%
Non-hourly	2804 (53.1%)	49.6%	54.5%	51.3%	46.9%	59.7%	50.3%
Urbanicity							
Rural	1016 (21.2%)	22.2%	21.8%	19.5%	24.6%	19.4%	18.9%
Urban	4407 (76.7%)	74.7%	76.1%	78.4%	73.9%	78.2%	80.1%
Missing	114 (2.1%)	3.1%	2.1%	2.1%	1.5%	2.4%	1.0%
Census Region							
Northeast	838 (16.2%)	14.23%	14.8%	16.1%	16.3%	16.7%	20.3%
South	2264 (37.3%)	46.0%	36.4%	38.4%	40.1%	34.1%	32.0%
West	1235 (21.7%)	18.8%	22.1%	20.9%	20.9%	25.0%	17.9%
North Central	1145 (23.8%)	19.0%	25.5%	23.9%	22.1%	22.8%	29.6%
Missing	55 (1.1%)	2.0%	1.2%	0.7%	0.6%	1.3%	0.2%
Race and Ethnicity							
NH-Black	1432 (14.5%)	18.5%	13.3%	17.5%	17.1%	10.5%	14.8%
Hispanic	1175 (12.9%)	14.8%	9.8%	14.4%	15.2%	12.0%	15.4%
NH-White	2733 (67.6%)	61.4%	71.5%	63.6%	62.6%	72.6%	66.0%
NH-Other	183 (4.6%)	5.3%	5.0%	3.8%	5.1%	4.1%	3.9%
Missing	14 (0.3%)	NA	0.4%	0.7%	NA	0.7%	NA
Work hours instability ratio							
>0.25	2612 (48.4%)	61.1%	42.1%	31.2%	66.0%	48.1%	37.4%
0	1297 (21.7%)	15.6%	26.3%	34.4%	12.2%	19.1%	27.0%
0–0.25	1579 (29.1%)	22.3%	30.6%	33.9%	20.6%	32.3%	35.4%
Missing	49 (0.8%)	1.0%	1.0%	0.6%	1.3%	0.5%	0.2%
Usual hours per week	39.6 (0.2)	34.6 (0.7)	37.2 (0.4)	38.7 (0.5)	41.5 (0.5)	42.0 (0.4)	42.3 (0.4)
Difference in hours per week	13.7 (0.2)	15.3 (0.6)	10.8 (0.4)	8.8 (0.5)	19.3 (0.6)	14.7 (0.5)	11.9 (0.7)
Shift Type							
Regular day shift	3264 (59.4%)	41.5%	63.9%	75.8%	45.7%	62.3%	68.7%
Regular night shift	219 (3.5%)	2.0%	3.1%	2.5%	4.4%	3.8%	5.0%
Regular evening shift	191 (3.2%)	3.8%	3.1%	2%	3.1%	2.9%	5.0%
Irregular schedule or hours	73 (1.3%)	1.3%	1.5%	1.6%	1.4%	1.3%	0.6%
Changes regularly from days to evenings or nights	613 (11.4%)	17.5%	11.8%	4.6%	15.5%	10.5%	5.2%
Split shift	152 (2.5%)	2.4%	1.6%	0.4%	3.1%	3.5%	2.9%
Missing	1025 (18.7%)	31.4%	15.0%	13.1%	26.8%	15.7%	12.5%
Ratio HHI 2019 to PL	4.9 (0.1)	3.9 (0.2)	5.2 (0.2)	4.1 (0.2)	4.8 (0.2)	5. (0.1)	4.7 (0.2)
Ratio HHI 1997 to PL	3.3 (0.1)	2.7 (0.1)	3.5 (0.1)	3.1 (0.1)	3.0 (0.1)	3.6 (0.1)	3.2 (0.2)

Abbreviations: HHI, household income; NA, not applicable, NH, non-Hispanic, PL, poverty line.

^a Percentages are weighted proportions in each group; continuous variables represented with weighted means and standard errors.

stratified estimates are available in the appendix ([Supplemental Table 3](#)). Inferences were robust to the alternative specification of CES-D-SF as a continuous score, with greater scores observed for women with ≤2 weeks notice (predicted score: 3.17; 95% CI: 2.61, 3.85) compared to women with >2 weeks notice (predicted score: 2.72; 95% CI: 2.28, 3.24; [Supplemental Table 4](#)).

5. Discussion

This study examined the association between work schedule notice and depressive symptoms among a nationally representative sample of

US workers. Women who received ≤2 weeks of schedule notice reported more depressive symptoms than women with greater notice; this association was not observed for men. Exposure to short schedule notice was not equitably distributed. Hispanic and NH-Black respondents, those with low educational attainment, hourly workers, and those with more fluctuations in hours were all more likely to report schedule notice of ≤2 weeks than notice of >2 weeks. This study provides further evidence that groups which have been historically marginalized and oppressed are disproportionately exposed to scheduling precarity, and that addressing scheduling precarity may be an important target for mitigating mental health inequities.

Table 2
Occupation and Industry for respondents' main employment at the time of interview by gender and degree of work schedule notice^a.

	Total (n = 5537)	Women			Men		
		≤2 weeks	>2 weeks	Consistent	≤2 weeks	>2 weeks	Consistent
		(n = 697)	(n = 1408)	(n = 613)	(n = 1021)	(n = 1222)	(n = 576)
Occupation							
Cleaning and Building Services	2.4%	4.6%	1.8%	2.5%	3.7%	1.5%	1.6%
Construction and Extraction	5.4%	0.6%	0.2%	0.3%	17.3%	5.0%	8.5%
Community and Social Services	2.2%	2.7%	3.2%	4.6%	0.5%	1.4%	1.4%
Education and Library	0.9%	1.5%	1.8%	1.6%	0.1%	0.4%	NA
Engineering Technicians	0.4%	0.8%	NA	NA	0.8%	0.7%	0.4%
Engineers, Architects, and Surveyors	0.9%	NA	0.3%	0.2%	1.4%	2.0%	0.6%
Entertainers, Performers, and Sports	1.5%	2.0%	1.7%	1.6%	1.0%	1.3%	1.5%
Entertainment Attendants	0.5%	0.9%	0.7%	NA	0.5%	0.4%	0.2%
Executive, Administrative and Managerial	12.7%	9.5%	13.2%	10.1%	10.0%	17.3%	11.1%
Farming, Fishing, and Forestry	0.4%	0.6%	NA	NA	0.7%	0.4%	0.6%
Food Preparation	0.2%	0.6%	NA	0.3%	0.2%	0.4%	0.3%
Food Preparations and Serving	4.2%	8.2%	3.5%	2.7%	6.0%	3.2%	2.4%
Health Care Support	3.9%	6.4%	7.2%	6.7%	1.4%	1.3%	0.5%
Health Diagnosis and Treating Practitioners	4.1%	3.4%	9.3%	5.6%	0.3%	2.4%	1.4%
Installation, Maintenance and Repair	4.4%	0.2%	0.1%	0.4%	7.2%	7.5%	10.9%
Legal	1.2%	1.9%	1.2%	1.5%	0.6%	1.2%	0.9%
Life, Physical, and Social Science	0.1%	NA	NA	NA	0.0%	0.2%	0.1%
Management	5.5%	4.3%	6.8%	8.7%	3.2%	4.3%	6.7%
Mathematical and Computer Sciences	3.3%	1.2%	1.5%	1.4%	2.7%	6.2%	5.6%
Media and Communication	1.1%	2.1%	1.5%	1.0%	0.8%	1.0%	0.4%
Office and Administrative Support	12.0%	12.2%	17.5%	22.0%	5.4%	8.9%	7.3%
Personal Care and Service	2.9%	6.4%	4.9%	4.4%	0.9%	0.9%	1.2%
Physical Scientists	0.4%	NA	NA	NA	0.2%	0.6%	0.6%
Production and Operating	1.4%	0.7%	0.5%	1.1%	2.4%	1.3%	3.0%
Protective Services	2.4%	0.9%	1.0%	1.3%	2.6%	4.4%	3.6%
Sales and Related	8.0%	11.7%	7.0%	4.9%	7.5%	9.1%	7.6%
Setter, Operators, and Tenders	3.5%	3.5%	1.4%	2.5%	5.2%	3.9%	6.0%
Social Scientists and Related	0.5%	0.8%	1.0%	0.2%	NA	0.5%	0.4%
Teachers	5.3%	4.2%	9.6%	10.6%	0.7%	3.2%	3.3%
Transportation and Material Moving Workers	6.4%	4.7%	1.3%	1.4%	15.1%	7.0%	9.3%
ACS Special Codes	0.1%	NA	0.1%	0.1%	NA	0.1%	0.4%
Missing	1.7%	3.4%	1.1%	1.0%	1.5%	1.8%	2.2%
Industry							
Agriculture, Forestry and Fisheries	0.7%	1.1%	0.3%	0.5%	1.1%	0.7%	0.7%
Construction	7.0%	1.2%	0.9%	0.9%	18.5%	8.4%	10.8%
Entertainment, Accommodations, and Food Service	5.8%	13.0%	4.6%	2.9%	7.3%	4.7%	3.9%
Educational, Health, and Social Services	22.7%	24.7%	41.9%	39.9%	4.5%	13.8%	9.2%
Finance, Insurance, Real Estate	6.8%	4.9%	6.7%	10.8%	5.3%	6.4%	8.6%
Information and Communication	1.8%	1.4%	1.3%	1.5%	1.5%	2.5%	2.1%
Manufacturing	9.4%	7.5%	4.3%	7.3%	12.3%	12.4%	13.5%
Mining	0.5%	NA	0.2%	0.3%	1.1%	0.8%	0.4%
Other Services	4.1%	7.2%	3.6%	3.2%	4.2%	3.6%	4.3%
Public Administration	4.8%	1.8%	4.1%	6.7%	2.6%	7.6%	5.2%
Professional and Related Services	12.1%	12.5%	11.1%	9.7%	14.1%	12.5%	12.5%
Retail Trade	8.4%	9.7%	9.1%	6.1%	6.6%	8.4%	10.8%
Transit and Warehousing	4.6%	3.5%	1.7%	1.5%	9.5%	5.7%	5.1%
Utilities	0.7%	0.6%	0.3%	0.4%	0.9%	0.8%	1.7%
Wholesale Trade	2.4%	1.4%	1.3%	1.3%	4.1%	2.5%	4.0%
Missing	8.1%	9.6%	8.7%	7.0%	6.3%	9.2%	7.2%

Abbreviations: NA, not applicable.

^a All proportions are weighted.

We observed an association between short work schedule notice and high depressive symptoms among women but not men. This is generally consistent with studies that show short scheduling notice and fluctuations in work hours are independently associated with increased psychological distress among food service and retail workers (Schneider & Harknett, 2019), and unpredictable work schedules to be associated with depressive symptoms (Lee & Kawachi, 2021). This may be because schedule precarity is thought to contribute adversely to mental health by contributing to work-life conflict (Harknett & Schneider, 2019), which has been shown to disproportionately affect women; working women (versus men) are more often tasked with household duties (Del Boca et al., 2020) and are more likely to take on caregiver roles (Smith, 2004). Therefore, shorter work schedule notice may have a more deleterious effect on women, due to their increased household and care responsibilities.

Short work schedule notice was distributed unevenly by socio-demographic characteristics. Respondents with lower levels of educational attainment, and those whose parents had lower levels of educational attainment, were more likely to report ≤2 weeks schedule notice compared to >2 weeks notice. Respondents who resided in the South and in rural areas also were more likely to be exposed to short schedule notice. Our observation that NH-Black and Hispanic people disproportionately experienced scheduling precarity is consistent with centuries of racist policies and structures that have shaped the inequitable distribution of opportunity (Bailey et al., 2017; Siqueira et al., 2014). This context has contributed to occupational segregation of NH-Black and Hispanic people into occupations and industries in which workers report less access to advanced schedule notice; this pattern can be observed in our study as well as data from the US Bureau of Labor Statistics encompassing a broader age range of individuals (U.S. Bureau

Table 3
Association between work schedule notice and high depressive symptoms.

Schedule Notice	Total (N, %) ^a	CES-D-SF \geq 8 (n, Prevalence) ^a	Crude Prevalence Ratio (95% CI) ^b	Adjusted Prevalence Ratio (95% CI) ^{b,c}	
Women	<2 weeks	1286 (55.2%)	101 (15.9%)	1.58 (1.23–2.04)	1.39 (1.07–1.80)
	\geq 2 weeks	614 (23.1%)	127 (8.9%)	Reference	Reference
	Consistent	550 (21.7%)	50 (7.8%)	0.80 (0.57–1.12)	0.77 (0.55–1.08)
Men	<2 weeks	1095 (45.9%)	77 (7.7%)	1.16 (0.83–1.62)	1.06 (0.75–1.50)
	\geq 2 weeks	900 (33.9%)	73 (5.8%)	Reference	Reference
	Consistent	518 (20.1%)	34 (5.9%)	1.04 (0.70–1.56)	0.94 (0.62–1.42)

Abbreviations: CI, confidence interval; CESD-SF, Center for Epidemiologic Studies of Depression Short-Form scale.

^a All proportions are weighted.

^b Estimated using modified Poisson models.

^c Adjusted for census region, urbanicity, pay rate, household composition, age, race and ethnicity, parental education, and respondents' education.

of Labor Statistics, 2023). These occupations and industries may represent important first targets for focused interventions, however, the existence of some degree of limited work schedule notice across all industries and occupations examined in our study necessitates the consideration of broader reaching solutions, as well. Presently, many of the existing secure scheduling policies – like the Seattle Secure Scheduling Ordinance – limit coverage to certain industries (e.g., retail and food services) (Office of Labor Standards, n.d.). Our findings provide evidence for consideration of expansion of policy coverage to all workers rather than specific industries and occupations.

We did not observe heterogeneity in the association between work schedule notice and the prevalence of high depressive symptoms by fluctuations in weekly work hours. But those who reported the most fluctuations in weekly work hours experienced disproportionate exposure to \leq 2 weeks notice, as others have observed in earlier waves of NLSY97 (Lambert et al., 2014). Therefore, addressing schedule notice still has the potential to reduce the burden of depressive symptoms among those most frequently exposed to greater fluctuations in working hours.

This study has several limitations. First, this analysis is cross-sectional and therefore, should be considered in conjunction with evidence from longitudinal studies before causal inferences can be made. Second, 599 (10.7%) of respondents were excluded from analyses because they were missing one or more key study variables. Respondents with missing data were disproportionately a race other than NH-White, received a non-hourly pay rate, and had lower levels of educational attainment. We suspect those excluded due to missingness to be disproportionately exposed to \leq 2 weeks notice and high depressive symptoms, biasing our estimates towards the null. Third, the NLSY97 does not provide a clinical diagnosis of depression; however, the cutpoint of \geq 8 on CES-D-SF is consistent with symptoms of major depression (Levine, 2013). Fourth, misclassification in the exposure ascertainment may have occurred as the survey questions pertaining to notice ask about two years of employment history and demand a single answer. Fifth, while most fair scheduling policies in the US dictate “at least 14 days” of advanced work schedule notice, we were unable to identify participants reporting exactly 14 days of notice from those reporting 1–2 weeks with the response options available. Sixth, there is the possibility for misspecification of fluctuations in hours as measured by the instability ratio. Fluctuations in total hours worked in a given time period may reflect either desirable flexibility or precarious scheduling depending on the employee's control over their schedule. For the

2011 and 2013 cycles of NLSY97, questions were asked that allowed these two causes of work hour fluctuations to be disaggregated (Lambert et al., 2014), but these questions were not included in the 2019 cycle. Future studies on scheduling precarity and mental health outcomes would benefit from the disaggregation of desirable flexibility and work hour volatility imposed by employers, as these have different implications for the mental health and wellbeing of workers. Seventh, while other schedule characteristics, such as canceled shifts, last-minute shift changes, and back-to-back closing and opening shifts, are likely correlated with advanced notice and with worker well-being, data were not available to examine said characteristics in the NLSY97. Eighth, the NLSY97 cohort is composed of respondents within a narrow age range, and therefore, the results of this study may not be generalizable to other age cohorts, even among US workers; for example, this cohort was influenced by the aftermath of the 2008 global financial crisis as they matured in the workforce, whereas a new generation of workers will likely be influenced by the aftermath of the COVID-19 pandemic. Nevertheless, the NLSY97 cohort is nationally representative of US adults aged 37–42 years of age, and oversampled people of color. Respondents included in the analytic sample have a wide variety of occupations, and therefore, this analysis serves to update the only other published nationally representative descriptive study on how components of scheduling precarity are distributed within the US workforce.

6. Conclusion

Our study findings contribute to the growing body of evidence suggesting that policies that require work schedule notice may have a positive impact on worker health and wellbeing. Many of the current laws that regulate advanced notice only apply to workers in select industries (e.g., retail and food service, manufacturing). Policies requiring advanced notice may also facilitate individuals accessing mental health services. However, this study suggests that the potential benefits of advanced schedule notice are not confined to select industries. Future legislation should consider workers in a wider set of industries and additional dimensions of schedule precarity in the US workforce.

CRedit authorship contribution statement

Hawkinson: Data curation; Formal analysis; Methodology; Writing - original draft.

Andrea: Methodology; Writing - review & editing.

Hajat: Writing - review & editing; Funding acquisition.

Minh: Writing - review & editing.

Owens: Writing - review & editing.

Blaikie: Writing - review & editing.

Seiler: Writing - review & editing.

Molino: Writing - review & editing.

Oddo: Methodology; Writing - review & editing; Funding acquisition.

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Declaration of competing interest

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Data availability

The data is publicly available.

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Appendix A. Supplementary data

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