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Abstract

This study tests a central theoretical assumption of stress process and job strain models, namely that increases in employees' control and support at work should promote well-being. To do so, we use a group-randomized field trial with longitudinal data from 867 information technology (IT) workers to investigate the well-being effects of STAR, an organizational intervention designed to promote greater employee control over work time and greater supervisor support for workers' personal lives. We also offer a unique analysis of an unexpected field effect—a company merger—among workers surveyed earlier versus later in the study period, before or after the merger announcement. We find few STAR effects for the latter group, but over 12 months, STAR reduced burnout, perceived stress, and psychological distress, and increased job satisfaction, for the early survey group. STAR effects are partially mediated by increases in schedule control and declines in family-to-work conflict and burnout (an outcome and mediator) by six months. Moderating effects show that STAR benefits women in reducing psychological distress and perceived stress, and increases non-supervisory employees' job satisfaction. This study demonstrates, with a rigorous design, that organizational-level initiatives can promote employee well-being.

Keywords

subjective well-being, flexibility, organizational intervention, work-family, gender

Scholars have long theorized social structures, contexts, and policies as central to physical and emotional health (cf. Berkman, Kawachi, and Glymour 2014; House 2002; Schoeni et al. 2008; Tausig and Fenwick 2011). This “social determinants of health” framing has generated a lively field of sociological research on the social causes of illness, health, and subjective well-being (Aneshensel, Rutter, and Lachenbruch

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1991; Link and Phelan 1995; Turner, Wheaton, and Lloyd 1995; Wheaton 2001; Wheaton and Clarke 2003; Wickrama et al. 1997). This work emphasizes the embeddedness of individuals in particular social structures, with corresponding risks, rules, claims (or needs/demands), and resources that shape their subjective well-being (Keyes 1998; Kohn and Schooler 1982; Mirowsky and Ross 2003a, 2003b; Ross and Mirowsky 1992, 2003; Ryff and Keyes 1995).

The social determinants of health perspective proposes that *changing* the social context should, therefore, promote or reduce health outcomes. This is the thesis underpinning our study, in which we sought to implement a change in the pivotal social environment of paid work. Specifically, we draw on a group-randomized field trial of an organizational intervention designed to promote control over work time and supervisor support for employees' personal and family life. We collected longitudinal data from 867 information technology (IT) workers in a Fortune 500 corporation to assess whether such changes do, in fact, improve four measures of subjective well-being: burnout, job satisfaction, perceived stress, and psychological distress. Studying the well-being effects of increasing work-time control and support also informs scholarship on work-family conflict, gender, and work-time mismatches (Angrave and Charlwood 2015; Reynolds and Aletraris 2006; Schieman, Milkie, and Glavin 2009).

THEORETICAL UNDERPINNINGS

Four theoretical threads guide much of the research on the social determinants of health. Sociologists have drawn on stress process theory, which contends that structural conditions produce stress that affects subjective well-being (Pearlin 1999; Pearlin et al. 1981). A second thread is the considerable interdisciplinary scholarship on the job strain theoretical model, where high strain is the result of high demands combined with low control and low support (Johnson and Hall 1988; Karasek 1979; Karasek and Theorell 1990, 2000).

Third, fundamental cause theory is used to explain the ongoing relationship between socioeconomic status (SES) and health/well-being outcomes over time (Link and Phelan 1995; Link et al. 2008; Phelan et al. 2004; Phelan, Link, and Tehranifar 2010). People with higher SES more often possess and have access to resources—such as economic, cultural, and social capital—that protect them from multiple deleterious health outcomes. The fourth thread emphasizes the social gradient, arguing that occupational status predicts health, well-being, and mortality (Marmot et al. 1997; Marmot et al. 1991).

Because we are testing whether a deliberate change in the work environment promotes subjective well-being, and not examining the reproduction of advantages/disadvantages among people with different status locations, we draw on stress process and job strain theories. We control for location in the status hierarchy by sampling workers in one industry (information technology) and one organization (a Fortune 500 firm). This professional sample was a deliberate choice because we were seeking employees in a demanding work environment but without a raft of other stressors associated with low income that might override any work initiative we could design. In other words, this sample allows us to investigate the effects of changes in the work environment among workers who face high work demands, but who are unlikely to face additional neighborhood and family stressors tied to poverty and financial struggles that would not be addressed by this intervention.

Theorizing Change: The Stress Process Approach

Stress has been defined as the mismatch between claims and resources, or the misfit between a person and her environment (Kaplan 1983). A long tradition of theory and research on family stress (e.g., Hill 1949; Hochschild 1989), life course processes (Elder, George, and Shanahan 1996; Moen and Roehling 2005), and stress more generally (e.g., Lazarus and Folkman 1984; Mirowsky and Ross 2003a,

2003b; Pearlin et al. 1981; Pearlin et al. 2005; Turner et al. 1995) depicts stress as occurring when a gap between resources and claims (i.e., the demands, needs, and expectations that individuals face) reduces people's sense of control. Scholars underscore that shifts in both resources and claims alter the social environment over the life course (e.g., Elder 1998; Pearlin et al. 1981; Pearlin et al. 2005). Pearlin (1989:241) points out the importance of observing "how deeply well-being is affected by the structured arrangements of people's lives and by the repeated experiences that stem from these arrangements."

The structural arrangements of paid work are fundamental to well-being, given that work is pivotal to identity, meaning, routine, and status, as well as income, and occupies many waking hours of adults in the workforce. For contemporary workers, role strain is often implicitly or explicitly about *time* (e.g., gaps between the time needed for occupational and family demands, and how to schedule and arrange work and family tasks so multiple responsibilities can be met) (see also Clawson and Gerstel 2014; Fenwick and Tausig 2007; Jacobs and Gerson 2004; Moen 2003; Schieman, Whitestone, and Van Gundy 2006). This was the rationale for the development of our intervention aimed at providing workers with more control over their time and training supervisors to recognize the conflicting work and home pressures workers face. Note that we are examining workers' control over their work time, not reductions in work time such as part-time hours. Research shows that people with more ability to manage their time and more support from their supervisors report greater well-being. The challenge is to devise and test whether an organizational *change* giving workers greater control over their time and more supervisor support *improves* their well-being.

Theorizing Stressful Work Conditions: The Job Strain Model

The job strain model proposes that people with the greatest strain—workers in highly

demanding jobs with low job control and low support—are the most at risk of occupational hazards tied to poor health. Karasek (1979:290) describes job control as an employee's "potential control over his tasks and his conduct during the working day," operationalizing job control as "decision authority" and "intellectual [or skill] discretion." Job control has been empirically linked, in cross-sectional and longitudinal studies, to exhaustion and depressive symptoms (Mausner-Dorsch and Eaton 2000), psychophysiological stress responses, alcohol use, high blood pressure, heart disease (e.g., Bosma, Stansfeld, and Marmot 1998), mental and physical health (D'Souza et al. 2003; Stansfeld and Candy 2006), and work-family conflict and strain (Thomas and Ganster 1995). Ample evidence thus links job control with subjective well-being as well as physical health (see also de Lange et al. 2004; Van Der Doef and Maes 1999).

Research using the job strain model typically compares workers with considerable resources (like high levels of control and support) to other workers whose job conditions offer few such resources (little control or support). These research designs raise issues of selection, because different types of workers choose or are allocated to particular job environments that provide more or less control and more or less support. In other words, it is difficult to disentangle the well-being effects of stress-reducing organizational resources (such as control and support) from the well-being effects of other, unmeasured variables that may lead workers to jobs with different resources.

Combining these Approaches and Key Contributions

What is missing in the job strain literature are the health and well-being effects of employees' control over work time and supervisors' support of family and personal lives. The job strain model focuses on employees' control over *how* they perform their work, but many employees are stressed because they do not

have control over their *work time* (see Kelly, Moen, and Tranby 2011; Lyness et al. 2012; Moen, Kelly, and Hill 2011; Moen, Kelly, and Lam 2013; Moen, Kelly, Tranby, and Huang 2011). Similarly, the job strain model ties support at work to health but does not attend specifically to workplace support for non-work domains.

What is missing in the stress process literature is recognition of the importance of *deliberately changing conditions* and the importance of the meso-level work context, that is, the ways shifting policies and practices of a specific work organization affect individual workers' (micro-level) mental health. The stress process approach recognizes that changing resources and claims or needs enhance or reduce people's sense of control over their lives and affect their well-being (Gotlib and Wheaton 1997; Pearlin et al. 2005). For example, becoming unemployed (Pearlin 1989) or taking on caregiving of an aging parent (Aneshensel et al. 1995) increases stress and reduces feelings of well-being. Longitudinal studies capturing changing environments are thus key to capturing the stress process. However, researchers cannot randomly assign respondents to unemployment or caregiving, for instance, and various selection effects or corollary stressors affecting the odds of those changes may also affect well-being. This study thus extends the stress process literature to investigate whether and how deliberate randomized organizational changes may promote well-being.

The importance of our study to both stress process and job strain theories is that we move beyond comparisons of different types of workers (status differences) or those in different environments (e.g., high versus low control jobs) to study organizational changes that may reduce workers' stress and promote their well-being. We are thus testing the stress process approach and a variant of the job strain model (looking at time control rather than job control) in a deliberate experiment, not simply comparing people in different circumstances. Specifically, we investigate

within-person change in well-being over time in light of changes in their work-related resources. We do so through a rigorous field trial design, randomizing work teams to "STAR" (treatment) and "usual practice" (control) groups. This permits an assessment of whether a deliberate shift in the social environment produces corresponding shifts in well-being outcomes. This is arguably one of the strongest tests of stress process theory to date.

A substantial literature explores the relationship between work conditions and subjective well-being (e.g., Karasek 1979; Marklund, Bolin, and von Essen 2008; Mausner-Dorsch and Eaton 2000; Thomas and Ganster 1995), but relatively few longitudinal studies examine changes in these relationships over time (but see Kleiner and Pavalko 2010; Scott-Marshall 2010). Occupational health scholars have long emphasized workplace health promotion through individual behavioral change (e.g., reducing smoking [see Cahill and Lancaster 2014; Kristensen 2000]). These scholars are increasingly investigating deliberate interventions to change work conditions more broadly to improve employees' well-being, but this literature is largely divorced from sociologists' analysis of the social determinants of health and well-being. For example, a review of (non-experimental) organizational intervention studies "found some evidence of health benefits (especially beneficial effects on mental health, including reduction in anxiety and depression) when employee control improved or (less consistently) demands decreased or support increased" (Egan et al. 2007:945). But even in this field, randomized controlled trials are rare. None were included in systematic reviews of the health effects of organizational interventions (Egan et al. 2007), flexible work interventions and health (Joyce et al. 2012), or schedule control and health (Nijp et al. 2012).¹ Yet randomized field studies of the effects of organizational interventions on changes in subjective well-being over time are key to establishing causal relationships (Morgan and Winship 2007; see also Bianchi and Milkie 2010).

DESIGN

This is a randomized field trial assessing the effect of an organizational intervention on a range of measures of subjective well-being among employees of a large U.S. firm we call TOMO. The workplace initiative, STAR (Support. Transform. Achieve. Results.), was developed by the interdisciplinary Work Family and Health Network (WFHN), a national consortium of researchers working with organizational development experts to create and implement an evidence-based intervention to improve the work-family interface and health (King et al. 2012).

Both stress process and job strain theories emphasize the importance of work resources, and the implicit assumption in both is that increasing those resources should promote well-being. We fashioned the STAR intervention based on stress process and job strain theories, together with insights garnered from previous pilot studies (Hammer et al. 2011; Kelly et al. 2011; Kossek et al. 2011; Moen, Kelly, and Hill 2011; Moen et al. 2013; Moen, Kelly, Tranby, and Huang 2011). Details on the STAR intervention and its rollout are provided below, but we address the underlying logic here. Schedule control appears to be related to but distinct from traditional measures of job control (Moen, Kelly, and Huang 2008; Moen et al. 2013; Schieman et al. 2009). Similarly, having a supervisor supportive of family and personal life has been shown to promote well-being (Hammer et al. 2011; Kossek et al. 2011). STAR aims to (1) increase employees' control over their work hours and schedules and (2) increase employee perceptions of supervisor support for employees' work and family/personal lives. STAR's third goal, tied to research on the organizational rewards associated with "face time" and long hours, is to reorient the work culture toward results, rather than hours at the workplace (Kossek et al. 2014). We address the question: Does providing workers real flexibility in the form of greater control over their working time and more supportive supervisors improve their subjective well-being?

Previous analyses show that employees randomized to STAR subsequently report more schedules they describe as "variable" rather than a set shift, work more at home, feel more control over their work time, and see their supervisors as more supportive of their personal and family commitments, compared to employees in the control group (Kelly et al. 2014). We analyze STAR's impact on subjective well-being outcomes to begin investigating whether and how these workplace changes affect employees' health. Specifically, we identify the effects of STAR on changes in four measures of well-being over a 12-month period: burnout, job satisfaction, perceived stress, and psychological distress. Such subjective well-being measures are important in terms of intrinsic life quality, but they are also related to other health outcomes and have the potential to decrease stress-related symptoms and illnesses over a longer period of time (Melamed et al. 2006; Stansfeld et al. 2002). We focus on this set of well-being outcomes to assess whether outcomes proximal to work (burnout and job satisfaction) may be more sensitive to STAR effects than more global measures (perceived stress and psychological distress).

We also consider how the timing of an unexpected stressful organizational event—a merger—may have moderated any STAR effects. Because a merger was announced during the course of data collection, we are able to investigate whether the deliberate changes tied to the STAR intervention, including increased support and control over work time, had different effects depending on whether they were experienced prior to the shock of the merger announcement or after the stress of the impending merger was introduced.

HYPOTHESES

Taken together, the job strain and stress process approaches lead us to theorize that deliberate organizational changes targeting employees' control over their work time and the support they receive should produce corresponding changes in employees' subjective

well-being. Unlike worksite health promotion interventions that target stress or well-being directly as a private individual trouble (e.g., yoga classes or mindfulness training [see Hartfiel et al. 2011; Kabat-Zinn 2003]), STAR aims to change the rules of the game at work (including the policies, practices, interactions, and expectations that structure employees' lives on the job) and affect how work and personal life can be managed effectively and with less strain. STAR facilitates new practices, such as increased options to work at home and flexibility to shift one's schedule, but also emphasizes that employees have control over when, where, and how they do their work and that managers and co-workers support their efforts to address family and personal responsibilities (Kelly et al. 2014). Stress process theory suggests that this work redesign intervention may increase energy resources and decrease exposure to stresses by giving employees control to "fit" the pieces of their lives together more easily and feel supported in those efforts, thereby improving subjective well-being. Similarly, the job strain model suggests that increasing employees' control over where and when they do their work and providing greater support for family and personal life will enhance well-being.

Hypothesis 1: Employees randomized to the STAR initiative will experience positive changes in indicators of well-being (an increase in job satisfaction and decreases in burnout, perceived stress, and psychological distress) compared to employees working under usual practices (control group).

We also investigate possible mediators of the relationship between STAR and subjective well-being to help identify mechanisms through which workplace interventions may benefit employees. We theorize a mediated model in that we anticipate STAR will have direct effects in enhancing workers' subjective well-being, but will also operate in part through five theorized mechanisms: increasing workers' sense of schedule control,

increasing workers' sense that their supervisors are supportive, reducing workers' work-family conflict, encouraging workers to shift their schedules and work more at home, and reducing workers' feelings of burnout. We treat burnout—specifically emotional exhaustion—as an outcome, because it is an important measure of psychological health, but we also investigate whether changes in burnout by six months mediate the effects of STAR on the other well-being outcomes.

Increasing workers' schedule control and sense of having a supportive supervisor are key goals of the STAR intervention and have been shown to change in the expected directions by the six-month follow-up (Kelly et al. 2014). Given that these two resources are strongly correlated with subjective well-being outcomes (Grzywacz, Carlson, and Shulkin 2008; Moen, Kelly, Tranby, and Huang 2011), we expect changes in them to mediate the salutary well-being effects of STAR. Work-family conflicts (from family to work as well as from work to family) are a common form of stress in the lives of contemporary workers (Bianchi, Casper, and King 2005; Bianchi and Milkie 2010; Major, Klein, and Ehrhart 2002), as is burnout (Halbesleben and Buckley 2004; Maslach, Schaufeli, and Leiter 2001; Schaufeli and Bakker 2004). We test whether the STAR intervention promotes subjective well-being through the reduced work-to-family and family-to-work conflict observed previously (Kelly et al. 2014). Shifting work schedules and working at home may also enable workers to adjust their work arrangements to better fit their individual and family needs, thereby improving well-being.

Hypothesis 2: Changes in workers' perceptions of schedule control, family supportive supervisors, work-family conflict, and burnout, along with increases in working at home and shifts in schedules, will mediate STAR effects on subjective well-being.

The stress process approach emphasizes potential differences in well-being outcomes based on status locations (Pearlin 1999;

Pearlin et al. 1981). This theory underscores the inequality in stress and well-being based on mostly invariant status locations like gender, race, and social class. Additionally, role strain, or “the felt difficulty in fulfilling role obligations” (Goode 1960:483), is a chronic stressor found more often among people in different status locations. Accordingly, we examine variations in STAR effects for particular subgroups, theorizing that workers in this professional sample most at risk of chronic stress at home and on the job, and facing the greatest work-family strains, will benefit most from STAR. (Naturally, STAR may be too small a change to address the many multifaceted stressors—including economic insecurity—confronting less privileged workers; hence our focus on professionals.)

Hypothesis 3: Workers with more family-care obligations (i.e., women generally, or women or men with children at home) or fewer job-related resources (employees compared to managers) will benefit more from STAR.

We also investigate age-cohort differences in the effects of STAR, given the different family-care obligations and different expectations regarding work and family across age-cohorts (Galinsky, Aumann, and Bond 2009).

ORGANIZATIONAL CHANGES: STAR AND AN UNEXPECTED MERGER

The STAR intervention was delivered as a pilot initiative in the information technology (IT) division of a Fortune 500 company and was announced by senior executives. STAR was not presented as part of the larger study investigating how work affects health and personal life broadly, but instead as a company pilot that might well be implemented throughout the IT division eventually. Although STAR was developed jointly by WFHN researchers and outside consultants, the training was delivered by consultants. This pilot process was not seen as unusual;

the IT division commonly piloted new initiatives developed in-house or brought in by consultants.

STAR involved eight hours of participatory training sessions that encouraged teams and managers to identify new work practices and processes that would increase employees' control over their work time and focus on key results (rather than simply face time at work). For example, there were extensive discussions concerning communicating by instant messenger, coordinating more efficiently with off-shore staff, and better anticipating and handling periods of high demands, such as around software releases. Additionally, training activities proposed that being “always on”—quickly responsive via e-mail, instant messenger, or in person—did not necessarily mean workers were productive or efficient in accomplishing the most important tasks. Teams varied in the changes they implemented regarding work processes and coordination, but all workers randomized to the STAR initiative experienced considerable flexibility as to where and when they worked, including the ability to work at home without requiring a supervisor's permission. Previously, work at home was sometimes allowed with managerial approval, but such a case-by-case “accommodation” does not shift control to employees (Kelly et al. 2014; Moen, Kelly, Tranby, and Huang 2011).

The STAR intervention also involved supervisor training to encourage supervisor support for family/personal life and professional development; this involved four hours of additional training sessions as well as customized computer-based training for managers that included a video message from a senior executive endorsing STAR. Given their centrality to STAR (and the theories that informed the intervention), we analyze changes in workers' sense of control over work time and location, and their supervisor being supportive of family and personal life, as likely mechanisms linking the STAR initiative with improvements in workers' well-being. For more information on STAR, its development, and its customization for this organizational culture, see Kelly and colleagues (2014), Kossek and colleagues

(2014), and STAR materials at <http://www.workfamilyhealthnetwork.org>.

Randomized field trials offer the strongest causal evidence for the effects of interventions (Hannan 2006; Oakes and Kaufman 2006). Yet, any field study is vulnerable to real-world events. In this case, a merger was announced during our data collection, while STAR training was occurring for some groups randomized to the intervention. This unexpected event, portending significant organizational changes, directly affected the study, because the survey and STAR were rolled out to different units of this IT workforce over an extended period of about 12 months.² Such external shocks cannot simply be ignored in research (although they often are). Moreover, this surprise event offered the opportunity to further capture the stress process (Pearlin 1989; Pearlin et al. 1981; Pearlin et al. 2005): suddenly learning one's employer is to be taken over by another corporation generates a pervasive sense of uncertainty about the future (Lam et al. 2015).

Everyone in the study was exposed to the merger announcement and process, but the timing vis-à-vis our data collection suggested different outcomes by survey timing. The Early Survey Group was interviewed first and, for those randomized to the experimental condition, began the STAR intervention prior to the merger announcement.³ The Late Survey Group was exposed to the merger announcement before the baseline survey and before STAR. Because of this difference in timing, we consider these two groups separately. As we will describe, we propose that STAR will have stronger effects on well-being outcomes for respondents in the Early Survey Group, who had completed or initiated STAR prior to the merger announcement.

In effect, the merger provided an opportunity to assess the influence of an unexpected organizational stressor at about the same time an intervention to improve well-being was introduced. Mergers and restructuring are part and parcel of corporate life, but few studies examine organizational interventions in the context of other ongoing organizational changes that may involve new roles, relocation, or job

loss. The limited research, though, suggests that organizational interventions aimed at increasing employees' control have no positive effects in the context of downsizing (Egan et al. 2007).

We are able to use this conjunction of the planned and unplanned organizational changes to suggest scope conditions for the benefits of initiatives like STAR. The timing of the baseline survey and the introduction of the STAR intervention in relation to the exogenous shock of the merger announcement adds complexity to the study, but it also enables us to assess whether an increase in resources (supervisor support and schedule control) *prior to* an exogenous stressor (merger announcement) operates differently than introduction of an intervention following such an exogenous shock. We expect the Early Survey Group (who experienced STAR before learning about the merger) may have been more open to this work redesign and thus better positioned to benefit from it. This group is the focus of our analysis.

Although implementation of STAR was identical for the Early and Late Survey Groups, the ways employees interpreted the intervention may not be the same. Workers undergoing the baseline survey and STAR training after the merger announcement (Late Survey Group) may not have taken the STAR intervention seriously, given the uncertainties and dislocations fueled by this announcement. Indeed, observations of STAR training sessions occurring after the merger announcement revealed that employees routinely and explicitly questioned whether STAR would "survive" the merger and whether it fit with the emerging culture of the combined firm. Moreover, the Late Survey Group's baseline responses already reflect the effects of knowing about the merger, leading to some differences from the baseline responses of the Early Survey Group (see Lam et al. 2015). Differences between the two groups may arise from different perspectives because the Late Survey Group knew of the upcoming takeover. Accordingly, we present the results separately for these two groups and focus on the Early Survey Group.

METHODS

Randomization

The randomization process began by grouping employees and managers in the IT division into 56 study groups. Some groups consisted of large teams reporting to the same manager; other study groups included combinations of several smaller teams who either reported to the same senior leadership or worked closely together on the same application. We developed a randomization design that would ensure balance on job function, division (reporting to a particular VP), and size of study group, modifying a biased-coin randomization technique for use with group randomization (Bray et al. 2013; Frane 1998). All eligible work units within the IT division participated in and were randomized to STAR or to usual practice.

Study Recruitment and Data Collection

We use data collected at three time points—baseline, six months, and 12 months—from employees and managers in two cities who were part of the Information Technology (IT) division of this major U.S. firm.⁴ Recruitment materials emphasized the value of a study investigating the connections between employees' work, family, and health for the employees (who received some personalized health information), the employing organization, and scientific knowledge more broadly; there was no reference to STAR. Recruitment materials also emphasized the independence of the research team from TOMO and the confidentiality of individual data. Computer-assisted personal interviews lasting approximately 60 minutes were conducted at the workplace on company time.

Sample

The sample combines responses from employees and managers; they answered the same survey questions, except managers were not asked about perceived stress (saving time for other questions). At baseline, 70 percent of

eligible employees participated ($N = 823$); 87 percent ($N = 717$) and 85 percent ($N = 701$) of baseline employee participants were retained in the 6-month and 12-month follow-ups, respectively. The response rate at baseline among managers was 86 percent ($N = 221$), with 89 percent ($N = 196$) and 85 percent ($N = 188$) of baseline managers completing the 6-month and 12-month follow-ups. We conducted analyses among respondents who completed all three survey waves.⁵

Study groups began the study on a rolling basis over a year to accommodate limited staff and space for the in-person interviews. When the Late Survey Group went through STAR training, they already knew about the impending takeover by another organization. In contrast, the Early Survey Group randomized to STAR went through the initiative early in the roll-out, before learning of the looming merger.

The Early Survey Group analytic sample consisted of 455 respondents nested in 32 study groups. The Late Survey Group's answers at baseline reflect the fact that they already knew about the upcoming merger. However, for comparison, we show results for both survey groups in Tables 1 and 2. Results for the pooled sample (867 respondents in 56 study groups) are shown in Table S2 of the online supplement (<http://asr.sagepub.com/supplemental>); these models include a variable *merger announcement timing* distinguishing the Early Survey Group (= 1) from the Late Survey Group (= 0).

Measures

Our principal explanatory variable is exposure to the *STAR intervention*, with respondents randomized to the intervention (STAR) coded 1 and the controls (usual practice) coded 0. This specification reflects an intent-to-treat analysis, in which all respondents randomized to the intervention are assumed to be "exposed" to the treatment of STAR. In this analytic sample, mean attendance rate was 76 percent of sessions. Among this group, 9 percent ($n = 20$) attended fewer than

half of the STAR sessions, and only 3 percent ($n = 7$) of those randomized to STAR attended none of the sessions. Intent-to-treat is the more conservative approach for evaluating effects of interventions, preserving the identification strategy of the experimental design (Begg et al. 1996; Friedman, Furberg, and DeMets 2010).

Details of measures, including items and alphas, are available in Table S1 in the online supplement. *Emotional exhaustion (burnout)* consists of a three-item subscale of the Maslach Burnout Inventory (Maslach and Jackson 1986). *Job satisfaction* is measured by a three-item scale developed by Cammann and colleagues (1983) on global job satisfaction. *Perceived stress* is evaluated with a four-item scale validated by Cohen, Kamarck, and Mermelstein (1983) that has been found to be predictive of physical and mental health outcomes.⁶ This measure was only on the employee survey; managers are therefore not included in the analysis of perceived stress. *Psychological distress* is captured by the K6, a six-item scale validated by Kessler and colleagues (2003) that is widely used in the United States as an assessment of nonspecific psychological distress.

To preserve temporal order, we constructed mediators as six-month changes, subtracting Wave 1 from Wave 2, in the following variables. *Schedule control* reflects the degree to which respondents felt they had control over their work time, with eight items adapted from Thomas and Ganster (1995). *Family supportive supervisor behaviors (FSSB)* assesses employee perceptions of supervisors' behavioral support for integrating work and family (Hammer et al. 2013). *Family-to-work conflict* reflects the degree to which role responsibilities from family or personal life are incompatible with participation in the work role; we use a five-item subscale developed by Netemeyer, Boles, and McMurrian (1996). We also tested the effects of changes in *work-to-family conflict* (Netemeyer et al. 1996) as a potential mediator. For the Early Survey Group, however, STAR does not significantly predict changes in work-to-family

conflict, suggesting it is not, in fact, a mediator. *Variable schedule* distinguishes work schedules that may change from a set day-time, evening, or night schedule. We constructed *hours working at home* based on the question, "About how many hours/week do you work or take calls from home on this job?" We analyze burnout as a measure of subjective well-being (when we assess change by 12 months) and a potential intervening mechanism (change by six months in burnout may mediate other 12-month outcomes).

Subgroup analyses investigate whether respondents with greater vulnerability or resources relevant to the work-family interface benefit more from the STAR intervention. We defined three key subgroups on the basis of *gender* (women coded as 1), *age-cohort* (respondents born before 1955 coded as Leading-Edge Boomers, respondents born between 1955 and 1964 coded as Trailing-Edge Boomers, and respondents born in 1965 and later coded as GenXers), and *managerial status* (official supervisors coded as 1). See Table 1 for descriptive statistics on these moderators. We also investigate four subgroups that combine gender and the presence of a child under age 18 at home: *women with children at home*, *women with no children at home*, *men with children at home*, and *men with no children at home*.

ANALYSIS

To examine the effects of STAR on subjective well-being, we estimate mixed-effects models with respondents nested within study groups, the unit randomized to STAR (treatment) or usual practice (control). Well-being outcomes were measured at Wave 3, 12 months after baseline. We regressed these outcomes on their lagged measures at baseline and condition (STAR or control). We additionally control for gender, age-cohort, and manager status to improve precision of estimates, but the pattern of findings does not change when these are omitted. Coefficients for STAR capture effects of the intervention on outcomes (Hypothesis 1). Results for the Early Survey

Group are our main models, presented in Table 2 and compared side-by-side with the Late Survey Group.

To test mediation (Hypothesis 2), we examine the effects of changes in potential mediators over a six-month period on subsequent changes (by 12 months) in subjective well-being measures. We adopt two approaches to test mediation. One is the classic Baron and Kenny (1986) approach, which requires satisfaction of three conditions: (1) the key independent variable (i.e., STAR) is a significant predictor of the dependent variable (i.e., well-being outcomes); (2) the key independent variable is a significant predictor of the mediator; and (3) the coefficient for the key independent variable is greatly reduced when adding the potential mediator. Condition 1 is established in Table 2, and Condition 2 is established in Table 1 (based on *t*-tests, but results remain even with mixed-effects models adjusting for covariates). In Table 3 (Section 1 for each panel), we assess Condition 3 by evaluating the extent to which the STAR coefficients are weakened after mediators are added.

A second approach for mediation analysis builds on Sobel's test (Sobel 1982) and addresses concerns that Baron and Kenny's approach does not directly estimate and quantify the magnitude and significance of the mediation effect (i.e., to what extent the mediator mediates the predictor's effect on the outcome). The canonic Sobel's test was developed for single-level models and suffers low statistical power (MacKinnon, Warsi, and Dwyer 1995), which is problematic given our multilevel data structure and relatively small sample of groups. We therefore use a method developed by Krull and MacKinnon (2001) for multilevel models that combines the Sobel's test with bootstrapping to obtain the sampling distribution of the mediation effect non-parametrically. We conducted this set of analyses using the `ml_mediation` program in Stata; the mediation effects were obtained by bootstrapping the `ml_mediation` command with 1,000 replications with a seed value of 1. Corresponding results are shown in Section 2 for each panel in Table 3.

We present moderation results (Hypothesis 3) with figures, showing STAR effects for different subgroups. We conducted the mediation and moderation analyses using the Early Survey Group, who took the baseline survey and experienced STAR before learning about the merger.

RESULTS

Descriptive Statistics

Table 1 shows descriptive statistics by experimental condition for the Early Survey Group (Panel A) and Late Survey Group (Panel B). For our focal Early Survey Group sample, subjective well-being and demographic variables at baseline are balanced by experimental condition, as would be expected due to randomization. The only exception is age-cohort membership (by chance).

We find no differences in baseline well-being outcomes among respondents in the Early Survey Group (Panel A); but as hypothesized, by Wave 3 the Early Survey respondents in STAR had significantly lower levels of burnout ($p < .001$), perceived stress ($p < .05$), and psychological distress ($p < .05$), as well as noticeably higher job satisfaction ($p < .01$). This provides initial support for Hypothesis 1. By contrast, the Late Survey Group (Panel B) showed no difference in well-being outcomes at Wave 3 by STAR condition.

We calculated changes in perceptions of schedule control and family supportive supervisor behavior, reductions in family-to-work conflict and burnout, and increased adoption of variable schedules and working from home as the first step in testing potential mediators between STAR and changes in well-being outcomes by 12 months. Previous research demonstrates that over a six-month period, STAR improved employees' sense of schedule control and family supportive supervisor behaviors, while reducing family-to-work conflict (Kelly et al. 2014), findings replicated in Table 1 for the Early Survey Group (Panel A). Over six months among the Early Survey Group sample, schedule control increased by .31 for STAR respondents, whereas the increase was merely

Table 1. Descriptive Statistics of the Analytic Sample

	Panel A: Early Survey Group					Panel B: Late Survey Group				
	STAR (N = 234)		Usual Practice (N = 219)			STAR (N = 202)		Usual Practice (N = 210)		
	Mean/%	SD	Mean/%	SD	t-test	Mean/%	SD	Mean/%	SD	t-test
<i>Dependent Variables</i>										
Burnout by Wave 3	3.92	1.52	4.54	1.41	***	3.98	1.54	3.71	1.41	
Job Satisfaction by Wave 3	4.12	.71	3.89	.77	**	4.1	.75	4.01	.8	
Perceived Stress by Wave 3	8.18	2.56	8.8	2.85	*	8.16	2.8	7.94	2.39	
Psychological Distress by Wave 3	10.12	3	10.83	3.58	*	10.03	3.19	9.87	2.68	
<i>Independent Variables</i>										
Study Group Level										
Experimental Condition (STAR = 1)	100%		0%			100%		0%		
Individual Level										
Baseline Burnout	4.37	1.53	4.52	1.45		4.41	1.58	3.9	1.46	***
Baseline Job Satisfaction	3.95	.79	3.95	.75		4.03	.77	4.05	.75	
Baseline Perceived Stress	8.63	2.7	8.81	2.68		8.46	2.77	8.23	2.67	
Baseline Psychological Distress	10.78	3.04	11.09	3.24		10.55	3.24	10.38	3.02	
Women (= 1)	36%	.48	38%	.49		46%	.5	32%	.47	**
Age Cohort										
Leading-Edge Boomers (b. 1946 to 1954)	14%	.35	10%	.3		22%	.42	17%	.38	
Trailing-Edge Boomers (b. 1955 to 1964)	44%	.5	33%	.47	*	37%	.48	39%	.49	
GenXers (b.1965 to 1980)	42%	.5	57%	.5	**	41%	.49	44%	.5	
Managerial Status	21%	.41	16%	.37		24%	.43	26%	.44	
<i>Potential Mediators</i>										
Δ Schedule Control (W2–W1)	.31	.62	.04	.52	***	.23	.47	.06	.45	***
Δ FSSB (W2–W1)	.16	.77	.02	.63	*	–.01	.59	–.06	.58	
Δ Family-to-Work Conflict (W2–W1)	–.04	.57	.07	.55	*	–.03	.53	–.05	.59	
Δ Burnout (W2–W1)	–.26	1.41	.08	1.19	**	–.26	1.15	–.24	1.09	
Δ Variable Schedule										
No both waves	54%	.5	61%	.49		57%	.5	67%	.47	*
No → Yes	24%	.43	12%	.32	***	22%	.41	11%	.31	**
Yes → No	7%	.25	15%	.36	**	6%	.24	10%	.3	
Yes both waves	15%	.36	12%	.32		15%	.36	12%	.33	
Δ Work Hours at Home (W2–W1)	7.6	11.67	2.21	7.97	***	9.32	12.17	1.06	6.9	***

Note: Early Survey Group refers to respondents who did not know about the merger until after their baseline survey. Late Survey Group refers to respondents who were aware of the upcoming merger prior to baseline survey. Mean differences between STAR and usual practice (control) groups are tested using t-tests.
* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed).

.04 for the control group ($p < .001$). A similar pattern occurred for family supportive supervisor behaviors (.16 for STAR and .02 for control, $p < .05$). Family-to-work conflict decreased by .04 for respondents randomized to STAR, whereas it increased by .07 for the control group ($p < .05$). About one in four STAR respondents reported their schedules changed from “not variable” to “variable,” compared with 12 percent in the control group ($p < .001$). Over the six months, STAR respondents increased their time working at home by 7.6 hours a week, significantly higher than the two-hour increase among control respondents ($p < .001$). Finally, we observe a reduction in burnout over six months for STAR respondents but not for the control group (–.26 versus .08, $p < .01$). These findings lay the groundwork for testing their effects as mediators between STAR and changes in well-being. Also note that, except for perceived and actual schedule flexibility, respondents in the Late Survey Group did not experience the desirable changes brought about by the STAR intervention (Panel B).

Effects of STAR on Subjective Well-Being

Table 2 shows the effects of STAR on burnout, job satisfaction, perceived stress, and psychological distress at 12 months for Early (Panel A) and Late (Panel B) Survey Groups. We present the outcomes in this order because the first two are distinctively job-related, whereas the latter capture general states of subjective well-being. Results from the multilevel analysis show that by Wave 3, STAR respondents in the Early Survey Group (not exposed to merger announcement when randomized to STAR) experienced significantly reduced emotional exhaustion/burnout (–.534, $p < .001$) and increased job satisfaction (.208, $p < .01$), as well as lower perceived stress (–.478, $p < .05$) and psychological distress (–.570, $p < .05$) than similarly situated respondents in the control group. We further calculated effect sizes by dividing STAR coefficients (from Table 2) by the standard deviation of the outcome at baseline. STAR effects are mostly small (.2) to moderate (.5) as judged by

Cohen’s (1988) rule of thumb, but in general are higher for burnout (.36) and job satisfaction (.27) than for perceived stress (.18) and psychological distress (.18). By contrast, for respondents in the Late Survey Group (taking baseline survey after merger announcement), STAR had no well-being effects. This suggests STAR benefited the subjective well-being of workers who were not worried about the merger at the time they began or received the STAR training. Given the null STAR effects for the Late Survey Group, we conducted all subsequent analyses on the Early Survey Group.

As a sensitivity check, we also conducted analyses for the full sample (see Table S2 in the online supplement). For this combined sample, we find that STAR significantly decreased burnout (–.289, $p < .01$) and increased job satisfaction (.160, $p < .01$) by Wave 3. These effects are maintained even after controlling for the effect of being in the Early or Late Survey Group. Given that the Late Survey Group’s baseline responses are confounded by their prior exposure to the stress of the merger, results from the Early Survey Group represent the most valid tests of STAR’s effects on well-being.

Mediation Analysis of STAR on Subjective Well-Being

To more precisely assess how STAR improves subjective well-being in the Early Survey Group, we examine specific mechanisms theorized to account for the relationship between the organizational intervention and well-being: increasing schedule control and family supportive supervisor behaviors (FSSB), decreasing family-to-work conflict and burnout, and increasing schedule flexibility and working at home.

We use two methods to test mediation, Baron and Kenny’s approach (Sections 1 of Table 3) and a modified Sobel’s test, tailored for multilevel models with bootstrapped standard errors (Sections 2 of Table 3). These two methods do not always coalesce; our discussion focuses on similar patterns found in both approaches. First, psychological distress has

Table 2. Linear Mixed-Effects Models Predicting Subjective Well-Being by Wave 3, by Early/Late Survey Group

	Panel A: Early Survey Group				Panel B: Late Survey Group			
	Burnout, Wave 3	Job Satisfaction, Wave 3	Perceived Stress, Wave 3	Psychological Distress, Wave 3	Burnout, Wave 3	Job Satisfaction, Wave 3	Perceived Stress, Wave 3	Psychological Distress, Wave 3
STAR (= 1)	-.534*** (.114)	.208** (.066)	-.478* (.238)	-.570* (.254)	-.060 (.139)	.100 (.081)	.126 (.255)	.092 (.233)
Lagged Dependent Variables at Baseline	.575*** (.038)	.567*** (.036)	.593*** (.043)	.608*** (.040)	.584*** (.038)	.584*** (.041)	.594*** (.043)	.599*** (.036)
Managers (= 1)	-.165 (.144)	.179* (.071)		-.528 (.322)	.078 (.133)	-.066 (.072)		.402 (.260)
Women (= 1)	-.046 (.117)	.071 (.058)	.047 (.238)	.004 (.263)	.193 (.120)	.091 (.065)	-.137 (.242)	-.093 (.235)
Age Cohort (Ref. = GenXers, b. 1965 to 1980)								
Leading-Edge Boomers (b. 1946 to 1954)	.146 (.182)	-.021 (.090)	.102 (.362)	.604 (.409)	.090 (.157)	.009 (.085)	-.177 (.308)	.119 (.306)
Trailing-Edge Boomers (b. 1955 to 1964)	.040 (.122)	.046 (.061)	.073 (.248)	.515 (.275)	-.083 (.128)	.021 (.069)	-.152 (.263)	-.066 (.251)
Observations	453	455	370	455	412	412	309	412
Number of groups	32	32	32	32	35	35	35	35
ICC	0	.022	.006	0	.0278	.0457	.0153	.00371
BIC	1497	869	1676	2239	1346	840.3	1361	1899
Study-Group Variance	.000	.008	.029	.000	.038	.018	.063	.019
Individual Variance	1.414	.344	4.756	7.115	1.316	.381	4.072	5.132
Proportion of Study-Group-Level Variance Explained	1.000	.489	.922		.603	.352	.777	
Proportion of Individual-Level Variance Explained	.338	.364	.326	.348	.369	.333	.371	.403

Note: Early Survey Group refers to respondents who did not know about the merger until after their baseline survey. Late Survey Group refers to respondents who were aware of the upcoming merger prior to the baseline survey. Proportion of study-group-level variance and proportion of individual-level variance explained are calculated in comparison with corresponding null models (models with no covariates) that are not shown here. Proportion of study-group-level variance explained is undefined for psychological distress, because the study group variance in the null model is zero (and hence the denominator is zero). * $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed).

Table 3. Multilevel Mediation Analysis Predicting Subjective Well-Being by Wave 3, Early Survey Group

Panel A: Burnout, Wave 3				
1. Baron and Kenny's Approach: Estimates from Mixed-Effects Models with Mediators Added				
STAR (= 1)	-.534*** (.114)	-.418*** (.119)	-.495*** (.116)	-.477*** (.116)
Δ Schedule Control (W2-W1)		-.342*** (.100)		-.506*** (.118)
Δ FSSB (W2-W1)			-.267*** (.080)	-.492*** (.122)
Δ Family-to-Work Conflict (W2-W1)				
Δ Variable Schedule No (W1) to Yes (W2)			.311** (.100)	-.374** (.123)
Δ Work Hours at Home (W2-W1)				-.262* (.105)
				-.149 (.084)
				.235* (.102)
				.096 (.156)
				-.006 (.006)
2. Sobel's Test with Bootstrapped Standard Errors: Estimates of Indirect Effects from Multilevel Mediation Analysis				
Indirect Effects (bootstrapped standard errors in second row, proportion of total effects mediated ["-" if mediators not significant] in third row):				
STAR->Δ Schedule Control (W2-W1)->Outcome	-.098*			
	(.039)			
	18.95%			
STAR->Δ FSSB (W2-W1)->Outcome		-.036 (.024)		
		-		
STAR->Δ Family-to-Work Conflict (W2-W1)->Outcome			-.041* (.021)	
			7.89%	
STAR->Δ Variable Schedule No (W1) to Yes (W2)->Outcome				.017 (.019)
				-
STAR->Δ Work Hours at Home (W2-W1)->Outcome				-.030 (.029)
				-

(continued)

Table 3. (continued)

Panel B: Job Satisfaction, Wave 3					
1. Baron and Kenny's Approach: Estimates from Mixed-Effects Models with Mediators Added					
STAR (= 1)	.208** (.066)	.171** (.064)	.190** (.061)	.192** (.063)	.176** (.063)
Δ Schedule Control (W2-W1)		.128** (.049)			.198** (.065)
Δ FSSB (W2-W1)			.176*** (.039)		.216*** (.065)
Δ Family-to-Work Conflict (W2-W1)				-.110* (.049)	.167** (.063)
Δ Burnout (W2-W1)					.041 (.052)
Δ Variable Schedule No (W1) to Yes (W2)				-.077*** (.021)	.141*** (.042)
Δ Work Hours at Home (W2-W1)					-.039 (.050)
					-.039 (.022)
					.022 (.076)
					.001 (.003)
2. Sobel's Test with Bootstrapped Standard Errors: Estimates of Indirect Effects from Multilevel Mediation Analysis					
Indirect Effects (bootstrapped standard errors in second row, proportion of total effects mediated [^a] in third row):					
STAR->Δ Schedule Control (W2-W1)->Outcome		.035* (.015)			
		17.11%			
STAR->Δ FSSB (W2-W1)->Outcome		.022 (.013)			
STAR->Δ Family-to-Work Conflict (W2-W1)->Outcome		-		.014 (.010)	
STAR->Δ Burnout (W2-W1)->Outcome					.027* (.012)
					13.33%
STAR->Δ Variable Schedule No (W1) to Yes (W2)->Outcome					-.001 (.009)
					-

(continued)

Table 3. (continued)

STAR->Δ Work Hours at Home (W2-W1)->Outcome					.011 (.014)
Panel C: Perceived Stress, Wave 3					
1. Baron and Kenny's Approach: Estimates from Mixed-Effects Models with Mediators Added					
STAR (= 1)					
	-.478*	-.513*	-.526*	-.495*	-.479*
	(.238)	(.233)	(.231)	(.227)	(.231)
Δ Schedule Control (W2-W1)		-.144 (.198)			
Δ FSSB (W2-W1)			.006 (.158)		
Δ Family-to-Work Conflict (W2-W1)				.338 (.203)	
Δ Burnout (W2-W1)					.233** (.081)
Δ Variable Schedule No (W1) to Yes (W2)					-.354 (.310)
Δ Work Hours at Home (W2-W1)					-.009 (.012)
2. Sobel's Test with Bootstrapped Standard Errors: Estimates of Indirect Effects from Multilevel Mediation Analysis					
Indirect Effects (bootstrapped standard errors in second row, proportion of total effects mediated ["-" if mediators not significant] in third row):					
STAR->Δ Schedule Control (W2-W1)->Outcome		-.036 (.047)			
STAR->Δ FSSB (W2-W1)->Outcome			.001 (.025)		
STAR->Δ Family-to-Work Conflict (W2-W1)->Outcome				-.045 (.035)	

(continued)

Table 3. (continued)

[illegible]

151

Table 3. (continued)

STAR→Δ FSSB (W2-W1)→Outcome	-.023 (.027)	
STAR→Δ Family-to-Work Conflict (W2-W1)→Outcome	-.118* (.052) 23.57%	
STAR→Δ Burnout (W2-W1)→Outcome	-.114* (.058) 22.72%	
STAR→Δ Variable Schedule No (W1) to Yes (W2)→Outcome	.006 (.033)	
STAR→Δ Work Hours at Home (W2-W1)→Outcome		-.110 (.080)

Note: Early Survey Group refers to respondents who did not know about the merger until after their baseline survey. All models control for lagged dependent variables at baseline, manager status, gender, and age cohort. Results for covariates are available upon request. Multilevel mediation analysis was done using the ml_mediation program in Stata, which was developed based on Krull and MacKinnon (2001). We obtained indirect effects by bootstrapping the ml_mediation command with 1,000 replications with a seed value of 1. Coefficients under sections 1 and 2 are not directly comparable. Those under section 1 (Baron and Kenny's approach) denote how the outcome changes with a one-unit increase in the mediator. Take the mediator of burnout for job satisfaction (Panel B) as an example, -.077 means a one-unit increase in burnout decreases job satisfaction by .077. Coefficients under section 2 (Sobel's test with bootstrapped standard errors) represent the product of two values: STAR's effect on the mediator and the mediator's effect on the outcome, so the signs could differ from corresponding coefficients in section 1 depending on how STAR affects the mediator. Again use the mediator of burnout for job satisfaction (Panel B) as an example. .027 has a positive sign because STAR decreases the mediator, burnout, and because burnout decreases job satisfaction. The product of these two negative values therefore is positive. .027, which means the mediation effect of reduced burnout on the STAR-job satisfaction relationship is .027.

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed).

most of its STAR effects mediated (Panel D). Baron and Kenny's approach suggests a full mediation by three mediators (schedule control, family-to-work conflict, and burnout). Similarly, the modified Sobel's tests show that these three indirect paths are all statistically significant, each accounting for over 20 percent of the total STAR effect on psychological distress. Second, perceived stress is the only outcome with little mediation (Panel C), suggesting STAR has a direct, rather than indirect, effect on employees' stress. Third, changes in schedule control (from baseline to six months) are a strong mediator, accounting for 17 percent of the STAR effect in increasing job satisfaction, 23 percent of the STAR effect in decreasing psychological distress, and 19 percent of the STAR effect in decreasing burnout between baseline and Wave 3. Changes in family-to-work conflict also mediate the relationship, but not as strongly; 8 percent and 24 percent of the STAR effects on decreased burnout and decreased psychological distress, respectively, are mediated by reductions in family-to-work conflict. We also considered burnout itself as a possible mediator, finding that changes in burnout account for 13 percent of the STAR effect on increased job satisfaction and 23 percent of the STAR effect on decreased psychological distress.

Fourth, of the six mediators, FSSB and the two flexibility practice measures (schedule changes and working at home) seem to be the weakest; none of the mediation effects are defined as statistically significant according to the modified Sobel test. Taken as a whole, Hypothesis 2 is partially supported in that some (but not all) of the STAR effects on well-being outcomes occur through STAR's effects in increasing workers' schedule control and reducing their levels of family-to-work conflict and burnout.

Moderation Analysis of STAR Effects on Subjective Well-Being

The stress process theoretical model emphasizes the importance of status locations as potential moderators of relationships between

the social environment and well-being (Pearlin 1999). Accordingly, we examine whether STAR effects differ among various subgroups of respondents, again focusing on the Early Survey Group. To do so, we analyze the interaction of STAR and four potential moderators: gender, gendered parental status, age-cohort, and managerial status. We find no statistically significant difference between STAR and the usual practice groups in subjective well-being outcomes by age-cohort, suggesting that STAR promoted well-being across various age groups of workers.

However, we find that STAR reduced psychological distress more for women than for men. To facilitate understanding of this moderating effect, we present a figure showing models with significant interaction terms. In Figure 1a, women randomized to STAR have significantly lower levels of psychological distress by Wave 3 than women in the control group. No such difference is found for men (gender interaction, $p < .05$). We also see a gender interaction for perceived stress, although it is only marginally significant ($p < .06$, see Figure 1b). Note that both men and women benefit from STAR in the two well-being measures most closely tied to work, with similar declines in burnout and increases in job satisfaction regardless of gender. The gender component of Hypothesis 3 is thus only partially supported.

Figure 2a further examines gender differences by presenting predicted psychological distress at Wave 3 for four subgroups: women with children at home, women without children at home, men with children at home, and men without children at home. We do not find support for our hypothesis that workers engaged in active parenting (especially mothers) will benefit most from STAR; the STAR effect seems to be largest among women without children at home ($p < .05$). Figure 2b shows means of psychological distress at Wave 1 and Wave 3 for women with and without children at home and by STAR. We see that mothers and women without children at home randomized to STAR reported comparable declines in psychological distress over 12 months (the two solid lines). Women without children in the control group,

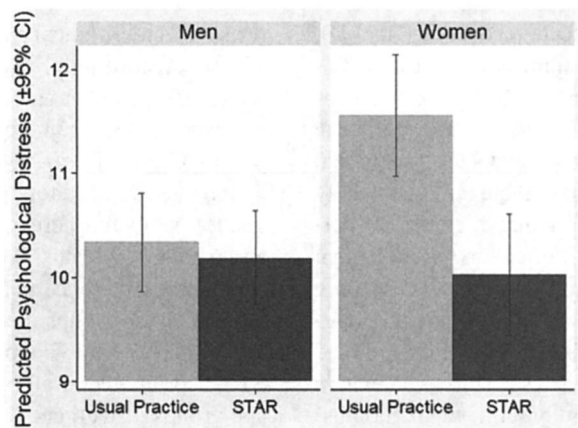


Figure 1a. Predicted Psychological Distress at Wave 3 with 95% CIs by STAR and Gender, Early Survey Group

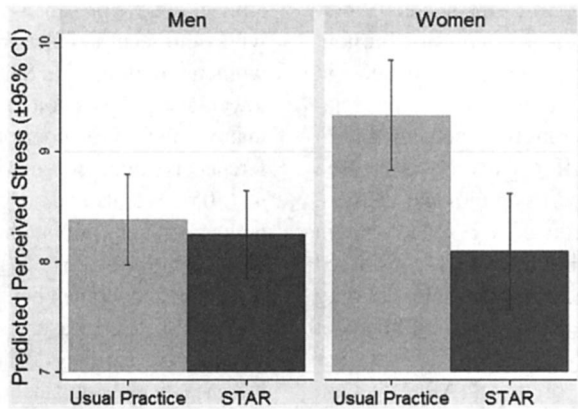


Figure 1b. Predicted Perceived Stress at Wave 3 by STAR and Gender, Early Survey Group

by contrast, experienced increased psychological distress over this period (black dashed line), which appears to be the main reason why we find a particularly large STAR effect for women without children at home. In further analysis, we find women without children at home were older (average age of 50 versus 44 to 48 for the other groups), much more likely to be single (41 percent versus 3 to 23 percent), and more apt to have adult care responsibilities (31 percent versus 20 to 25 percent). We speculate that the increased distress of women in the control group may reflect the challenges and vulnerabilities of older women in highly demanding jobs with less control over their time, but this is the case for only one well-being measure; analyses of the three other outcomes found no

differences in effects of STAR by gender/active parenting status.

We hypothesized that managers would benefit less than employees in terms of improved subjective well-being, which is partially supported for job satisfaction. Figure 3 shows that employees (but not managers) randomized to STAR had higher levels of job satisfaction than their peers in the usual practice groups ($p < .05$).

DISCUSSION AND CONCLUSIONS

This study contributes to the growing body of theory and research on the social determinants of health and well-being (Berkman

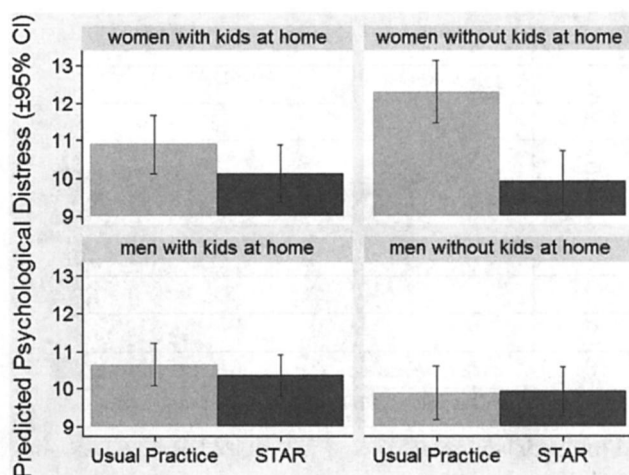


Figure 2a. Predicted Psychological Distress at Wave 3 by STAR, Gender, and Family Caregiving Context, Early Survey Group

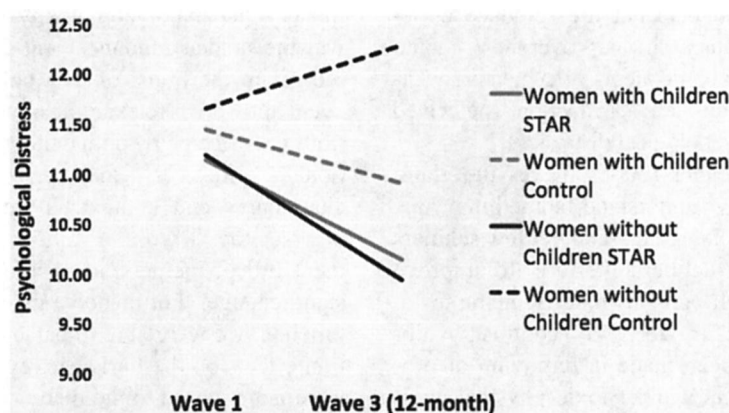


Figure 2b. Means of Psychological Distress at Wave 1 and Wave 3 among Women, by STAR and Parental Status, Early Survey Group

et al. 2014; House 2002; Tausig and Fenwick 2011) and specifically to stress process and job strain theories. Its primary contribution is in putting these approaches in motion, examining the implications of changing the social environment of work for corresponding changes in well-being. Some social structures consequential for health are seemingly intractable, such as one's gender, race, age, and parents' socioeconomic status (Berkman et al. 2014; Tilly 1998). Others are institutionalized, taken-for-granted regimes—including temporal regimes of policies, practices, rules, and routines regarding work time—that *can be changed* through deliberate efforts like the STAR organizational intervention.

We advance stress process and job strain theoretical models by moving beyond examining workers in different occupations or circumstances to demonstrate that changes in work conditions enhance subjective well-being. Although the potential for change in social environments is an explicit component of stress process and job strain theories, most research involves cross-sectional correlational studies or, to a lesser extent, longitudinal studies of events, such as job loss or caregiving, to examine potential declines in well-being. We demonstrate, with a rigorous randomized field trial, that *changes* in work conditions arising from an organizational intervention (providing workers with greater control over the time and timing of

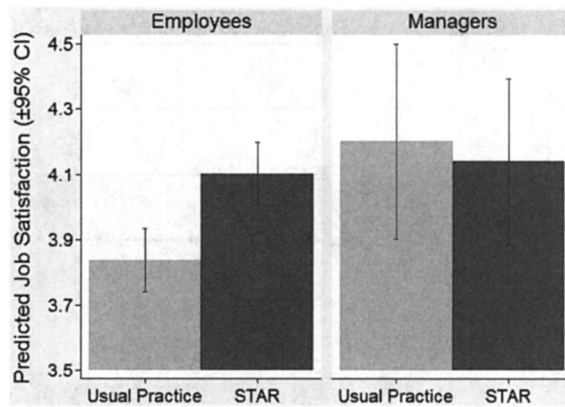


Figure 3. Predicted Job Satisfaction at Wave 3 with 95% CIs by STAR and Managerial Status, Early Survey Group

their work, and encouraging supervisor support for family and personal life) produce corresponding salutary changes over a 12-month period in four components of subjective well-being: burnout, job satisfaction, perceived stress, and psychological distress.

Bronfenbrenner (2005) makes the claim that to really understand something, one should try to change it—and yet few scholars have studied deliberate efforts to improve subjective well-being by modifying the social environments of work. By contrast, major strides have been made in removing or protecting workers against toxic physical environments, even though too many disadvantaged workers still face hazards today. There has been a real lag in recognizing the toxicity of social environments, including the ways work is constrained by rigid work-time rules and unsupportive supervisors. Some employers offer individual-level stress reduction techniques, suggesting methods to cope with difficulties rather than promoting well-being by improving the work environment. This is understandable, given the time and financial costs of developing and testing a theoretically grounded intervention that is acceptable to organizational stakeholders while simultaneously substantial enough to make a difference in workers' lives.

Our study does just that. It also confirms there are inevitable complexities with even

“clean” research designs such as field experiments. One major complexity of our study was the sudden announcement of a corporate merger in the midst of data collection. This event allowed us to examine how work conditions are affected by both deliberate organizational initiatives and the challenging, changing social context. In retrospect, we now see the IT world as a turbulent environment full of mergers, acquisitions, and constant change. Fortunately, given the study timeline, we were able to parse out intervention effects on the Early Survey Group (who were not exposed to the merger shock before exposure to STAR) from the Late Survey Group.

We found pronounced salutary effects of the intervention only for the Early Survey Group. One important implication of our findings is that workers (like those in the Late Survey Group) already faced with major organizational dislocations (e.g., mergers, acquisitions, or dramatic rounds of downsizing) are unlikely to buy into and benefit from more positive organizational interventions. Other research has also found that workplace interventions have null effects (and, in some cases, negative impacts) on health and well-being when organizational restructuring and downsizing are also occurring (Egan et al. 2007). There was no significant downsizing in the study period we report on here, but we nevertheless find no STAR effects on

well-being among the Late Survey Group. The uncertainty of the upcoming merger off-set—and perhaps overwhelmed—any potential benefits of STAR for workers facing the impending organizational changes.

The positive effects of this organizational intervention on the Early Survey Group raise additional questions relevant to stress process and job strain theoretical models. In particular, *how* does STAR influence subjective well-being? We find evidence of three partial mediators for different components of well-being: increases in respondents' sense of schedule control, reductions in their family-to-work conflict, and reductions in burnout. But much of STAR's effects remain unexplained by these mediators, suggesting the need for greater attention to the "how" of organizational innovations like STAR and, indeed, for continued attention to the mechanisms underlying inequality in health and well-being, as well as in other resources (Reskin 2003).

Another important question raised by both stress process and job strain models is whether this type of workplace intervention benefits particular sets of workers more than others. We theorized that workers potentially vulnerable to stress at work, at home, and due to the juxtaposition of the two would be most apt to see improvements in subjective well-being. We find no moderators of burnout; in other words, STAR reduced workers' burnout regardless of their gender, their parenting circumstances, their age-cohort, or whether they were managers or non-supervisory employees. Similarly, STAR improved the job satisfaction of all these subgroups with only one exception: employees were more apt than managers randomized to STAR to experience an increase in job satisfaction. The broad effects of STAR across subgroups likely reflect that these outcomes are more explicitly tied to work than the more global measures of perceived stress and psychological distress.

Our findings that STAR reduced psychological distress and perceived stress more for women is consistent with our expectation that more vulnerable workers would benefit more from these changes. Women's well-being is

clearly affected by work roles and resources as well as normative family caregiving responsibilities (Simon 2014), and the link between work-family strains and well-being is clearer for mothers than for fathers (Nomaguchi, Milkie, and Bianchi 2005). However, the increase in psychological distress among women without children in the control group suggests that vulnerability extends beyond simply caring for young children. Future research needs to consider the stresses of employed older women who are more apt to be single and caring for parents or other adults, in particular. Our findings suggest that women without children at home may be distressed due to their high workloads (including paid work and caregiving) and lower likelihood of having a spouse to share home tasks, caregiving, and breadwinning, *and* that organizational changes, like STAR, can improve their well-being.

Mothers benefit from these organizational changes too. Mothers in STAR reported significantly more time adequacy with their family (Kelly et al. 2014), and mothers in STAR increased their time with adolescent children over a one-year period, whereas mothers in the control group decreased their time with children (Davis et al. 2015). There is also evidence that STAR "crossed over" from parents' experiences to positively affect adolescents' well-being, as measured in greater positive affect and less negative reactivity to daily stressors for children who had a parent in STAR, compared to children whose parent was in the usual practice group (Lawson et al. forthcoming). Adolescents with a parent in STAR also reported less variation in sleep duration from night to night, less time to fall asleep, and better sleep quality, although no difference was found in sleep duration (McHale et al. 2015). While research on mothers, fathers, and children is certainly important, it should be balanced by research on the growing number of older women workers to fully understand the nexus of work, family, and health.

What are the implications for studying workers' mental health and for devising organizational policies and practices to reduce

risk factors? First, drawing on stress process and job strain approaches, we provide clear evidence that specific conditions matter for well-being *and* can be changed. This necessitates more than “helping” workers muddle through their stressful lives by teaching them individual coping strategies. Instead, this study demonstrates the value of an organizational initiative promoting greater flexibility and control for workers as well as greater supervisor support. Moreover, organizational changes that lower workers’ burnout, perceived stress, and psychological distress bring benefits to employers as well, because such outcomes are apt to reduce productivity and increase absenteeism, presenteeism (i.e., showing up, but not being engaged at work), turnover, health problems, and poor life quality at work and at home.

Second, we show that organizational interventions can promote facets of subjective well-being partly because they increase control and reduce family-to-work conflict and burnout, but there are also other unidentified mechanisms that need to be investigated. Moreover, different mechanisms may operate for people in working-class or other nonprofessional or less technical jobs. For example, employees represented by unions may appreciate this type of intervention (if pursued with the union’s support) because it increases their voice outside of the formal bargaining context and legitimates addressing work-life concerns as well as wages and benefits in negotiations and on the job (Berg et al. 2014).

Third, interventions targeting all workers, not just those most at risk, seem to have broad impacts and reach beyond the most vulnerable subgroups of workers. But IT workers are all less “at risk” than workers with less education, skills, and professional status; future studies need to test similar interventions and specify mechanisms in different workforce populations. A real limitation, though a deliberate one, of this study is the focus on IT workers who have demanding, stressful jobs but who are not simultaneously income-strapped. Researchers seeking to develop and test interventions advancing subjective

well-being should move beyond IT workers to consider the service sector, blue-collar jobs, and other white-collar work environments and how economic hardship may moderate any intervention effects.

Fourth, issues of sustainability are important. We were unable to test for sustainability given subsequent dislocations in the merging organization after the 12-month survey. This is a key topic for future research.

Finally, this study demonstrates the value of real-world, randomized field trial research designs for teasing out causal relationships and processes, despite the costs and complexities they invariably engender. If randomized field trials are not feasible, natural experimental designs studying the effects of policy, economic, or other changes happening “on the ground” but not deliberately implemented by researchers are another way of capturing and studying change.

Social scientists are now equipped with the methodological tools, and more often able to collect the necessary longitudinal data, to better inform both theory and policy decision-making related to the social determinants of physical and mental health as well as other resources. Scholars should begin to recognize and strive to improve the quality of intervention and organizational research to showcase the structural forces and changes that can impede or promote workers’ well-being.

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Notes

1. We found one study in which nursing units were randomly assigned to self-managed scheduling or the control condition (Pryce, Albertsen, and Nielsen 2006); this design is closest to our group-randomized trial. Pryce and colleagues (2006) found no significant effects of self-scheduling on nurses' health and well-being, although the intervention improved work-life balance and job satisfaction.
2. A corporate merger is always highly confidential because it significantly affects a firm's stock price. Our contacts in TOMO had a sense the company was not doing well, but neither HR managers, managers, nor employees had specific clues about a forthcoming merger announcement.
3. Within the Early Survey Group, 76 percent of the STAR sample had completed the STAR training before the merger was announced. The remainder of the Early Survey Group randomized to STAR had completed the baseline survey and had begun the STAR training sessions, or their upper management had introduced STAR, before the merger was announced. In supplemental analyses, we found that this latter group—who learned of the merger during the STAR training period, rather than after it was completed—did not differ significantly from others in the Early Survey Group in age, cohort membership, gender, managerial status, baseline well-being outcomes, or baseline job demands (psychological job demands and work hours). Given these similarities and given our rationale in distinguishing early versus late respondents (i.e., whether their baseline well-being measures were contaminated by the merger announcement), we report the simpler comparison of early compared to later respondents.
4. Workers were eligible to participate in the study if they were employees (not contractors) or managers located in the two cities where data collection occurred. One study group, whose employees were represented by collective bargaining agreements, was excluded because of concerns that the intervention might conflict with some contractual work rules; union leadership was consulted on the decision and suggested that course of action.
5. We excluded 15 employees who were randomized to the STAR intervention but were not invited to participate in STAR because of a staff error. We also excluded eight employees initially randomized to the control group, because they were shifted to new teams already going through STAR.
6. If a respondent skipped a specific item but completed at least 75 percent of the scale (e.g., 3 out of 4 items for perceived stress), we assigned the mean from that respondent's responses to other questions in that scale. If respondents did not complete at least 75 percent of the scale, they were omitted from that model.

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