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Abstract

Existing research on the service sector in the United States documents the macro-level fundamental causes of precarious work, often with a focus on economic outcomes such as wages and fringe benefits. The authors focus on the temporal dimension of precarity, drawing upon new panel data from 1,725 hourly workers in retail and food service collected as part of The Shift Project to examine how exposure to unstable and unpredictable work schedules can heighten vulnerability to job turnover and downward wage mobility, propagating employment disadvantage at a micro-level. The authors find that precarious scheduling, including short advance notice and on-call shifts, significantly increases turnover and that these associations are partly mediated by work-life conflict and job dissatisfaction. Further, job turnover is associated with downward mobility in earnings. Exposure to precarious work can trigger a process of cumulative disadvantage and constrain intra-generational mobility.

The retail and food service sectors employ 17 percent of American workers (Current Population Survey 2018) and these jobs are characterized by precarious employment conditions including low wages, few fringe benefits, non-standard employment relations, high turnover and short tenure, and unstable and unpredictable work schedules (Kalleberg 2011). Prior research traces the fundamental causes of precarious working conditions to macro-level sources such as declining unionization (Western and Rosenfeld 2011), financialization (Chan 2013), globalization (Beck 2000; Ross 2009; Kalleberg 2011), and reduced governmental regulation and oversight (Bernhardt et al. 2008; Kalleberg 2009; Bernhardt 2012). This work shows, for instance, how union decline led to lower wages (Western and Rosenfeld 2011) and how financialization reduced job quality (Applebaum and Batt 2014).

We draw attention to the micro-level dynamics in which exposure to precarious job conditions ignites a process of cumulative disadvantage (DiPrete and Eirich 2006). We focus in particular on a process of cumulative disadvantage related to the temporal dimensions of employment precarity. On the one hand, jobs in retail and food service are characterized by within-job temporal precarity in the form of unstable and unpredictable work schedules (Lambert 2008). These schedule conditions have begun to receive more attention as researchers have documented their high prevalence (Lambert, Fugiel, and Henly 2014) and their consequences for work-family conflict (Henly and Lambert 2014) and for worker health and well-being (Schneider and Harknett 2019a). On the other hand, these jobs are also characterized by between-job temporal precarity in the form of very low job tenure and high rates of turnover (Lambert 2008; Carré et al. 2008; Lambert and Henly 2012).

These two temporal dimensions of job quality: unstable and unpredictable work schedules and turnover are important elements of job quality that have both received scholarly attention

under the umbrella of research on precarious work. Unlike previous work that has documented the prevalence of these two phenomena independently from one another, we argue that work schedules and job turnover are interlocking dimensions of precarious work that produce and amplify instability. While employers use irregular schedules to shift short-term economic risk from the firm to employees, this strategy causes downstream instability for both workers and firms.

In this paper, we harness new longitudinal data to examine schedule instability as a predictor of job turnover at a set of large retail and fast food firms, and we demonstrate that unstable and unpredictable work schedules are associated with higher rates of turnover. Further, we show that the relationship between work schedules and turnover is mediated by caregiving obligations and work-family conflict, perceptions of supervisor treatment, and job satisfaction for highly unstable workers. In addition, we demonstrate that this schedule-induced turnover does not produce upward mobility to better jobs, but rather in this instance represents downward intra-generational mobility. Beyond documenting the association between work schedules and turnover and identifying key underlying mechanisms, these findings demonstrate that precarious work is not a set of independent forms of vulnerability, but rather a self-reinforcing system where instability in one dimension begets instability in another, further entrenching labor market disadvantage.

Prior Research

Temporal Precarity: Unstable Schedules and Short-Tenure Jobs

Low-skill hourly workers are increasingly exposed to temporal precarity within and between jobs. By temporal precarity, we mean instability and uncertainty surrounding how workers can allocate their time between economic and noneconomic activity and about their future employment circumstances.

A key source of temporal precarity within jobs is employees' work schedules. By giving workers limited advance notice of their schedules, holding workers on call, adjusting hours last-minute, and assigning highly variable hours week-to-week, employers are able to more efficiently match labor to fluctuations in customer demand (Houseman 2001; Appelbaum, Bernhardt, and Murnane 2003; Cappelli and Neumark 2004; Carré et al. 2008; Lambert 2008; Lambert and Henly 2012). Although conservative estimates suggest that roughly 15 percent of retail workers hold irregular schedules (Golden 2015), others find higher rates of instability. For example, McMenamin's (2007) analysis of the 2004 Current Population Survey supplement finds that half of workers in service occupations work alternate shifts. More broadly, Lambert, Fugiel, and Henly (2014) find that in a given month, 75 percent of early-career workers experience hour fluctuation, and the average range between greatest and fewest weekly hours worked in a month is 10 hours. While some variable/flexible scheduling practices are desirable to workers (for example, workers may prefer the flexibility to work from home or the opportunity to work regular nonstandard hours to accommodate their childcare needs), most workers would prefer lower-paying jobs with stable and predictable schedules over higher-paying jobs with irregular schedules (Lambert, Haley-Lock, and Henly 2012; Mas and Pallais 2017). Instead, the benefits of "flexible" scheduling arrangements in low-wage work appear to accrue to employers, who can flexibly allocate labor to match customer demand by passing along instability to their employees (Lambert 2008). While employees with predictable hours or input into their work schedule may be able to anticipate the days and times that they will work, employees with unstable and unpredictable schedules experience uncertainty about their work life that may limit their ability to balance work and home life, create economic instability, and reduce job satisfaction (Schneider and Harknett, 2019a; Lambert and Henly, 2014).

Studies of precarious work have also identified high levels of between-job instability among low-wage workers. Beginning in the 1980s, corporations experiencing increased competitive pressure and shareholder demands for higher performance at lower costs turned to strategic downsizing, restructuring, and streamlining to reduce costs (Useem 1993; Osterman 1999; Uchitelle 2006; Fligstein and Shin 2007). Retention rates and long-term jobholding began to decline as a result (Swinnerton and Wial 1995). Workers in more recent cohorts have been employed with their employer for less time at the same age than workers of previous cohorts (Farber 2007), and separations may be even more harmful than before as the rates at which workers reallocate between firms and transition from unemployment to employment have both declined (Davis and Haltiwanger 2014; Fujita 2018). These declines in job security have been most pronounced for lower SES workers. Workers without college degrees, and particularly men with low education, experienced the greatest declines in retention rates while women saw a moderate increase in retention (Diebold et al. 1997; Farber 1998, 2010). While the economy as a whole saw substantial declines in job stability due to increases in involuntary job loss at the end of the 20th century, turnover in low-wage work occurs at much higher rates.

Descriptive work has shown that in addition to having highly unstable work schedules, low-skill hourly jobs tend to have notably high rates of voluntary turnover (Applebaum et al. 2003; Lambert 2008; Carré et al. 2008; Lambert and Henly 2012). For example, Lambert (2008) found median yearly turnover rates of 50 percent for low-skill hourly jobs. As income mobility declined significantly in the new economy (Chetty et al. 2017), high rates of voluntary turnover may not reflect upward mobility, but rather churn between similar low-skill jobs. Yet, empirical research has not in fact documented if exposure to precarious work schedules in fact leads to more job turnover.

In fact, quite to the contrary, a large body of theoretical and empirical work in economics is oriented around a theory of compensating differentials in which unfavorable conditions on one dimension of job quality may be compensated for by more favorable conditions on another (Becker, 1991). For instance, mothers may earn lower wages, but this may be compensated for by more generous fringe benefits or more work schedule control (Waldfogel 1997) or workers who have non-standard shifts may earn more than those with regular day shifts (Kotsiuk 1990). However, the empirical record is quite mixed and notable papers find little evidence of compensating differentials for many aspects of job quality (Kilbourne et al. 1994; Budig and England 2001), perhaps because large firms have monopsony power over workers (Osterman 2018; Card et al. 2018). Prior research has not explored whether workers willing to work unstable and unpredictable schedules benefit from a compensating differential of more job security.

Work Schedules and Turnover as a Cumulative Disadvantage Process

Rather than dimensions of job quality being related to one another as compensating differentials, one dimension of precarious work may instead give rise to another in a process of cumulative disadvantage (see DiPrete and Eirich 2006 for a review). In a cumulative disadvantage process, rewards are allocated unevenly by status group. Those rewards can then be used as resources to attract additional rewards, exacerbating inequality (Merton 1968). A key status distinction among low-wage service sector workers is between core and periphery employees. Employers in the service sector often employ a small and stable core of employees and a large and flexible group of part-time peripheral employees (Kalleberg 2003; Cappelli and Neumark 2004; Lambert 2008). Keeping a high headcount of part-time employees who can be held on-call and re-scheduled at the last minute allows managers to absorb fluctuations in labor demand (Lambert and Henly 2012). The temporal instability that peripheral workers experience due to just-in-time scheduling

practices may feed into inequality in other dimensions of workers' lives. We predict that schedule instability has negative consequences for workers' family and economic lives, which in turn leads to higher rates of turnover among highly unstable workers. Turnover due to schedule instability may suppress earnings, further entrenching inequality between workers.

Understanding the relationship between work schedules and turnover as a cumulative disadvantage process represents a departure from prior research on precarious work. While previous research finds negative outcomes associated with work schedule instability and identifies precursors to employment instability, the literature has failed to capture the broader inequality-generating process associated with precarious work. Other researchers have speculated that firm practices associated with precarious work (including unstable and unpredictable work schedules) may be related to turnover (Lambert 2008; Carré et al. 2008), but very little research examines this relationship empirically. Instead, extant theories of quits tend to situate instability in the individual's psychology. "Proximal precursors" to quits such as job satisfaction or withdrawal cognitions predominate studies of quit behavior, while "distal determinants" such as work environment and alternative job opportunities, play a less prominent role (see Griffeth et al. 2000 for a meta-analysis). We contend that an important causal pathway begins outside of the individual; precarious working conditions affect workers' psychological and material wellbeing, in turn influencing turnover.

Pathways from Precarious Schedules to Job Instability

There is good reason to expect that unstable and unpredictable work schedules may precipitate quits. Precarious work schedules are associated with more work-life conflict, lower job satisfaction, more financial strain, and worse perceived treatment by managers. In turn, the quits literature finds that each of these stressors are significant determinants of quits.

One pathway by which work schedule instability may lead to employment instability is through work life conflict. Although some scheduling policies afford employees greater control and flexibility may reduce work-family conflict (Thomas and Ganster 1995) and turnover intentions (O'Neil et al. 2009; Hammer et al. 2009; McNall et al. 2009), work-family conflict is exacerbated by nonstandard hours (Pleck et al. 1980) and variable, unpredictable, and low-control schedules (Henly, Shaefer, and Waxman 2006; Henly and Lambert 2014). Unstable and unpredictable work schedules can produce instability at home by forcing parents to rely on ad-hoc childcare arrangements rather than formal or regular providers (Carrillo et al. 2017). In turn, conflict experienced at home due to work is a significant predictor of turnover (Boyar et al. 2003).

In addition to challenging workers' ability to meet their caregiving obligations, work schedule instability can lead to broader economic hardship. In the precarious work literature, we see that nonstandard work and variation in hours are associated with lower pay (Kalleberg, Reskin, and Hudson 2000; Dynan et al. 2012) and earnings instability (Finnigan 2018), and that unstable and unpredictable work schedules are associated with income volatility and household economic instability (Schneider and Harknett 2019a). Standard economic theories of turnover suggest that employees will quit when there are better wage alternatives (Jovanovic 1979; Topel and Ward 1992; Rogerson et al. 2005). If just-in-time scheduling practices lower earnings and increase instability, and low earnings are associated with higher turnover, it seems likely that schedule instability may affect turnover through financial instability.

Beyond causing caregiving and economic hardship in workers' home lives, unstable and unpredictable work schedules also create conflict in individuals' work lives. Prior research suggests that structural determinants of turnover are at least partially mediated by job satisfaction (Kim et al. 1996; Gaertner 1999). Employees who have little control over their schedule and are

not given their preferred shifts report lower job satisfaction (Aletraris 2010; Swanberg et al. 2011), while employees with flexible and compressed workweek schedules report higher job satisfaction. Low job satisfaction is a significant determinant of quit behavior among retail workers (Lucas et al. 1990; Clark 2001; Booth and Hamer 2007). Workers who are dissatisfied with their job may begin to perceive other employment as more desirable than their current job and develop withdrawal cognitions (Hom and Kinicki 2001; Mitchell et al. 2001). Reductions in job satisfaction may then mediate the relationship between precarious schedules and turnover.

Finally, disparities in the schedules supervisors assign different workers can cause instability in worker-supervisor relationships, eventually leading to turnover. Employees with greater control over their schedule tend to report feeling greater support from their supervisor (Swanberg et al. 2011). In the retail industry, worker control over schedules is low and supervisors' discretionary allocation of flexible and desirable schedules to only some workers can strain worker-supervisor relationships (Henly, Shaefer, and Waxman 2006). Employees who feel supported by their supervisor tend to quit at lower rates (Maertz Jr. et al. 2007). Supervisors' reliance on just-in-time work scheduling practices may cause unwanted instability in workers' lives and deteriorate supervisor-worker relationships, leading to higher rates of turnover.

Hypotheses

Prior work has shown that low-wage, low-skill jobs can be characterized by both unstable and unpredictable work schedules and by high turnover. Further, we know that work schedules are associated with some of the strongest determinants of turnover. Through bringing the literatures on work schedules and turnover into conversation with one another, we seek to understand how firms' scheduling practices structure employee turnover, cumulating exposure to multiple dimensions of precarious employment

We expect that unstable and unpredictable work scheduling practices will be associated with job turnover. We also expect that the relationship between unstable and unpredictable work scheduling practices and turnover will be mediated by caregiving and work-family obligations, job satisfaction, financial strain, and perceptions of fair treatment by one's supervisor. Last, we expect that these quits do not represent upward mobility – rather, workers who leave their jobs due to an undesirable work schedule move to similar or worse-paying jobs to avoid temporal instability at work and its downstream consequences.

Data and Methods

Survey Data

The Shift Project uses Facebook targeted advertisements to recruit service sector workers to complete an on-line survey that asks about their job conditions, demographic characteristics, economic security, health, and family life. The Shift Project survey has collected survey data from over 50,000 service sector workers employed at 120 of the nation's largest retail and food service firms nationally between 2016 and 2018.

The Shift Project approach to data collection uses advertisements targeted to U.S. adults employed at particular large employers in the retail and food service sector. Because of the widespread use of Facebook among U.S. adults, the Facebook sampling frame covers roughly 80 percent of the adult population, comparing favorably to some traditional sampling frames, such as landlines (Blumberg and Luke 2007; Link et al. 2007; Blumberg and Luke 2010; Busse and Fuchs 2012). The method of data collection and the data validation checks conducted by the Shift Project are detailed in a set of recent papers by Schneider and Harknett (2019a; 2019b). Although the Shift data come from a nonprobability sample, Schneider and Harknett (2019b) show that Shift respondents' distribution on wages and tenure closely resembles that of respondents from similar

target populations in gold standard national, representative labor force surveys including the 1997 National Longitudinal Survey of Youth (NLSY97) and the Current Population Survey (CPS). Moreover, Schneider and Harknett (2019b) demonstrate that the direction and magnitude of multivariate relationships in Shift data are similar to those found in the NLSY97 and CPS. Prior analyses of Shift data are also robust to using multiple weighting schemes and to corrections for selection bias (Schneider and Harknett 2019b).

This paper draws on the panel study component of the Shift Project. This panel began in Spring of 2017 and consisted of 5,174 service sector workers in 30 large U.S. cities. All members of the Shift Project panel survey were paid hourly and working for a large chain retailer or food service employer when they were surveyed at baseline. Workers were employed in a variety of subsectors including retail apparel, grocery, pharmacy, big box stores, fast food, casual dining, and other retail, but all worked for large national chains.

These workers were invited to complete a follow-up survey in Fall of 2017, on average seven months following baseline. Of the original sample of 5,174, 2,408 (47%) responded to the follow-up survey, and 1,725 have complete data on all variables used in the main analyses. We conduct a non-response analysis to gauge any potential biases that may result from non-response to the follow-up survey. We find that those who attrite from the panel are similar to those who are retained on work schedule characteristics and some demographics, but differ a moderate amount on a small set of demographic variables. These results are shown in Appendix Table 3 and discussed briefly below.

Key Variables

Dependent Variables: Turnover and Wages

The key dependent variable in our analysis is job turnover. Turnover is coded 0 if a worker remained in the same job at follow-up and 1 if a respondent reports leaving their baseline survey job in the follow-up survey. Respondents who moved to a new job or who are unemployed in the follow-up survey are both coded as 1 on the turnover measure. In our main analyses presented, our measure of turnover captures turnover for any reason, and thus combines workers who quit their jobs and those who were fired or laid off.

We also conduct a parallel set of analyses for a narrower measure of job turnover, limited to those respondents who quit their baseline job. These results are summarized in a robustness section and shown in Appendix Tables 1 and 2.

We also analyze *weekly earnings* at follow-up as a third outcome. Weekly earnings for hourly workers are defined by multiplying respondents' reported hourly wages by their reported usual total hours worked per week. For salaried workers, weekly earnings are calculated by dividing reported monthly pay by 4.5. Unemployed respondents are coded as having $0 weekly earnings.

Independent Variables: Work Schedule Instability

We examine 6 measures of work schedule instability and unpredictability. *On-call* denotes if, within the last month, the respondent has been asked to be available to come into work with just a few hours' notice or less. *Cancelled shift* records if the respondent's employer has cancelled one of their scheduled shifts in the last month. Respondents who report working *clopening* shifts have worked a closing shift and then worked the next morning's opening shift with less than 10 hours off in between shifts in the last month. *Schedule type* is a categorical variable characterizing work schedules as variable, regular day shift, regular evening shift, regular night shift, rotating shift, or

other. *Advance notice* is how far in advance respondents usually know what days and hours they will need to work, grouped into categories of 2+ weeks, 1-2 weeks, 4-6 days, and 0-3 days. The *instability scale* ranges from 0 to 6 is defined as the sum of indicators for on-call, cancelled shifts, clopening shifts, reporting a variable schedule, having less than two weeks advance notice, and having no input into their schedule. Correlations between components of the instability scale range from -0.02 to 0.14 (Appendix Table 1).

Mediators

We use two scales in the mediation analyses. The *caregiving and work-family conflict scale* is a composite of three variables that measure how a respondent's job affects their ability to attend to their home life. The first item asks if the respondent's work schedule affords them flexibility to handle their family needs. The second asks if they have difficulty dealing with family or personal needs during work. The third asks if their work schedule makes it hard to provide caregiving to their family or relatives. Each of these items captures part of the effect of work schedules on home life. Respondents answer each of these questions using a scale of "Always true", "Often true", "Sometimes true", and "Never true". The *caregiving and work-family conflict scale* is created by summing a respondent's response value on each of these variables.

Prior research suggests that unstable and unpredictable work schedules also cause financial insecurity and instability (Schneider and Harknett 2019a; Finnigan 2018). To capture how work schedules affect turnover through economic insecurity, we develop a *financial strain scale* comprised of three variables. Analyses by the Federal Reserve Board suggest that in 2017, 4 in 10 US adults could not come up with $400 to cover an unexpected expense, indicating widespread economic insecurity (The Federal Reserve Board of Governors 2018). The first item of the *financial strain scale* asks how confident the respondent is that they could come up with $400

within the next month. The second item asks respondents to rate how difficult it is for them to cover their bills and expenses. The last item asks respondents to report how volatile their income is. Responses to these items are standardized and summed to create the *financial strain scale*. We also use two single-variable mediators. *Job satisfaction* is respondents' self-reported job satisfaction. *Supervisor fair treatment* records if the respondent perceives their supervisor as treating them fairly.

Control variables

All analyses control for demographic characteristics including race, gender, if the respondent has children, age, education, school enrollment status, and marital status. We also control for job characteristics such as usual weekly hours worked, managerial status, hourly wage, and industry. We account for how long each respondent has been in the risk set for turnover by controlling for job tenure at first contact and length of time between first and second contact.

Analytic Approach

First, we fit discrete-time logistic regression models predicting turnover using one work-scheduling variable at time as a predictor:

$$\text{log odds}(\text{TURNOVER}_{it+1}) = \beta_0 + \beta_1(WS)_{it} + \gamma X_{it} \qquad (1)$$

where *WS* is on-call, shift cancellation, clopening, schedule type, advance notice, or the instability scale. X_i is a vector of covariates that includes age, race, gender, if a respondent has children, education, school enrollment status, marital status, job tenure, usual hours, wage, if the respondent is a manager, industry, and time between interviews. β_1, summarizing the relationship between work schedule instability and job turnover, is of primary interest.

Next, we test for mediation in the relationship between work schedules and turnover. Because we employ a nonlinear model to predict turnover, a binary outcome, we cannot use traditional

strategies to test mediation such as the standard Baron and Kenny (1986) method. Instead, we deploy a method developed in Breen, Karlson, and Holm (2011), and Karlson and Holm (2011), and described in Kohler, Karlson, and Holm (2011) that allows for the decomposition of total effects into direct and indirect effects in nonlinear models, net of control variables (henceforth the KHB method). While coefficients cannot generally be compared across nonlinear models due to rescaling (Mood 2010), the KHB method is able to recover the degree to which a mediating variable changes the effect of a predictor on a response variable while accounting for rescaling and attenuation bias. Karlson, Holm, and Breen (2010) derive a test statistic for the mediation analyses based on the delta method (Sobel 1982).

We use the instability scale as our measure of unpredictable and unstable work schedules in the mediation analysis because this is our most comprehensive measure and because using a scale will tend to reduce measurement error compared with single items. We test if the relationship between the instability scale and turnover is mediated by four potential mediators: the caregiving/work-family conflict scale, the financial strain scale, supervisor support, and job satisfaction. Following the KHB method, the mediation analysis tests if the total effect of schedule instability on turnover is significantly reduced by each mediator. This entails testing if the effect of instability on turnover in model 2 is significantly different from the effect of instability on turnover in model 3, i.e. if $\beta_1 - \gamma_1$ is significantly different from 0:

$$\text{log odds}\,(\text{TURNOVER}_{it+1}) = \beta_0 + \beta_1(\text{INSTABILITY})_{it} + \beta_2 X_{it} \qquad (2)$$

$$\text{log odds}\,(\text{TURNOVER}_{it+1}) = \gamma_0 + \gamma_1(\text{INSTABILITY})_i t + \gamma_2(\text{MEDIATOR})_{it} + \gamma_3 X_{it} \qquad (3)$$

We also conduct three additional analyses that aid in the interpretation of our findings. First, if workers quit their jobs for markedly better options, we may be less concerned that employer

practices induce turnover. In order to determine if quits represent upward mobility, we estimate how the change in earnings between the baseline and follow-up survey differs for respondents who quit their job and those who did not using the following regression:

$$\text{EARNINGS}_{it+1} - \text{EARNINGS}_{it} = \beta_0 + \beta_1(\text{QUIT})_{it+1} + X_{it} + \epsilon_i \quad (4)$$

where β_1 is an estimate of the difference in change in earnings between respondents who quit their job between baseline and follow-up and respondents who did not quit, X_{it} is a vector of controls measured at baseline, and ϵ_i is the error.

Second, we consider whether the relationship between work schedules and turnover may be different for those who quit their jobs compared with those who left their jobs for other reasons. Although roughly 89 percent of respondents in the sample who left their job quit, our results may be biased by including respondents who were laid off or fired. We conduct the same analyses on our sample restricting the outcome variable to quits only, and present these results in Appendix Tables 1 and 2.

Finally, because turnover is reported retrospectively (i.e. respondents report if they left their employer from the previous survey round) we may be concerned that our results are due to selection bias in survey follow-up. We use logistic regression to test for differences in attrition from the panel by race, gender, kids, age, education, school enrollment, marital status, income, usual hours, tenure, manager status, on call work, cancelled shifts, clopening, work schedule type, and advance notice. Gender, education, and school enrollment, are the only significant predictors of nonresponse, and the effects are not substantively large. Further details are included in Appendix 5.

Results

Descriptive Statistics

Our sample of service sector workers experienced a high degree of exposure to precarious work schedules at baseline. As shown in Table 1, 40.7% reported a variable work schedule and only 48.6% reported receiving their schedule more than two weeks in advance. Significant fractions of respondents were also exposed to on-call shifts (20.8%), cancelled shifts (13.6%), and clopening shifts (41.4%). Taken together, we see that 61.1 % of the sample had fewer than three exposures, 22.6% had 3, 11.1% had 4, and 4.8% had five or more exposures.

[[Table 1 near here]]

Table 2 describes the extent of turnover in our sample. We see that 30.3% had left their jobs by follow-up. Given a mean follow-up period of 7 months, this implies a 51.9% annual turnover rate, which compares to the 53.0% documented in the sector in 2017 (Bureau of Labor Statistics 2018). We see that the very large majority of this turnover (88.5%) is reported by respondents to be quits rather than involuntary terminations. When asked to select all reasons why they quit, nearly half of respondents report that they quit in order to take a better job. But, large shares also list a bad work schedule (26.2%), bad manager (31.4%), or just bad job quality overall (18.0%) as reasons for quitting.

[[Table 2 near here]]

Work Schedule Instability and Job Turnover

Table 3 presents results from a set of logistic regression models in which job turnover is regressed on a measure of work schedule instability and covariates (coefficients on control variables are presented in Appendix Table 2). Across the six different indicators of schedule instability and

unpredictability, we see a consistent pattern: greater work schedule instability and unpredictability are associated with greater odds of job turnover.

[[Table 3 near here]]

On-call work and cancelled shifts are each associated with greater odds of job turnover. Being asked to work on-call means holding one's schedule open for work with no guarantee that it will translate into work and to pay. Workers asked to be on-call have 1.35 the odds of job turnover compared with workers who are not asked to be on-call. Shift cancellations were associated with 1.93 times greater odds of turnover. In terms of predicted values, turnover was 34% among those with at least one on-call shift (versus 27% among those without) and 41% among those with at least one cancelled shift (versus 27% among those without).

We also see that the odds of turnover are greater for workers who report variable or rotating shifts compared with those with regular schedules. Compared to respondents who worked regular daytime schedules, the odds of turnover are 1.52 times greater for respondents who worked rotating schedules and 1.31 times greater for respondents who work variable schedules ($p<.10$).

The less advance notice respondents receive of their work schedule, the more likely they are to leave their job. Compared to respondents who receive their schedules two or more weeks in advance, the odds of turnover are 1.43 times greater for respondents with one to two weeks of advance notice and almost 2 times greater for respondents with only zero to three days of advance notice. In terms of predicted values, turnover was 37% among those with 0-3 days' advance notice against 24% among those with at least two weeks'.

We find the same pattern when looking at the relationship between the composite instability scale and job turnover. Compared to respondents who report no instability, the odds of turnover are 1.84 times greater for respondents with three types of instability, 1.96 times greater

for respondents with four types of instability, and 2.70 times greater for respondents with five types of instability. The more types of schedule instability a worker faces, the more likely that worker is to leave the job.

Four Potential Mediators of the Relationship between Schedule Instability and Turnover

Having documented consistent significant relationships between schedule instability and job turnover, we next examine four potential pathways through which work schedules may lead to job turnover. We test four hypothesized intervening mechanisms –work-family conflict, job (dis)satisfaction, financial strain, and feelings of unfair treatment at work. Descriptive statistics for these four hypothesized mediators are presented in Table 4. The caregiving/work-family conflict scale ranges from 3.0 to 12.0 with a mean of 6.5. The financial strain scale is centered at 0 and ranges between -3.4 and 4.3. Slightly less than half of respondents report that their supervisor always treats them fairly, while over a third of respondents are very satisfied with their job. Of these four pathways, we find that work-family conflict and job satisfaction are the strongest mediators and that financial strain and feelings of unfairness play a relatively smaller mediating role.

[[Table 4 near here]]

For the mediation analysis, we focus on the relationship between the work instability scale, which ranges from 0 to 5 or more types of work schedule instability, and job turnover. We decompose the total relationship between the instability scale and job turnover, net of controls, into direct and indirect effects. The direct effect of schedule instability is the remaining association between schedule instability and turnover, net of controls and holding the mediator constant. The indirect effect is the component of the total effect of schedule instability on turnover that acts

through the hypothesized mediator. Direct and indirect effects are presented both as coefficients and as percentages of the total effect.

Table 5 begins with a test of whether caregiving and work-family conflict mediate the relationship between work schedules and turnover. We hypothesize that work schedule instability causes more work-family conflict, which in turn increases the chance that someone will be forced to leave their job. For respondents with five or higher on the instability scale, the total effect of schedule instability on the likelihood a respondent leaves their job can be divided into a 36 percent direct effect and a 64 percent mediated, indirect effect. That is, work-family conflict mediates 64 percent of the total relationship between schedule instability and job turnover. For respondents with four on the instability scale, caregiving and work-family conflict mediate 58% of the relationship between instability and turnover, but this falls short of the conventional $p<.05$ threshold for statistical significance ($p = 0.12$).

Table 5 next shows that job satisfaction also mediates the relationship between high levels of schedule instability and job turnover. For workers with 5 or more types of schedule instability, 66% of the relationship with job turnover operates via job satisfaction. Respondents with highly unstable schedules leave their jobs in part because this instability leads them to be unsatisfied with their job.

[[Table 5 near here]]

We find only weak evidence that perceptions of fair treatment by employees' supervisors mediates the relationship between work schedules and job turnover. Although perceptions of unfair treatment appear to explain about 47% of the relationship between highly unstable work schedules and job turnover, this mediation falls just shy of statistical significance ($p<0.10$).

Although financial strain could, in theory, be another reason why schedule instability leads to job turnover, we find no statistically significant evidence for this pathway.

Finally, simultaneously accounting for mediation by caregiving and work-family conflict, job satisfaction, financial strain, and supervisor fair treatment, we see substantial mediation for respondents with highly unstable schedules (not shown). For workers with five or greater on the instability scale, all four mediators simultaneously account for 89% of the relationship with turnover. Of that 89%, mediation by work-family conflict accounts for 29% of the indirect effect while mediation by job satisfaction accounts for 59% of the indirect effect. For workers with four on the instability scale, about 83% of the relationship between schedule instability and turnover is explained by all four mediators, with work-family conflict and job satisfaction accounting for about 30% and 64% of the indirect effect respectively, though this mediation falls short of statistical significance ($p = 0.12$).

Unstable and unpredictable work schedule characteristics are strong predictors of turnover. Employees who work on-call, have shifts cancelled, and receive short notice of schedule changes are more likely to leave their jobs than respondents who do not experience instability. The greater an employee's schedule instability, the more likely they are to leave their job. For employees with highly unstable schedules, we find some evidence that turnover is driven in part by the effect of schedule instability on caregiving and work-family conflict and on job satisfaction, and weaker evidence of mediation by perceptions of fair treatment by supervisors.

Job Turnover and Earnings

Because job turnover is driven in part by poor job quality, there is a possibility that job turnover results in upward mobility. While our primary measures of job quality of interest relate to scheduling, we cannot define these variables at follow-up for those who are unemployed. We can,

however, define a measure of earnings at follow-up for all respondents. We test for the change in earnings due to job turnover (Table 6). Net of controls, employees who experience either voluntary or involuntary job turnover after the baseline survey earned $130 less per week than respondents who remained in the same job. Overall, job turnover is associated with downward mobility in earnings. We disaggregate the reasons for turnover in Model 3. Here we can see more pointedly that workers who report leaving their jobs because of their work schedule earn $154 less per week than workers who remain in their job. Workers who were fired, or left their job because of their manager, because of the work, or for other reasons also experienced significant downward mobility in weekly earnings. There was one subset of workers who report leaving their job for a better job opportunity and experienced a $87 increase in their weekly earnings. The subset of workers experiencing modest upward mobility constitutes 47% of all workers who experienced job turnover. Most germane for our analytic purposes, 26% of workers who experienced turnover cited their work schedule as the reason, and these workers experienced a sizeable decline in their weekly earnings.

[[Table 6 near here]]

Robustness and Attrition Analysis

In the preceding analysis, we analyze all job turnover collectively whether the job exit was voluntary or involuntary. One rationale for doing so is that the distinction between quits and firings in low-wage work is murkier than in other sectors because employers use strategies such as informal layoffs, where employers assign employees zero hours, with the expectation that workers will quit as a result (Lambert 2008). Quits may be the result of employers wanting to downsize without laying off or firing employees. As shown earlier in Table 2, roughly 89 percent of turnover in our sample is due to quits. Nevertheless, as a robustness check, we conducted a parallel set of

analyses of job turnover that workers self-reported as "quits" as opposed to involuntary exits from firing or layoffs. The results from these analyses are consistent with those presented in Tables 3 and 5 for all job turnover (results shown in Appendix Tables 3 and 4).

Because our data are collected from a baseline and follow-up survey, results may potentially be biased due to survey attrition. Therefore, we investigate potential differential attrition by key sample characteristics. We specify a logistic regression model to predict nonresponse based on a host of demographic, job, and work schedule characteristics. We find that only gender, education, and school enrollment are significant predictors of nonresponse. Male respondents, respondents with low education, and respondents not enrolled in school are more likely to attrite from the panel. Unadjusted and adjusted probabilities of nonresponse by gender, education, and enrollment status are presented in Appendix Table 5. Adjusting for all other covariates, male respondents are 5 percentage points more likely to attrite than females. Respondents with no high school diploma are 5 percentage points more likely to attrite than respondents with a high school diploma, and 14 percentage points more likely to attrite than respondents with some college education. Respondents not enrolled in school are 5 percentage points more likely to attrite than respondents enrolled in school. We see no evidence of differential rates of attrition by other demographic measures such as age, race, or marital status. Similarly, and quite importantly, we see no selective attrition by work schedule characteristics, tenure, managerial status, or wage. These attrition patterns suggest that our analyses are likely unaffected by differential attrition because there is no selection out of the panel on any of our focal variables.

Discussion

Employees in low-wage jobs experience significant work-related instability on both economic and temporal dimensions of job quality. Instability along both dimensions has increased as a result of

employers' implementation of practices that transfer risk from employers to employees. In aggregate, these practices define precarious work in the new economy. While previous studies have documented the form and prevalence of precarious work and its macro-level causes, we seek to understand one moment where precarious work is self-propagating. We show empirically a relationship between work schedule instability and job turnover and its underlying mechanisms, demonstrating how two elements of precarious work constitute and reinforce one another.

Previous studies of precarious work that document high rates of turnover among service sector employees (e.g. Carré et al. 2008; Lambert 2008) are largely descriptive, and thus the mechanisms underlying turnover among low-wage workers were not well understood. High turnover may simply be an independent feature of the job that both firms and employees select into. However, our analyses show that turnover is significantly affected by negative working conditions, specifically by unstable and unpredictable work schedules. Over one quarter of respondents who quit their jobs directly attributed their departure to bad work schedules. Nonstandard work schedules afford employers greater labor flexibility while baking instability into the structure of some employees' jobs. This instability propagates throughout workers' family and economic lives. While prior studies show that unstable and unpredictable work schedules impede access to regular childcare arrangements (Henly et al. 2006; Carrillo et al. 2017), and reduce feelings of job satisfaction and supervisor support (Aletraris 2010; Swanberg et al. 2011), we demonstrate that the effects of schedule instability do not stop there. Scheduling practices such as working on-call shifts, shift cancellations, irregular schedules, and short notice of schedule changes lead to employment instability by interfering with workers' caregiving obligations and lowering their perceived job quality.

Rather than work schedule instability being compensated for by job stability or wage growth, we find that instead these dimensions of job quality work together to cumulate disadvantage, heightening the precarity of employment along several dimensions of job quality. These precarious workers churn between employers, yet our results show that most quits fail to result in upward mobility. It appears that many service sector workers quit their jobs due to poor working conditions rather than for better paying opportunities elsewhere. Precarious workers' position on the margins of the service sector becomes more entrenched as schedule instability begets family and economic instability, which then begets employment instability. Rather than escaping the cycle of instability, these workers accumulate disadvantage while providing employers with a set of workers whose schedule variation and high turnover allow employers to buffer against the ebbs and flows of labor demand.

This analysis is not without limitations. We did not have sufficient longitudinal data to allow for panel data analysis with individual fixed effects. Thus, we could not account for individuals' unobserved characteristics. It is possible that an unobserved trait leads some workers to select or be channeled into unstable and unpredictable schedules and to be more likely to quit their jobs. Therefore, we cannot rule out the possibility that some omitted variable in part explains the relationship between unstable work schedules and job turnover. However, the modeling of hypothesized mediators lends credence to the idea that unstable work schedules causally contribute to job turnover. Last, our data cover a relatively short period of time. A longer follow-up period is necessary to examine the longer-term mobility consequences of schedule-related turnover for workers themselves as well as for their children.

Through our examination of the mechanisms relating work schedules and turnover, we offer both empirical and theoretical contributions to the literature on precarious work. Empirically,

we show that employees assigned unstable and unpredictable schedules are likely to experience higher turnover. The short-run efficiency gains made by employers through just-in-time scheduling practices come to the detriment of long-run stability for employees and search and training costs for employers. Unstable and unpredictable schedules also have negative effects on employees' economic and noneconomic life by interfering with caregiving obligations, deteriorating relationships with supervisors, and reducing job satisfaction. Finally, our work suggests that the different dimensions of job quality are not independent. We show that negative outcomes workers experience due to unstable and unpredictable schedules in turn affect turnover, suggesting that firm practices that affect one dimension of precarious work propagate outward to shape other dimensions of precarity.

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Table 1. Sample Descriptives at Baseline

	Mean or %
Race	
White Non-Hispanic	75.0
Black Non-Hispanic	3.8
Hispanic	15.9
Other Race/Ethnicity Non-Hispanic	5.3
Female	69.2
Has kids	27.5
Age group	
18-19 years old	18.3
20-29 years old	50.6
30-39 years old	16.8
40-49 years old	9.5
50-59 years old	4.0
60-69 years old	0.9
Education	
No degree or diploma earned	4.5
High school diploma/GED	24.8
Some college	70.7
Enrolled in school	37.9
Relationship status	
Married	19.5
Cohabiting	23.3
Single	57.2
Usual weekly work hours	
0-10 hours	3.2
10-20 hours	18.6
20-30 hours	28.3
30-40 hours	43.7
40+ hours	6.3
Job tenure	
Less than 1 year	25.7
1-2 years	36.2
3-5 years	20.5
6+ years	17.6
Manager	17.8
Industry	
Retail	12.5
Department/discount stores/General Merch	17.3
Grocery	16.1

Clothing	4.5
Restaurants and Food Services	46.3
Pharmacy	3.3
Hourly wage ($)	12.19
Work schedule	
Variable Schedule	40.7
Regular Daytime schedule	21.2
Regular Evening Schedule	9.7
Regular Night Shift	8.3
Rotating Schedule	16.8
Other	3.4
Advance notice	
2+ weeks	48.6
1-2 weeks	29.2
4-6 days	5.4
0-3 days	16.9
On-call	20.8
Cancelled shift	13.6
Clopening	41.4
Instability scale	
0	11.0
1	22.6
2	28.0
3	22.6
4	11.1
5+	4.8
n	1725

Table 2. Job Turnover at Follow-up

Type of turnover	Mean or %
Job turnover	30.3
Job turnover type (% of total turnover)	
Was laid off or fired	11.5
Quit	88.5
Quit reasons (% of total quits)	
Better job	46.5
Bad schedule	26.2
Bad manager	31.4
Bad work	18.0
Other reason	42.0
n	1725

Table 3. Log Odds and Odds Ratios of Turnover regressed on Schedule Instability

Model		Log Odds	Robust SE	Odds Ratio	95% CI
(1)	On-call	0.30**	(0.13)	1.35**	[1.03 - 1.76]
(2)	Cancelled shift	0.66***	(0.16)	1.93***	[1.41 - 2.62]
(3)	Clopening shift	0.18	(0.12)	1.19	[0.95 - 1.50]
(4)	Schedule type				
	Regular day (reference category)				
	Variable schedule	0.27*	(0.16)	1.31*	[0.96 - 1.80]
	Regular Evening Schedule	0.32	(0.21)	1.38	[0.90 - 2.09]
	Regular Night Shift	0.13	(0.24)	1.14	[0.71 - 1.83]
	Rotating Schedule	0.42**	(0.19)	1.52**	[1.05 - 2.20]
	Other	-0.11	(0.35)	0.90	[0.45 - 1.79]
(5)	Advance notice				
	2+ weeks (reference category)				
	1-2 weeks	0.36***	(0.13)	1.43***	[1.10 - 1.86]
	4-6 days	0.33	(0.24)	1.40	[0.87 - 2.25]
	0-3 days	0.64***	(0.16)	1.90***	[1.38 - 2.60]
(6)	Instability scale				
	0 types of instability (reference category)				
	1	0.045	(0.22)	1.05	[0.68 - 1.62]
	2	0.17	(0.22)	1.18	[0.77 - 1.81]
	3	0.61***	(0.22)	1.84***	[1.19 - 2.84]
	4	0.67***	(0.25)	1.96***	[1.20 - 3.22]
	5+	0.99***	(0.30)	2.70***	[1.50 - 4.84]

Notes: Each row or set of rows separated by spaces represent results from separate regression models. Sample size ranges from n=1715 to 1725 across models. Each model includes controls for race, gender, parenthood status, age, educational attainment, school enrollment, marital status, job tenure, usual weekly work hours, managerial status, industry, hourly wage, and time between interviews.
* p<0.10 ** p<0.05 *** p<0.01

Table 4. Mediator Descriptive Statistics

Mediator	Min	Mean or %	Max
Caregiving/work family conflict scale	3.0	6.5	12.0
Financial strain scale	-3.4	0.0	4.3
Supervisor treats fairly			
Always true		44.5	
Often true		31.4	
Sometimes true		18.4	
Never true		5.7	
Job satisfaction			
Very satisfied		35.2	
Somewhat satisfied		41.8	
Not too satisfied		15.9	
Not at all satisfied		7.1	
n			1725

Table 5. Log odds of Turnover regressed on Schedule Instability Scale with and without Mediators

Log odds coefficients, robust standard errors (total and direct effects) and Sobel (1982) standard errors (indirect effects), and percent mediated shown

	Mediators											
	Caregiving			Job Satisfaction			Financial Strain			Fair Treatment		
Instability scale	Total effect	Direct effect	Indirect effect	Total effect	Direct effect	Indirect effect	Total effect	Direct effect	Indirect effect	Total effect	Direct effect	Indirect effect
1	0.0543	-0.0796	0.134	0.0438	-0.0917	0.136	0.0545	0.00629	0.0483	0.0516	-0.0530	0.105
	(0.228)	(0.228)	(0.271)	(0.227)	(0.228)	(0.346)	(0.224)	(0.224)	(0.137)	(0.229)	(0.229)	(0.267)
	100%	**-147%**	**247%**	**100%**	**-209%**	**311%**	**100%**	**12%**	**89%**	**100%**	**-103%**	**203%**
2	0.177	-0.0214	0.199	0.173	-0.0264	0.199	0.178	0.0947	0.0829	0.176	0.0494	0.127
	(0.222)	(0.223)	(0.272)	(0.222)	(0.223)	(0.347)	(0.218)	(0.218)	(0.139)	(0.223)	(0.223)	(0.267)
	100%	**-12%**	**112%**	**100%**	**-15%**	**115%**	**100%**	**53%**	**47%**	**100%**	**28%**	**72%**
3	0.637***	0.275	0.361	0.629***	0.213	0.415	0.626***	0.507**	0.119	0.631***	0.346	0.285
	(0.228)	(0.232)	(0.276)	(0.227)	(0.231)	(0.349)	(0.223)	(0.224)	(0.141)	(0.227)	(0.229)	(0.270)
	100%	**43%**	**57%**	**100%**	**34%**	**66%**	**100%**	**81%**	**19%**	**100%**	**55%**	**45%**
4	0.705***	0.296	0.409	0.698***	0.248	0.450	0.685***	0.540**	0.146	0.697***	0.385	0.313
	(0.257)	(0.262)	(0.277)	(0.258)	(0.262)	(0.350)	(0.253)	(0.255)	(0.143)	(0.257)	(0.259)	(0.271)
	100%	**42%**	**58%**	**100%**	**36%**	**64%**	**100%**	**79%**	**21%**	**100%**	**55%**	**45%**
5+	1.021***	0.367	0.654**	1.021***	0.347	0.674*	1.009***	0.763**	0.246	1.028***	0.542*	0.485*
	(0.309)	(0.321)	(0.288)	(0.310)	(0.320)	(0.355)	(0.301)	(0.308)	(0.155)	(0.306)	(0.313)	(0.277)
	100%	**36%**	**64%**	**100%**	**34%**	**66%**	**100%**	**76%**	**24%**	**100%**	**53%**	**47%**

* p<0.10 ** p<0.05 *** p<0.01

Table 6. Changes in Earnings Regressed on Turnover and Turnover Reasons
OLS coefficients and (Robust Standard Errors) shown

Turnover outcome	Model 1	Model 2	Model 3
Left job	-129.5***		
	(15.80)		
Quit job		-108.8***	
		(16.68)	
Quit for better job			87.41**
			(37.82)
Quit because of schedule			-154.3***
			(48.78)
Quit because of manager			-234.8***
			(48.17)
Quit because of the work			-199.5***
			(68.80)
Fired, laid off, or end of temp work			-216.0***
			(43.70)
Quit for other or multiple reasons			-133.5***
			(19.83)
n	1456	1456	1456

* p<0.10 ** p<0.05 *** p<0.01

Appendix Table 1. Correlation Matrix Between Components of Instability Scale

	Variable schedule	<2 weeks notice	On-call	Cancelled shift	No schedule control	Clopening shift
Variable schedule	1.00					
<2 weeks notice	-0.02	1.00				
On-call	0.01	0.13	1.00			
Cancelled shift	0.07	0.09	0.11	1.00		
No schedule control	0.04	0.10	0.05	0.12	1.00	
Clopening shift	0.14	0.05	0.17	0.10	0.13	1.00

Appendix Table 2. Regression Coefficients from Table 3

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Log Odds	Robust SE	Log Odds	Robust SE	Log Odds	Robust SE	Log Odds	Robust SE	Log Odds	Robust SE	Log Odds	Robust SE
Race												
White Non-Hispanic (reference category)												
Black Non-Hispanic	-0.0047	(0.28)	0.0076	(0.29)	0.023	(0.28)	0.019	(0.28)	0.050	(0.29)	-0.0076	(0.29)
Hispanic	0.041	(0.15)	0.077	(0.15)	0.057	(0.15)	0.078	(0.15)	0.080	(0.15)	0.063	(0.15)
Other Race/Ethnicity Non-Hispanic	0.23	(0.24)	0.24	(0.23)	0.22	(0.24)	0.22	(0.24)	0.27	(0.23)	0.25	(0.24)
Female	-0.14	(0.13)	-0.12	(0.13)	-0.14	(0.13)	-0.14	(0.13)	-0.13	(0.13)	-0.14	(0.13)
Has kids	-0.12	(0.17)	-0.11	(0.17)	-0.078	(0.17)	-0.083	(0.17)	-0.13	(0.17)	-0.048	(0.17)
Age group												
18-19 years old (reference category)												
20-29 years old	0.11	(0.17)	0.069	(0.17)	0.091	(0.17)	0.13	(0.17)	0.10	(0.17)	0.092	(0.17)
30-39 years old	-0.27	(0.25)	-0.33	(0.25)	-0.30	(0.24)	-0.26	(0.25)	-0.29	(0.25)	-0.30	(0.25)
40-49 years old	-0.26	(0.29)	-0.32	(0.29)	-0.30	(0.29)	-0.27	(0.29)	-0.29	(0.29)	-0.30	(0.29)
50-59 years old	-0.30	(0.41)	-0.37	(0.41)	-0.33	(0.41)	-0.25	(0.41)	-0.28	(0.41)	-0.30	(0.41)
60-69 years old	-1.05	(1.02)	-1.12	(1.03)	-1.07	(1.02)	-1.05	(1.01)	-1.16	(1.06)	-1.12	(1.07)
Education No degree or diploma earned (reference category)												
High school diploma/GED	-0.43	(0.28)	-0.40	(0.28)	-0.44	(0.27)	-0.45	(0.28)	-0.43	(0.28)	-0.41	(0.28)
Some college	-0.31	(0.27)	-0.27	(0.27)	-0.32	(0.27)	-0.31	(0.27)	-0.31	(0.27)	-0.29	(0.28)
Enrolled in school	0.0038	(0.14)	-0.029	(0.14)	0.0025	(0.14)	-0.0016	(0.14)	0.060	(0.14)	0.030	(0.14)
Relationship status												
Married (reference category)												
Cohabiting	-0.013	(0.18)	-0.032	(0.18)	0.0056	(0.18)	0.042	(0.18)	-0.0082	(0.18)	0.0067	(0.18)
Single	-0.34*	(0.18)	-0.32*	(0.18)	-0.32*	(0.18)	-0.30*	(0.18)	-0.35*	(0.18)	-0.32*	(0.18)
Usual weekly work hours												
0-10 hours (reference category)												

10-20 hours	-0.18	(0.30)	-0.096	(0.31)	-0.22	(0.30)	-0.25	(0.31)	-0.19	(0.30)	-0.15	(0.30)
20-30 hours	-0.28	(0.29)	-0.18	(0.30)	-0.33	(0.29)	-0.36	(0.30)	-0.23	(0.29)	-0.26	(0.29)
30-40 hours	-0.42	(0.30)	-0.28	(0.31)	-0.47	(0.30)	-0.47	(0.31)	-0.40	(0.30)	-0.38	(0.30)
40+ hours	0.23	(0.38)	0.41	(0.38)	0.17	(0.38)	0.20	(0.38)	0.27	(0.38)	0.20	(0.37)
Job tenure												
Less than 1 year (reference category)												
1-2 years	-0.23*	(0.14)	-0.24*	(0.14)	-0.25*	(0.14)	-0.22	(0.14)	-0.24*	(0.14)	-0.28**	(0.14)
3-5 years	-0.40**	(0.17)	-0.41**	(0.17)	-0.42**	(0.17)	-0.38**	(0.17)	-0.39**	(0.17)	-0.45***	(0.17)
6+ years	-0.96***	(0.22)	-0.95***	(0.22)	-0.96***	(0.23)	-0.90***	(0.23)	-0.94***	(0.23)	-1.01***	(0.22)
Manager	0.31+	(0.17)	0.29+	(0.17)	0.31+	(0.17)	0.27	(0.17)	0.28+	(0.17)	0.25	(0.17)
Industry												
Retail (reference category)												
Department/discount stores/General Merch	0.26	(0.21)	0.23	(0.21)	0.25	(0.21)	0.30	(0.21)	0.28	(0.21)	0.21	(0.21)
Grocery	-0.11	(0.23)	-0.12	(0.23)	-0.11	(0.23)	-0.12	(0.23)	-0.21	(0.23)	-0.14	(0.23)
Clothing	0.33	(0.30)	0.13	(0.32)	0.33	(0.30)	0.36	(0.31)	0.33	(0.31)	0.22	(0.31)
Restaurants and Food Services	0.17	(0.19)	0.17	(0.19)	0.19	(0.19)	0.24	(0.19)	0.050	(0.19)	0.19	(0.19)
Pharmacy	-0.16	(0.35)	-0.18	(0.35)	-0.10	(0.35)	-0.051	(0.36)	-0.21	(0.36)	-0.12	(0.35)
Hourly wage ($)	-0.025	(0.020)	-0.024	(0.020)	-0.026	(0.021)	-0.029	(0.021)	-0.0098	(0.021)	-0.010	(0.021)
Months between contacts	0.12**	(0.051)	0.13**	(0.051)	0.11**	(0.051)	0.11**	(0.051)	0.12**	(0.052)	0.13**	(0.051)
n	1725		1725		1725		1719		1715		1725	

* p<0.10 ** p<0.05 *** p<0.01

Appendix Table 3. Log Odds and Odds Ratios of Quit regressed on Schedule Instability

	Log Odds	Robust SE	Odds Ratio	95% CI
On-call	0.41***	(0.14)	1.51***	[1.15 - 1.97]
Cancelled shift	0.55***	(0.16)	1.73***	[1.26 - 2.37]
Clopening shift	0.21*	(0.12)	1.23*	[0.97 - 1.57]
Schedule type				
Regular day (reference category)				
Variable schedule	0.27	(0.17)	1.31	[0.94 - 1.82]
Regular Evening Schedule	0.35	(0.22)	1.42	[0.92 - 2.20]
Regular Night Shift	0.075	(0.25)	1.08	[0.66 - 1.77]
Rotating Schedule	0.41**	(0.19)	1.50**	[1.03 - 2.20]
Other	-0.14	(0.37)	0.87	[0.42 - 1.79]
Advance notice				
2+ weeks (reference category)				
1-2 weeks	0.43***	(0.14)	1.54***	[1.17 - 2.03]
4-6 days	0.26	(0.25)	1.29	[0.79 - 2.11]
0-3 days	0.67***	(0.17)	1.95***	[1.41 - 2.70]
Instability scale				
0 types of instability (reference category)				
1	-0.15	(0.23)	0.86	[0.55 - 1.37]
2	0.089	(0.23)	1.09	[0.70 - 1.70]
3	0.55**	(0.23)	1.74**	[1.11 - 2.72]
4	0.60**	(0.26)	1.81**	[1.09 - 3.03]
5+	1.03***	(0.31)	2.80***	[1.54 - 5.09]

* p<0.10 ** p<0.05 *** p<0.01

Appendix Table 4. Log odds of Quit regressed on Schedule Instability Scale with and without Mediators

Log odds coefficients, robust standard errors (total and direct effects) and Sobel (1982) standard errors (indirect effects), and percent mediated shown

	Mediators											
	Caregiving			Job Satisfaction			Financial Strain			Fair Treatment		
	Total effect	Direct effect	Indirect effect	Total effect	Direct effect	Indirect effect	Total effect	Direct effect	Indirect effect	Total effect	Direct effect	Indirect effect
Instability scale												
1	-0.137	-0.251	0.114	-0.153	-0.280	0.126	-0.140	-0.169	0.0289	-0.143	-0.226	0.0836
	(0.239)	(0.239)	(0.231)	(0.238)	(0.239)	(0.324)	(0.235)	(0.234)	(0.0829)	(0.238)	(0.238)	(0.210)
	100%	**183%**	**-83%**	**100%**	**183%**	**-82%**	**100%**	**121%**	**-21%**	**100%**	**158%**	**-58%**
2	0.0984	-0.0709	0.169	0.0927	-0.0935	0.186	0.0960	0.0464	0.0496	0.0960	-0.00481	0.101
	(0.230)	(0.231)	(0.232)	(0.231)	(0.232)	(0.324)	(0.226)	(0.227)	(0.0855)	(0.230)	(0.230)	(0.210)
	100%	**-72%**	**172%**	**100%**	**-101%**	**201%**	**100%**	**48%**	**52%**	**100%**	**-5%**	**105%**
3	0.575**	0.267	0.308	0.562**	0.174	0.388	0.561**	0.490**	0.0714	0.568**	0.342	0.226
	(0.235)	(0.239)	(0.237)	(0.234)	(0.239)	(0.327)	(0.230)	(0.232)	(0.0897)	(0.233)	(0.235)	(0.214)
	100%	**46%**	**54%**	**100%**	**31%**	**69%**	**100%**	**87%**	**13%**	**100%**	**60%**	**40%**
4	0.622**	0.273	0.348	0.607**	0.187	0.420	0.602**	0.514+	0.0871	0.612**	0.366	0.246
	(0.266)	(0.270)	(0.239)	(0.267)	(0.271)	(0.328)	(0.262)	(0.265)	(0.0934)	(0.264)	(0.267)	(0.215)
	100%	**44%**	**56%**	**100%**	**31%**	**69%**	**100%**	**85%**	**14%**	**100%**	**60%**	**40%**
5+	1.056***	0.498	0.558**	1.055***	0.425	0.630*	1.037***	0.890***	0.147	1.055***	0.681**	0.374*
	(0.315)	(0.327)	(0.251)	(0.315)	(0.327)	(0.333)	(0.307)	(0.316)	(0.112)	(0.309)	(0.316)	(0.223)
	100%	**47%**	**53%**	**100%**	**40%**	**60%**	**100%**	**86%**	**14%**	**100%**	**65%**	**35%**

* p<0.10 ** p<0.05 *** p<0.01

Appendix Table 5. Unadjusted and Adjusted Probabilities of Nonresponse

	Probability of nonresponse	
Variable	Unadjusted	Adjusted
Gender		
Male	0.57	0.56
Female	0.52	0.51
Other	0.45	0.52
Education		
No degree or diploma earned	0.58	0.57
High school diploma/GED	0.52	0.52
Some college	0.45	0.43
Enrolled		
No	0.56	0.55
Yes	0.49	0.50