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Perceived time adequacy improves daily well-being: day-to-day linkages and the effects of a workplace intervention

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Abstract

Workplace interventions may change how employed parents experience family and personal time. This study examined the day-to-day linkages between time resources (assessed by time use and perceived time adequacy for parenting, partner, and personal roles) and daily well-being and tested

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whether a workplace intervention enhanced the linkages. Participants were employed, partnered parents in the information technology division of a large US firm and who provided eight-day diary data at two times ($N = 90$). Multilevel modeling revealed that, on days when parents perceived lower time adequacy than usual for the three roles, they reported less positive affect, more negative affect, and more physical symptoms, independent of time spent in the roles. Moreover, a workplace intervention designed to give employees more temporal flexibility and support for family responsibilities increased daily time spent with the focal child and increased perceived time adequacy for exercise. The intervention also decreased negative affect and physical symptoms for parents who spent more time with child and partner than the sample average. Our results highlight the importance of perceived time adequacy in daily well-being and suggest that workplace support can enhance perceived time adequacy for self and the experience of family time.

Keywords

Daily diary; daily well-being; perceived time adequacy; time use; workplace intervention

Time is a critical but vulnerable resource in the intersection between work and family roles. With increased demands at work and high expectations for family responsibilities, many employed parents report that they have a lack of time (Bianchi, 2009; Milkie, Mattingly, Nomaguchi, Bianchi, & Robinson, 2004; Milkie, Raley, & Bianchi, 2009). In particular, subjective perceptions about time, whether individuals feel they have enough time to fulfill their roles or carry out their activities ('perceived time adequacy'; Hill, Tranby, Kelly, & Moen, 2013), appear to be important for well-being. There is evidence that perceiving low time adequacy, on average, is negatively associated with physical health (Strazdins & Loughrey, 2007; Welch, McNaughton, Hunter, Hume, & Crawford, 2009) and employees' mental energy (Moen, Kelly, & Lam, 2013). Yet, the specific linkages between *daily* perceived time adequacy and *daily* well-being are unknown. Moreover, previous studies have rarely incorporated information on time use in examining the correlates of perceived time adequacy, which diminishes the ability to understand the unique importance of perceived time adequacy (vs. time use) for daily well-being. This study examined the day-today linkages between perceived time adequacy, time use, and well-being of employed and partnered parents, and tested whether a workplace intervention enhanced these linkages.

Perceived time adequacy and time use are time-related resources, but their implications for daily well-being may be different. Time use reflects how parents spend their time in daily activities, whereas perceived time adequacy indicates how parents evaluate or feel about the sufficiency of their time. According to the definition of the situation theory (Thomas & Thomas, 1928), individuals' perceptions of situational contexts have their own consequences. In a similar vein, stress theories (e.g. Lazarus & Folkman, 1984; Pearlin, 1989) also posit that subjective meaning of stressors or stressor appraisal leads to the psychological, physical, and behavioral manifestations of stress. This may be particularly salient when examining the daily implications of time use vs. perceived time adequacy for personally significant roles. For example, a parent may miss a family meal due to high work demands. Loss of family time per se may not be a source of stress in that single instance if

the parent does not perceive it as a concern. Nonetheless missing a family meal may become a source of stress if it is manifested in the parent's perception of less time adequacy for family than expected or needed to meet their sense of obligation to their family. In this way, the perceived loss of a moment in time could become a disappointment, a threat to self, or a source of predictable conflict. Thus, we examined the relative impact of perceived time adequacy vs. actual time use for perceived daily well-being.

Incorporating both time use and perceived time adequacy, this study addressed three research questions (Figure 1). The first question examined the unique associations of perceived time adequacy with daily well-being, independent of time use, to advance understanding of the significance of perceived time in employed parents' daily well-being. In examining the associations, we built on prior literature, by measuring perceived time adequacy for specific roles in non-work domains, an approach aimed at addressing some critiques around perceived time. For example, Goodin, Rice, Bittman, and Saunders (2005) argued that much of the time pressure that people feel is an illusion (i.e. 'time-pressure illusion'), because there is substantial free time left over after doing what is minimally necessary in daily activities. They assessed the 'time-pressure illusion' by calculating the difference between potentially uncommitted discretionary time and actually committed free time for paid work, household labor, and personal care, not directly measuring participants' own sense of being under time pressure. We took a more direct approach using participants' self-reports of perceived time adequacy in parent, partner, and personal roles, and examined their effects on well-being independent of actual time use in each of the roles. A phenomenon of perceiving a lack of time for children and partner among employed parents is well documented (Bianchi, 2009; Milkie et al., 2004), but perceptions about time for self-care (or 'me time') are relatively understudied. Considering the increasing trend of reporting lack of time as a significant barrier to obtaining adequate exercise (American Psychological Association, 2012), this study examined perceived time adequacy for exercise, an aspect of self-care time important for future health.

In addition, we further extended from prior research to focus on *daily* perceived time adequacy. Prior research has focused on global reports of perceived time adequacy over extended periods of time (e.g. the past week, month, or unspecified time periods; Hill et al., 2013; Kelly, Moen, & Tranby, 2011; Lee et al., 2015; Milkie et al., 2009; Moen et al., 2013). Global reports may be subject to memory distortions and self-report biases, and they fail to capture day-to-day fluctuations in perceived time adequacy (Bolger, Davis, & Rafaeli, 2003). Examining daily perceived time adequacy is important because it reflects mental and emotional resources that parents are able to draw on during a particular day, after ruling out stable third variable explanations, such as education and gendered role expectations, found in prior research (Hill et al., 2013; Milkie et al., 2004). In this study we used a daily diary design to examine daily variations in perceived time adequacy and their associations with daily well-being.

Moving beyond the associations between daily time resources and daily well-being, the second research question asked whether a workplace intervention can improve daily time resources in family and personal domains. To date, only a few studies have provided evidence on the possibility of increasing time resources through workplace interventions

(Davis et al., 2015; Kelly et al., 2014, 2011). We tested whether a randomized field experiment, designed to promote employees' schedule control and supervisor support for family and personal life, increased daily time use and perceived time adequacy for parenting, partner, and personal activities in a sample of employed and partnered parents. Furthermore, to the extent that more family time is associated with greater subjective well-being for contemporary parents (Musick, Meier, & Flood, 2016), the workplace intervention may enhance daily well-being of parents by allowing them to allocate more time resources in family and personal domains. Our last research question tested whether the intervention strengthened the links between time resources and daily well-being, such that the intervention would improve well-being for parents who spent more time or perceived more time adequacy in parenting, partner, and personal roles. This study contributes to the work–family literature by showing the importance of family and personal time resources for employed parents' daily well-being. We further show how improving the workplace community can enhance the experiences of family and personal time in both perceived adequacy and the actual amount of time devoted to personally significant roles.

Relative effects of perceived time adequacy on daily well-being, net of actual time use

Thomas and Thomas (1928) noted that, 'What is defined or perceived by people as real is real in its consequences' (p. 572). This definition of the situation theory implies the unique and potentially greater importance of perceived time adequacy for daily well-being beyond actual time use. Prior research that examined similar concepts (e.g. subjective time pressure or time strain) has also shown the adverse effects of perceiving a lack of time on parents' well-being (Nomaguchi, Milkie, & Bianchi, 2005; Roxburgh, 2012). This line of research suggests that perceiving adequate time relates to the positive evaluation of real-life contexts of time, which is important for stress minimization. The stress process theory (Pearlin, 1989) is also consistent with this perspective in that stress starts with an experience – not the actual existence of a stressor, but the perception of a stressor (e.g. perceiving a lack of time) may cause stress. Together, previous studies guide us to expect that perceived time adequacy may explain unique variance in daily well-being net of parents' reports of their time use.

In this study, we focused on the potential implications of perceived time adequacy for employed parents' daily positive and negative affect and physical symptoms, commonly measured affective and physical well-being in prior research (Emmons, 1991; Larsen & Kasimatis, 1991; Mroczek & Almeida, 2004). Although we found no prior studies identifying links between perceived time adequacy and daily affective and physical well-being, work–family stress research suggests that perceiving a lack of time may cause strain (Pearlin, 1989) because time is particularly vulnerable in competing demands between work and family roles (Edwards & Rothbard, 2000). Time-based perceived tensions between work and family roles (i.e. work–family conflict) have been found to negatively influence employed parents' well-being. Most studies on this topic have focused on between-person comparisons (Almeida et al., 2015). Some studies using daily diary data have shown that daily work–family conflict or daily perceived demands outweighing perceived resources are linked to less positive and more negative affect within persons (Almeida et al., 2015;

Gartland, O'Connor, Lawton, & Ferguson, 2014; Mroczek & Almeida, 2004). Moreover, high levels of anticipated daily obligations that exceeded perceived resources predict more physical symptoms on the same day (Gartland, O'Connor, Lawton, & Bristow, 2014). Based on this prior research, we hypothesized that perceived time adequacy for parenting, partner, and/or personal roles would be positively associated with employed parents' daily positive affect and negatively associated with their negative affect and physical symptoms, beyond the effects of their reports of time spent in each domain (H1).

Workplace intervention effects on daily time resources and on the links between time resources and daily well-being

Workplace support may have implications for employed parents' time resources. Indeed, some workplace interventions have shown to increase time resources for family and personal life. Kelly et al. (2011) found that retail employees participating in the Results-Only-Work-Environment (ROWE) intervention, designed to promote flexible work arrangements, significantly increased in perceived time adequacy for personal and family activities. The ROWE intervention helped to lay the foundation for the present study of the STAR (Support-Transform-Achieve-Results) workplace intervention – a randomized experiment designed to reduce work – family conflict by increasing employees' perceived schedule control and supervisor support for family and personal life (Kelly et al., 2014; Kossek, Hammer, Kelly, & Moen, 2014). Prior reports revealed that, as intended, the STAR intervention resulted in declines in employees' global ratings of work–family conflict, increases in global ratings of schedule control, and improvements in the global ratings of perceived time adequacy with family in analyses by employees (Kelly et al., 2014). On a daily level, STAR also increased parents' reports of time spent with children (Davis et al., 2015).

The current study was built on this work to test the effects of STAR on partnered parents' *daily* time resources in non-work domains. We reasoned that, to the extent that STAR promoted employees' global temporal resources in general and daily time with their children, the benefits would also be apparent in daily perceived time adequacy and other dimensions of daily time use. Thus, we tested the effects of STAR intervention on partnered parents' diary reports of both time spent and time adequacy in parent, partner, and personal domains. We hypothesized that parents who participated in the STAR intervention would exhibit increases in their daily time resources – both perceived time adequacy and time use – at post-intervention compared to the reports of parents in the control condition (H2). However, it is also plausible that these parents might not feel more time adequacy, day to day, under STAR because the expectations of parental time investment and emotional focus are so great that even improved work conditions do not allow them to meet those cultural and internalized expectations of giving 'enough time' to family.

We also tested whether STAR strengthened the links between time resources and daily well-being. The intervention may enhance parents' daily well-being under conditions when they spent or perceived more time in family and personal domains as the intervention intended. More time spent with family is positively linked to parents' subjective well-being (Musick et

al., 2016). More time spent in parenting may also induce fatigue and negative emotions (e.g. Ross & Van Willigen, 1996). However, a contemporary belief that time-intensive and child-centered parenting is important for positive child development (Kalil, Ryan, & Corey, 2012) may predict positive effects of more family time use, especially for employed parents who devote what time they have to their children (Sayer, Bianchi, & Robinson, 2004). Likewise, if the intervention allowed parents more personal time (i.e. in leisure, exercising), it may have positive effects on their daily well-being. Thus, we hypothesized that STAR parents who spent more time in parenting, partner, and personal roles would exhibit enhanced well-being at post-intervention than parents in the control condition. We also hypothesized that STAR parents who perceived higher time adequacy for the three roles would exhibit enhanced well-being at post-intervention, relative to parents in the control condition (H3).

Method

Participants

Data came from the Work, Family, and Health Study, a field trial testing the effects of a workplace intervention on employees' health (Bray et al., 2013; Kelly et al., 2014). Researchers partnered with the information technology division of a US company; the two largest workforces were invited to participate. A total of 56 work teams were identified and randomized to either the STAR or the control or Usual Practice (UP) condition (Kelly et al., 2014). Of 823 employees completing the baseline interview, 209 parents with an adolescent-age child (i.e. a target child aged 9–17 years; if parents had multiple children, the 1 closest to age 13 was selected) were eligible and invited to participate in a daily diary study with the target child. This study used parents' daily diary data. Of the 209 eligible parents, 131 participated (62.7% response rate), and 102 parents completed a follow-up assessment 12 months later (77.9% retention rate). Attriters ($n = 29$) and non-attriters ($n = 102$) did not differ on demographics (age, gender, marital status, household income) or intervention participation. Of the 102 diary longitudinal participants, 90 married or partnered parents answered questions about time resources for partner, parent and self and constituted the final sample for this study, which included 53 STAR and 37 UP parents.

Parents' mean age at baseline was 44.60 ($SD = 5.67$), 58% were fathers, 81% had baccalaureate degrees or higher and 18% had some college (1–3 years) or vocational education; mean annual household income was in the \$120,000–129,999 range, and average weekly work hours were 45.67 ($SD = 5.20$). Mean number of children was 2.11 ($SD = 1.17$), and children averaged 13.13 in age ($SD = 2.24$). There were no baseline differences in these sociodemographic characteristics between the STAR and UP parents.

Procedures

Trained interviewers obtained informed consent and then conducted computer-assisted personal interviews with the employees at the workplace at baseline and again at the 12 month follow-up. The daily diary data collection took place in the month following the workplace interviews at both baseline and at follow-up. Parents were telephoned on eight consecutive evenings and asked about their daily experiences, including time spent in daily activities, perceived time adequacy in parent, partner and personal domains, and daily moods

and physical symptoms. Call lasted about 20 minutes, and parents received \$150 at baseline and \$250 at 12-month follow-up for their participation.

STAR workplace intervention

Following baseline interviews, employees were randomly assigned to the STAR or UP condition. The STAR intervention consisted of a three-month structural and cultural change process, including two types of main activities. The first was training managers/supervisors to demonstrate support for employees' personal and family lives while also supporting employees' job performance. Specifically, managers/supervisors completed computer-based training that taught them about (1) personal and business reasons for reducing work–life conflicts, (2) top management support for this initiative, and (3) example behaviors and strategies that demonstrate both professional and personal support to their employees. The second was facilitator-led sessions for employees (with managers present) to identify new work practices to help transition from rigid work schedule to giving employees more control over their work schedule and time spent at work. Examples include cross-training to provide back-ups, possibility of remote work, and self-scheduling. Participatory sessions for employees lasted eight hours, and managers attended an additional four hours of training (for details on STAR procedures, see Kelly et al., 2014; Kossek et al., 2014). The efficacy of the intervention was assessed by changes in work-to-family conflict, schedule control, and perceived supervisor support for family life among employees who participated in the intervention sessions (STAR condition) compared to employees who did not and continued business as usual (UP condition). As intended, the intervention significantly decreased work-to-family conflict and increased schedule control and supervisor support at post-intervention among employees in the STAR condition compared to those in the UP condition (Kelly et al., 2014).

Measures

Daily perceived time adequacy—Time adequacy questions came from the Family Resource Scale – Revised (Van Horn, Bellis, & Snyder, 2001). We used 3 items that asked about daily perceived time adequacy for the target child (a child between 9 and 17 years of age, closest to age 13), partner, and self: ‘Since this time yesterday/since we last spoke, did you feel that you had enough time to be with your (target) child?’ ‘Did you feel that you had enough time to be with your spouse/partner?’ ‘Did you feel that you had enough time to exercise?’ Responses ranged from 1 (*strongly disagree*) to 5 (*strongly agree*).

Daily time use—On each call parents reported how much time they spent with the target child, partner, and on themselves:

Since this time yesterday: how much time did you spend taking care of or doing things with your (target) child – such as helping with homework, playing with them, driving them around, or doing something else with them?’ ‘How much time did you spend with your spouse/partner (while awake)?

‘How much time did you spend doing leisure activities, actively choosing to do things for yourself?’ Responses were coded as total hours per day.

Daily positive and negative affect—We used the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988), which consisted of 10 items on positive affect (enthusiastic, interested, determined, excited, inspired, alert, active, strong, proud, and attentive) and 10 items on negative affect (scared, afraid, upset, distressed, jittery, nervous, ashamed, guilty, irritable, and hostile). Responses on each item ranged from 1 (*none of the time*) and 5 (*all of the time*). Positive affect was calculated by averaging responses to the 10 items assessing positive affect: scores were only calculated if participants answered all 10 items. Likewise, negative affect was calculated by averaging responses to the all 10 items assessing negative affect. For both scales, higher scores reflected more positive or negative affect. For the positive affect scale, the daily-level correlation among the items was .92 and person-mean level correlation was .96 at baseline. For the negative affect scale, the daily-level correlation among the items was .83 and the person-mean level correlation was .92 at baseline.

Daily physical symptoms—To assess the daily number of physical symptoms, we adapted 10 items from Larsen and Kasimatis's (1991) physical symptom checklist. The items were,

Since the time you woke up today did you experience any: (1) headache, (2) back, neck, or shoulder pain, (3) leg or foot pain, (4) finger, hand, or wrist pain, (5) eye strain, (6) fatigue, (7) cough, sore throat, runny nose, fever, chills, or other cold/flu symptoms, (8) allergies, (9) stomach problems such as nausea, diarrhea, constipation, poor appetite, and (10) any other physical symptoms or discomforts (not diseases or conditions) today?

We summed across the 10 items. Higher scores indicated more physical symptoms.

Covariates—Prior research has reported variations in perceived time adequacy among parents with different socioeconomic status and work and family characteristics (Hill et al., 2013; Lee et al., 2015; Milkie et al., 2004). Thus, we included parents' age, gender (0 = *men*, 1 = *women*), race (0 = *non-white*, 1 = *white*), educational level (0 = *less than college graduate*, 1 = *college graduate or more*), spouse/partner's employed status (0 = *unemployed*, 1 = *employed*), and number of children. Target child's age and gender (0 = *boy*, 1 = *girl*) as covariates. Moreover, whether parents worked on that day (0 = *non-work day*, 1 = *work day*) and the proportion of parents' workdays across study days were included to take into account physical availability of the parents. Consistent with prior research (Almeida, Piazza, & Stawski, 2009), we controlled for day-in-study, given that daily well-being responses tend to be over-reported on the first day (e.g. more negative affect on *day1*) and to decrease over the course of diary days. Furthermore, a wave variable (0 = *baseline*, 1 = *12-month*) was included to examine changes between baseline and 12 months. We controlled for significant (at $p < .05$) or marginally significant (at $p < .08$) covariates that predicted daily well-being outcomes (Appendix 2), including parent age, gender, spouse employment, number of children, target child age, workdays, day of study, and wave. Additionally, in models for physical symptoms, parent's Body Mass Index (BMI; kg/m^2) was controlled for, following the practice in prior research (Gartland, O'Connor, Lawton, & Bristow, 2014). Lastly, we controlled for the effects of STAR intervention in all models to take into account any

potential difference by intervention participation in daily time resources and daily well-being. The intervention involved randomization of employees in background and work characteristics, thus can rule out potential differences due to baseline work factors, including schedule control, work hours, job demands, work– family conflict, and perceived time adequacy for family (Kelly et al., 2014). All continuous covariates were centered at the sample mean.

Analytic strategy

This study used multilevel modeling (conducted in SAS 9.4) to take into account the clustered data structure: 1440 daily observations across two waves (baseline and 12 months) were clustered within 90 persons (Bryk & Raudenbush, 1992). There were relatively small (and non-significant) variances at the work group or wave level compared to variances at the daily and person levels, and hence we used two-level models to simplify the model structure. Variances in variables were decomposed to level 1 (Within-Person; WP) and level 2 (Between-Person; BP). WP predictors were centered at each person mean and thus higher scores indicated higher than usual. BP predictors were centered at the grand mean, such that higher scores reflected higher than others in the sample. At the BP level, we tested, for example, whether parents who perceived lower time adequacy for their child, on average, reported less positive affect than those who perceived higher time adequacy for child, on average. At the WP level, we tested whether, on days when parents perceived lower time adequacy for their child than usual (compared to their cross-day average), they also reported less positive affect than usual, controlling for the cross-day average associations (Lee & Almeida, 2016). The Intra-Class Correlations (*ICCs*) of our key variables indicated high proportion of variance attributable to within-person differences and justified the use of multilevel modeling (Appendix 1).

To test the workplace intervention effects, we included an interaction term between wave and intervention condition (STAR, UP) to test whether the 2 groups differed in daily time resources at the 12-month post-intervention follow-up. To test whether STAR strengthened the links between time resources and daily well-being at post-intervention follow-up, we created a STAR assignment variable (0 = *All parents at baseline & UP parents at 12 months*; 1 = *STAR parents at 12 months*). The assumption underlying the STAR variable was that there was no baseline difference between the STAR and UP parents in their levels of daily well-being or in the links between time use and/or perceived time adequacy and daily well-being. Results of *t*-tests showed no baseline differences. In the case of significant interactions, we conducted follow-up tests using estimate commands in Proc Mixed. Interactions with high time adequacy or more time use were estimated at 1 *SD* above the sample mean, and interactions with low time adequacy or less time use were estimated at 1 *SD* below the mean.

Results

Day-to-day links between perceived time adequacy, time use, and well-being

Table 1 presents the results of the multilevel models examining the associations of time adequacy and time use with daily well-being, adjusted for covariates. Model 1 included the

two forms of *time resources for target child* – time spent with and perceived time adequacy for child. Beginning with positive affect, time spent with child was positively associated with positive affect at the BP level: Parents who spent more time with their child reported more positive affect, on average, than parents who spent less time with their child. Controlling for this overall BP effect, perceived time adequacy for child was positively associated with parents' positive affect at the Within-Person (WP) level: On days when parents perceived higher time adequacy for their child than usual (i.e. their own cross-day average), they reported more positive affect than usual. Time spent with child was not significantly associated with negative affect at either the BP or WP levels, but perceived time adequacy for child was related to negative affect at both the BP and WP levels: Higher BP time adequacy was associated with less negative affect, and on days when parents perceived higher time adequacy for their child than usual, they also reported less negative affect. Results for physical symptoms revealed a positive association with time spent with child at the WP level. Beyond this effect, perceived time adequacy for child was significantly linked to physical symptoms at both BP and WP levels: Higher average time adequacy was associated with fewer physical symptoms, and on days when parents perceived higher time adequacy for their child than usual, they also reported fewer physical symptoms.

Model 2 in Table 1 shows the results for *time resources for partner*. There were no significant associations between time spent with partner and positive affect, negative affect or physical symptoms. However, across all three well-being outcomes, perceived time adequacy for partner at the WP level predicted better daily well-being: On days when parents perceived higher time adequacy for their partner, they also reported more positive affect, less negative affect, and fewer physical symptoms. At the BP level, perceived time adequacy for partner also predicted negative affect: Parents who perceived higher time adequacy for their partner reported less negative affect, on average, than those who perceived lower time adequacy.

Model 3 in Table 1 shows the results for *time resources for self*. There were no significant associations between time spent on self (at either BP or WP levels) and any of the three daily well-being outcomes. Perceived time adequacy for self, however, was associated with all three daily well-being outcomes at the WP level: On days when parents perceived higher time adequacy for exercising than usual, they also reported more positive affect, less negative affect, and fewer physical symptoms.

Figure 2 shows the summary of results focusing on the within-person associations between perceived time adequacy and daily well-being. More daily perceived time adequacy for parenting, partner, and personal roles were linked more daily positive affect, less daily negative affect, and fewer daily physical symptoms, net of daily time spent in each of the roles (H1 supported).

The effects of the workplace intervention on daily time resources

Table 2 presents the results of multilevel models examining the STAR workplace intervention effects on daily time resources. There was a significant wave by intervention interaction on daily time spent with target child. Panel 1 in Figure 3 shows that employed and partnered parents who were randomly assigned to STAR increased daily time with their

child from baseline to 12 months, whereas UP parents showed no increase. This effect was consistent with previously reported STAR effect on all parents' (not just partnered parents') daily time spent with children (Davis et al., 2015). Moreover, a new STAR intervention effect emerged on daily perceived time adequacy for self. STAR parents showed significantly higher increases in daily perceived time adequacy in the personal domain (for exercising) than UP parents (Panel 2, Figure 3). Thus, H2 was supported for time use in the parenting role and perceived time adequacy in the personal domain.

The effects of the intervention on the links between time resources and daily well-being

There were no significant main effects of STAR on daily positive affect, negative affect, and physical symptoms (Appendix 2); however, STAR altered some of the links between time resources and daily well-being. In terms of *time resources for child*, there was a significant interaction between time spent with child (BP level) and STAR predicting negative affect, $B = -0.04$, $SE = 0.01$, $p = .003$. Panel 1 in Figure 4 shows that STAR parents who spent more time with their child exhibited significant decreases in negative affect by the 12-month follow-up. UP parents (who spent more time with their child) also decreased in negative affect, but STAR parents' decreases were larger. To determine values of time spent with child that STAR was linked to declines in negative affect, we conducted the region of significance test (Preacher, Curran, & Bauer, 2006). The result indicated that STAR significantly decreased negative affect for parents who spent at least 3.1 hours per day with their child, on average, which was 22% of the sample, controlling for the covariates, including child age. STAR did not, however, change the links between time spent with child and positive affect or physical symptoms. STAR also did not change the links between time adequacy for child and the three daily parent well-being outcomes.

With regard to *time resources for partner*, the interaction between time spent with partner (BP level) and STAR significantly predicted positive affect, $B = -0.03$, $SE = 0.02$, $p = .04$. However, the *post hoc* test indicated that STAR parents who spent more time with their partner did not significantly increase positive affect at the 12-month followup compared to their baseline, although UP parents did. There was also a significant interaction between time spent with partner (BP level) and STAR in predicting physical symptoms, $B = -0.09$, $SE = 0.04$, $p = .01$. Panel 2 in Figure 4 depicts that STAR parents who spent more time with their partner significantly decreased in physical symptoms from baseline to 12 months. UP parents who spent more time with their partner also decreased, and the difference in slopes for STAR and UP parents who were high in partner time only reached trend-level ($p = .086$). The region of significance test (Preacher et al., 2006) showed that STAR significantly decreased physical symptoms for parents who spent at least 6.2 hours per day with their partner – while wake – on average (12% of our sample). There was neither a significant interaction between time spent with partner and STAR in predicting negative affect, nor significant interactions between perceived time adequacy for partner and STAR predicting any of the three daily parent well-being outcomes. Lastly, we examined whether STAR changed the links between *time resources for self* and daily well-being; none of the interactions were significant. Thus, H3 was supported for the link between time with child and negative affect and also for the link between time with partner and physical symptoms (albeit at a trend-level).

Discussion

This study examined the links between time resources and daily well-being in employed and partnered parents and tested the effects of a workplace intervention on these linkages. Building on emerging research on perceived time adequacy, we examined daily variations of time adequacy in non-work domains, incorporating information on time use in each domain. Our daily diary design demonstrated that on days when parents perceived lower time adequacy for parenting, partner, and personal roles, they reported feeling less happy, more distressed, and experienced more physical discomforts. These results remained significant after accounting for how much time was spent in the roles. Furthermore, we provide evidence for the effects of the STAR workplace intervention on increased daily time resources for parenting and personal life and also on the links between more family time and improved well-being. These results support the definition of the situation theory (Thomas & Thomas, 1928) which emphasizes the importance of the subjective evaluation of contexts, especially for time-related circumstances and their consequences for well-being. The results also highlight the role of workplace contextual support in protecting employee-parents' time resources and thereby improve their well-being.

The current study contributes to the literature, first, by demonstrating the unique importance of perceived time adequacy for parenting, partner, and personal roles in daily well-being, beyond the amount of time spent in each role. Previous studies showed that perceived time pressure or time strain was negatively associated with well-being (Moen et al., 2013; Nomaguchi et al., 2005; Roxburgh, 2012), but did not examine relative effects of perceived time vs. actual time. Guided by the definition of the situation theory that what is perceived by individuals has its own consequences (Thomas & Thomas, 1928), we expected that perceived time adequacy would explain unique variance in daily well-being that time use did not explain. This expectation was supported for all three roles. Higher levels of daily perceived time adequacy for parenting, partner, and personal roles predicted better affective and physical well-being on that day, after controlling for the effects of time spent in each of the roles. Our findings tease apart differential implications of perceived and actual time resources in family and personal domains for employed parents' daily well-being, which adds new knowledge to the work and family literature. In fact, our findings refute the notion of a 'time-pressure illusion' (i.e. much of the time pressure that people feel is an illusion; Goodin et al., 2005), and instead highlight that the subjective perception of time adequacy has unique and stronger effects on daily well-being than the effects of actual time use.

Moreover, this study advances previous knowledge on perceived time adequacy by demonstrating day-to-day variations in time adequacy and the significance of daily time adequacy in employed, partnered parents' daily well-being. Both time adequacy and daily well-being were measured by self-reports which may reflect stable trait-like associations and poses a risk for common-method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) for the between-person results. Our findings, however, also focus on the *within-person level* testing whether on days when parents reported lower *than usual* perceived time adequacy for the three roles they also reported poorer *than usual* well-being. Furthermore, findings hold after controlling for other stable characteristics such as gender and socioeconomic status

(Hays, 1996; Hill et al., 2013; Milkie et al., 2004), thus signifying that daily perceived time adequacy matters for daily well-being regardless of individual differences.

We also documented the benefits of a workplace intervention in increasing employees' temporal resources. Building on previous studies that reported STAR intervention effects on employee schedule control and perceived time adequacy for family and personal life (Kelly et al., 2014) and an increase in parents' daily time spent with their child (Davis et al., 2015), we demonstrated that STAR also improved partnered parents' daily perceived time adequacy for themselves as well as daily time spent with their child. The results showed that workplace support can enhance a key resource of employed parents, significant for their daily well-being. Daily perceived time adequacy for exercising was linked with daily emotional and physical well-being in this study, and found in prior research as a key barrier to keeping many adults from engaging in regular exercise (American Psychological Association, 2012). To the best of our knowledge, this study is one of the first studies that reveals the positive effect of a workplace intervention on employees' perceived time adequacy for self-care in the specific domain of exercising.

We also found that the effects of STAR were more apparent for parents who spent more time with family. Specifically, STAR parents who spent more time with their child exhibited significant reductions in negative affect by the 12-month post-intervention follow-up compared both to their baseline and to UP parents who spent comparable amounts of time with their child. This finding extends prior research in documenting the implications of parents' time with children for their *own* well-being (see also Musick et al., 2016). And, similar effects of STAR emerged for time with partner: STAR parents who spent more time with their partner exhibited declines in physical symptoms compared to their baseline and tended to exhibit fewer symptoms compared to UP parents who spent comparable amounts of time with partner. These results suggest that the intervention enhanced *the experience of time with family*, as it improved the well-being of parents who participated in the intervention *and* spent more time with their child and partner. The intervention was designed to increase perceptions of schedule control by employees and of supervisor support for family and personal life (Bray et al., 2013; Kelly et al., 2014; Kossek et al., 2014). Taken together, our findings suggest that the STAR intervention was effective in increasing parents' daily temporal availability for their children and themselves and also improving daily well-being of parents who were able to allocate more time in the family domain – a key target of the intervention.

Nonetheless, we found no effects of the STAR intervention on the links between perceived time adequacy and daily well-being. This null effect suggests that more temporal flexibility and support from the intervention may not be enough to change the strong effects of perceived time adequacy on employed parents' daily well-being. The STAR intervention involved only one parent, but the families in our study sample were two-parent households. Given that reports of perceived time adequacy for parenting, partner and personal roles reflect sufficiency of time in non-work domains, these may require support from a partner who participates in family activities. STAR parents might not have been able to take advantage of schedule control provided by the intervention given that their partners were not provided with the same levels of flexibility and supervisor support. Future workplace

interventions may need to consider targeting both parents within families while involving randomization of employee-parents to treatment.

Limitations and future directions

In the face of its contributions, limitations of this study imply directions for future research. First, our measures of time use and time adequacy for personal life did not capture time resources for the same activity. That is, the measure of perceived time adequacy for self-focused on the domain of exercising and the measure of time spent on self-focused on leisure in general. Future research should measure time adequacy and time use within a specific personal activity domain. Also, we assessed time adequacy *to be with* child and partner, and thus our measures do not capture time adequacy for doing specific activities in each role. Although we found slightly different results across time adequacy for child or for partner, the high correlation between the two constructs (Table 1) calls for the refinement of these measures.

Importantly, our findings about the implications of time resources for daily well-being are correlational in nature and thus causal inferences about these linkages cannot be drawn. Although the results imply, for example, that perceiving lower time adequacy for child predicts poorer daily well-being, causality can operate in both directions. In contrast, the STAR effects on daily time resources and the links between time resources and daily well-being that compared the two intervention conditions at the 12-month follow-up do allow for causal inferences. Lastly, our sample was employed parents working in a large firm in information technology; the sample is relatively privileged in income and education compared to other US workers. On the one hand, income may allow for buying non-familial care and reducing household work so that it may be harder to observe the association between perceived time adequacy and daily well-being in this high-income sample. On the other hand, parents with high education tend to have high expectations regarding parenting roles (Sayer, Gauthier, & Furstenberg, 2004) and high work demands (Schieman & Glavin, 2011) so that the association between time resources and daily well-being may be stronger. Future research should examine these questions with samples of employed parents with less education or less income.

Conclusion

This study extends knowledge on employed parents' time resources, with emphasis on daily perceived time adequacy. Our findings highlight the unique importance of perceived time adequacy in employed parents' daily well-being and suggest that workplace supports can provide employees with resources that enhance the experience of family time. More generally, perceived time inadequacy appears to be a uniquely important issue for employed parents, and thus policy-makers and work organizations should continue to make efforts to decrease time-related tensions and increase time resources for working parents.

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Appendix 1: Descriptive statistics and correlations for time use, perceived time adequacy, positive affect, negative affect, and physical symptoms

	<i>M</i>	<i>(SD)</i>	<i>Range</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>
1. Time spent with target child	2.38	(1.29)	0.6–6.9	<i>0.20</i>	0.22	0.44	0.06	0.34	0.03	0.26	–0.05	–0.12
2. Time adequacy for target child	3.55	(0.58)	2.1–5	0.44	<i>0.23</i>	0.21	0.82	0.27	0.58	0.27	–0.27	–0.29
3. Time spent with partner	3.76	(1.87)	0.1–9.1	0.43	0.31	<i>0.28</i>	0.40	0.57	0.04	0.26	–0.28	–0.15
4. Time adequacy for partner	3.49	(0.65)	2.1–4.9	0.29	0.72	0.46	<i>0.29</i>	0.32	0.60	0.29	–0.37	–0.31
5. Time spent on self	2.54	(1.12)	0.6–5.3	0.39	0.31	0.53	0.35	<i>0.16</i>	0.29	0.18	–0.16	–0.14
6. Time adequacy for self	3.27	(0.63)	1.8–4.6	0.19	0.42	0.21	0.45	0.29	<i>0.27</i>	0.32	–0.30	–0.37
7. Positive affect	2.86	(0.65)	1.2–4.9	0.13	0.17	0.14	0.19	0.08	0.17	<i>0.66</i>	–0.14	–0.18
8. Negative affect	1.22	(0.20)	1–1.9	–0.06	–0.20	–0.14	–0.21	–0.13	–0.20	–0.10	<i>0.36</i>	0.48
9. Physical symptoms	1.05	(0.96)	0–4.9	–0.06	–0.17	–0.12	–0.19	–0.11	–0.24	–0.18	0.42	<i>0.43</i>

Note: $N = 90$ partnered parents, 720 days at baseline; 657–707 observations were used due to missing responses. Means, standard deviations, and ranges were based on person-means across days at baseline; inter-class correlations (ICC = between-person level variance/total variance) are reported on the diagonal in italics. Numbers below the diagonal are within-person level correlations and those above the diagonal are between-person level correlations; correlations in bold were significant at $p < .05$.

Appendix 2: Results of multilevel models examining the effects of covariates on daily well-being

	Positive affect <i>B</i> (SE)	Negative affect <i>B</i> (SE)	Physical symptoms <i>B</i> (SE)
<i>Fixed effects</i>			
Intercept	2.98 (0.24) ***	1.25 (0.08) ***	1.37 (0.38) ***
Age of parent	0.02 (0.01) †	–0.00 (0.00)	0.00 (0.02)
Parent gender, woman (vs. man)	–0.29 (0.14) *	0.10 (0.05) *	0.65 (0.22) **
White (vs. non-white)	0.06 (0.14)	0.02 (0.05)	–0.00 (0.23)
College graduate or more (vs. not)	–0.23 (0.17)	0.09 (0.05)	0.23 (0.26)
Spouse employed (vs. not)	0.24 (0.17)	–0.17 (0.05) **	–0.51 (0.27) †
Number of children	–0.04 (0.04)	0.03 (0.02) *	0.20 (0.08) *
Age of target child	–0.07 (0.03) *	–0.01 (0.01)	0.05 (0.05)
Target child gender, girl (vs. boy)	0.17 (0.13)	0.01 (0.04)	–0.26 (0.21)

	Positive affect <i>B</i> (SE)	Negative affect <i>B</i> (SE)	Physical symptoms <i>B</i> (SE)
Body mass index (BMI)	–	–	0.04 (0.02) [*]
Workday (vs. non-workday)	–0.11 (0.03) ^{***}	0.05 (0.02) ^{***}	0.25 (0.07) ^{***}
Proportion of workdays	0.75 (0.72)	0.24 (0.23)	1.20 (1.13)
Day in study	–0.02 (0.01) ^{**}	–0.01 (0.00) ^{***}	–0.07 (0.01) ^{***}
Wave, 12 months (vs. baseline)	0.16 (0.04) ^{***}	–0.06 (0.02) ^{**}	–0.41 (0.09) ^{***}
Intervention (vs. usual practice)	–0.09 (0.14)	0.04 (0.05)	0.14 (0.22)
Wave × intervention	–0.09 (0.05)	–0.03 (0.03)	–0.05 (0.11)
<i>Random effects</i>			
Between-person level variance	0.35 (0.06) ^{***}	0.03 (0.01) ^{***}	0.82 (0.14) ^{***}
Within-person level variance	0.20 (0.01) ^{***}	0.06 (0.00) ^{***}	1.08 (0.04) ^{***}

Notes: *N* = 90 partnered parents, 1440 days across baseline and 12 months; 1327–1418 observations were used due to missing responses. TC means Target Child. *P* means Partner. BMI was included only in the model for physical symptoms. For binary variables, reference group (coded as 0) is in parenthesis.

[†] *p* < .08

^{*} *p* < .05

^{**} *p* < .01

^{***} *p* < .001.

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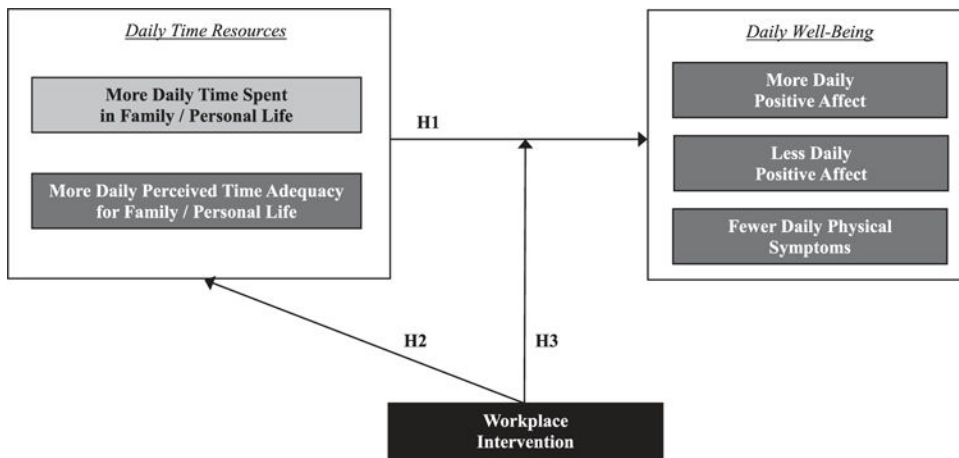


Figure 1.

A research model examining the day-to-day linkages between perceived time adequacy and well-being (H1) and testing workplace intervention effects on daily time resources (H2) and the links between time resources and daily well-being (H3).

Notes: The H1 tests the unique associations of daily perceived time adequacy with daily well-being, net of daily time use.

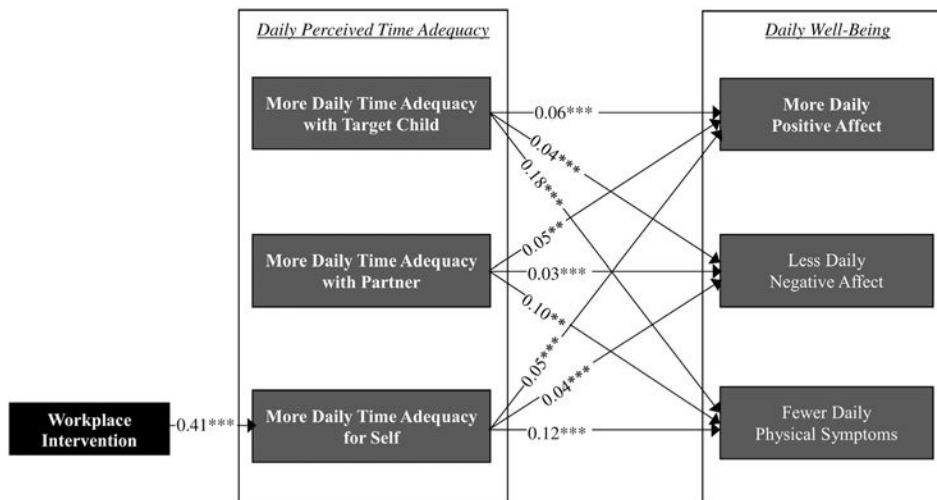


Figure 2. Summary of results that show the unique associations of daily perceived time adequacy with daily well-being and the effect of workplace intervention on daily perceived time adequacy for self. Notes: The associations of daily perceived time adequacy on daily well-being were adjusted for the associations of daily time use. Only within-person associations were presented. All variables oriented positively for clarity. ** $p < .01$, *** $p < .001$.

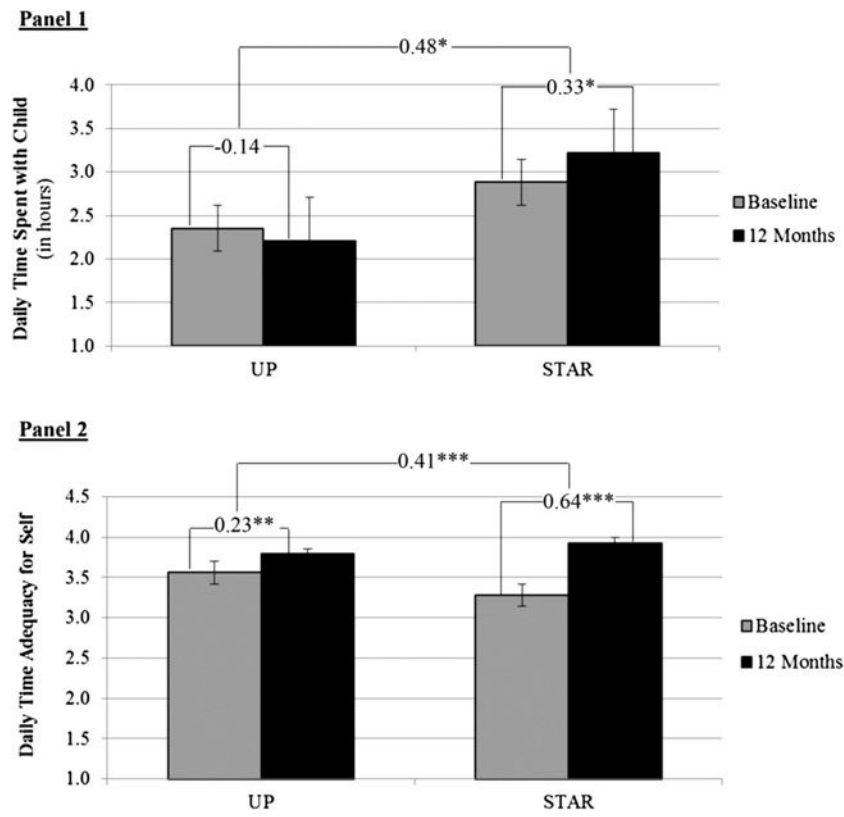


Figure 3. The main effects of STAR workplace intervention on daily time resources. Note: Daily time adequacy for self was specific to the activity domain of exercising (1–5 scale). * $p < .05$, ** $p < .01$, *** $p < .001$.

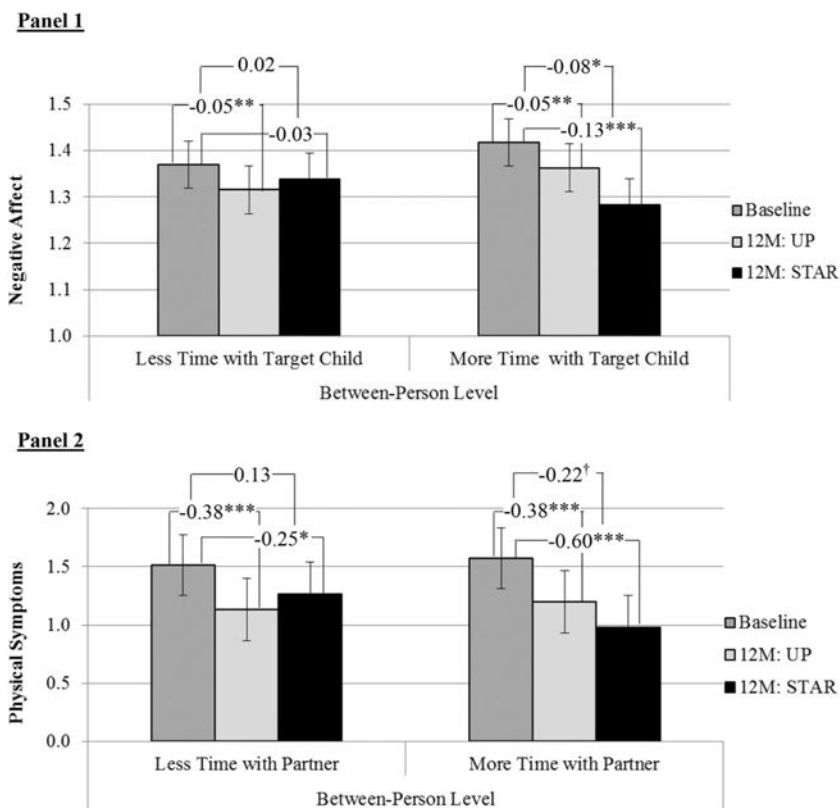


Figure 4. The interaction effects between STAR workplace intervention and time resources on daily well-being.
 Note: Negative affect (1–5 scale); physical symptoms (1–10 scale). † $p = .086$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 1

Results of multilevel models examining the effects of time adequacy and time use on daily positive affect, negative affect, and physical symptoms.

	Positive Affect <i>B (SE)</i>	Negative Affect <i>B (SE)</i>	Physical Symptoms <i>B (SE)</i>
Model 1: Time resources for target child			
<i>Fixed effects</i>			
Intercept	2.94 (0.15)	1.38 (0.05) ***	1.51 (0.24) ***
<i>Time spent with target child</i>			
Between-person (BP)	0.16 (0.05) **	0.00 (0.02)	-0.07 (0.09) **
Within-person (WP)	0.00 (0.01)	0.00 (0.00)	0.04 (0.02)
<i>Perceived time adequacy for target child</i>			
Between-person (BP)	0.18 (0.11) ***	-0.10 (0.04) **	-0.41 (0.19) *
Within-person (WP)	0.06 (0.02)	-0.04 (0.01) ***	-0.18 (0.04) ***
<i>Random effects</i>			
Between-person level variance	0.31 (0.05) ***	0.03 (0.01) ***	0.77 (0.13) ***
Within-person level variance	0.19 (0.01) ***	0.06 (0.00) ***	1.06 (0.04) ***
Model 2: Time resources for partner			
<i>Fixed effects</i>			
Intercept	2.87 (0.15) ***	1.38 (0.05) ***	1.53 (0.24) ***
<i>Time Spent with partner</i>			
Between-person (BP)	0.07 (0.04) †	-0.02 (0.01)	-0.01 (0.06)
Within-person (WP)	-0.00 (0.01)	-0.00 (0.00)	0.02 (0.01)
<i>Perceived time adequacy for partner</i>			
Between-person (BP)	0.12 (0.11) **	-0.09 (0.03) *	-0.31 (0.19) †
Within-person (WP)	0.05 (0.02)	-0.03 (0.01) ***	-0.10 (0.04) **
<i>Random effects</i>			
Between-person level variance	0.33 (0.05) ***	0.03 (0.01) ***	0.79 (0.14) ***
Within-person level variance	0.20 (0.01) ***	0.06 (0.00) ***	1.08 (0.04) ***
Model 3: time resources for self			
<i>Fixed effects</i>			
Intercept	2.92 (0.14) ***	1.36 (0.05) ***	1.46 (0.24) ***
<i>Time spent on self</i>			
Between-person (BP)	0.10 (0.06) †	-0.01 (0.02)	-0.08 (0.10)
Within-person (WP)	0.00 (0.01)	-0.00 (0.00)	0.01 (0.01)
<i>Perceived time adequacy for self</i>			
Between-person (BP)	0.20 (0.11) †	-0.07 (0.03) †	-0.33 (0.18) †
Within-person (WP)	0.05 (0.01) ***	-0.04 (0.01) ***	-0.12 (0.03) ***
<i>Random effects</i>			
Between-person level variance	0.32 (0.05) ***	0.03 (0.01) ***	0.77 (0.13) ***

	Positive Affect <i>B (SE)</i>	Negative Affect <i>B (SE)</i>	Physical Symptoms <i>B (SE)</i>
Within-person level variance	0.20 (0.01) ***	0.06 (0.00) ***	1.07 (0.04) ***

Notes: $N = 90$ persons, 1440 days across baseline and 12 months; 1310–1415 observations were used due to missing responses. Parents' age, gender, spouse's employment, number of children, target child's age, workdays, day in study, wave, and STAR intervention were controlled in all models; BMI was controlled only in the model for physical symptoms.

[†]
 $p < .10$

*
 $p < .05$

**
 $p < .01$

 $p < .001$.

Table 2
Results of multilevel models examining the effects of the star workplace intervention on daily time resources.

	Time Spent with Child B (SE)	Time Spent with Target B (SE)	Time Adequacy for Target Child B (SE)	Time Spent with Partner B (SE)	Time Adequacy for Partner B (SE)	Time Spent on Self B (SE)	Time Adequacy for Self B (SE)
<i>Fixed effects</i>							
Intercept	2.35 (0.45)***		3.97 (0.22)***	6.03 (0.73)***	4.02 (0.24)***	3.66 (0.45)***	3.56 (0.25)***
Age of parent	-0.02 (0.02)		0.02 (0.01)†	-0.01 (0.04)	0.03 (0.01)*	-0.02 (0.02)	0.02 (0.01)
Parent gender, woman (vs. man)	0.67 (0.25)*		-0.08 (0.13)	-0.37 (0.42)	-0.25 (0.14)†	0.10 (0.25)	-0.20 (0.14)
White (vs. non-white)	0.43 (0.26)		-0.11 (0.13)	0.60 (0.43)	-0.00 (0.14)	0.51 (0.26)*	-0.17 (0.15)
College graduate or more (vs. Not)	0.16 (0.30)		-0.10 (0.15)	-0.91 (0.50)†	-0.17 (0.16)	-0.47 (0.30)	-0.03 (0.17)
Spouse employed (vs. Not)	-0.34 (0.31)		-0.12 (0.15)	-0.29 (0.50)	-0.08 (0.16)	0.07 (0.30)	0.17 (0.17)
Number of children	-0.08 (0.10)		-0.10 (0.05)*	-0.00 (0.16)	-0.10 (0.05)†	0.03 (0.10)	-0.02 (0.05)
Age of target child	-0.19 (0.06)**		-0.03 (0.03)	-0.09 (0.10)	-0.02 (0.03)	0.05 (0.06)	-0.00 (0.03)
Target child gender, girl (vs. boy)	0.96 (0.24)***		0.20 (0.12)	0.60 (0.39)	0.24 (0.13)†	0.44 (0.24)†	0.12 (0.13)
Body mass index	-	-	-	-	-	-	-
Workday (vs. non-workday)	-1.83 (0.13)***		-0.59 (0.06)***	-3.06 (0.15)***	-0.69 (0.06)***	-2.30 (0.12)***	-0.53 (0.06)***
Proportion of workdays	-0.35 (1.30)		-1.20 (0.64)†	-2.84 (2.14)	-1.48 (0.70)*	-0.46 (1.29)	-1.42 (0.73)†
Day in study	0.01 (0.02)		-0.00 (0.01)	0.01 (0.03)	0.01 (0.01)	-0.00 (0.02)	0.02 (0.01)
Wave, 12 months (vs. baseline)	-0.14 (0.17)		0.34 (0.08)***	0.15 (0.21)	0.25 (0.07)***	0.41 (0.16)*	0.23 (0.07)**
Intervention (vs. usual practice)	0.53 (0.27)†		0.13 (0.13)	0.36 (0.42)	0.02 (0.14)	0.16 (0.26)	-0.28 (0.15)†
Wave × intervention	0.48 (0.23)*		-0.16 (0.10)	0.23 (0.27)	-0.00 (0.10)	-0.07 (0.21)	0.41 (0.10)***
<i>Random effects</i>							
Between-person level variance	0.87 (0.18)***		0.23 (0.04)***	2.80 (0.51)***	0.29 (0.05)***	0.90 (0.18)***	0.32 (0.06)***
Within-person level variance	4.02 (0.16)***		0.84 (0.03)***	5.97 (0.23)***	0.77 (0.03)***	3.83 (0.15)***	0.80 (0.03)***

Notes: N = 90 partnered parents, 1440 days across baseline and 12 months; 1327–1418 observations were used due to missing responses. BMI was included only in the model for physical symptoms. For binary variables, reference group (coded as 0) is in parenthesis. Workplace intervention effects are bolded.

† $p < .083$

* $p < .05$

.100 > p

10 > p
**

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