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Work–Family Conflict and Health Among Working Parents: Potential Linkages for Family Studies and Social Neuroscience

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Abstract

In this paired article the authors review research on paid work, parenting, and health in order to isolate fundamental questions and issues that remain unaddressed. Next, consistent with the theme of this special issue, the authors introduce social neuroscience and highlight how this emerging multidisciplinary science offers substantial promise for advancing key unresolved issues in the paid work, parenting, and health literature. The article concludes with suggestions for promising areas of research wherein family scientists and social neuroscientists could build collaborative research to address gaps in the work–family literature.

Keywords

health; paid work; parenting; social neuroscience; work–family conflict

The work–family interface, more popularly understood in terms of the challenge of meeting responsibilities in both the work and family domains, has been the topic of widespread recent attention. A former president of the American Psychological Association characterized the “work–family challenge” as a defining feature of the generation (Halpern, 2004). Initiatives like Workplace Flexibility 2010 and the White House Forum on Workplace Flexibility argued the necessity for public policy solutions to support workers in integrating their work and family lives (Office of the President, Council of Economic Advisors, 2010). In this same period, business-led initiatives like Corporate Voices for Working Families (2005) and advocacy organizations such as the Families and Work Institute lauded the organizational imperatives of management and human resource development strategies that enabled work-life balance. Most recently, the Eunice Kennedy Shriver National Institute of Child Health and Human Development and the Centers for Disease Control and Prevention launched the Work, Family & Health Network (<http://projects.iq.harvard.edu/wfhn/home>)

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Special Issue Guest Editor’s Note: This article examines the stress-based, biobehavioral framework underlying paid work, parenting, and health research and then summarize selected areas of social neuroscience research with a focus on stress and health research in social neuroscience as having the potential to further understanding of different work–family experiences should be conceived as “stressors” and, if so, how they may get “under the skin” to affect health outcomes. This examination of social neuroscience and work–family conflict builds on the paired article, “Nontoxic Family Stress: Potential Benefits and Underlying Biology” (this issue, xx–xx), in which Repetti and Robles discuss potential benefits of normative exposure to stress in children’s daily lives, emphasizing development of emotion regulation and coping and functioning of the neuroendocrine and immune systems.

with the explicit task of developing and testing the health-related benefits of employer strategies for promoting work–life balance.

Emerging results from the Work, Family & Health Network are expanding confidence that working adults' experiences of combining work and family are sensitive to deliberate intervention (Moen, Kelly, Tranby, & Huang, 2011) and that these interventions produce subsequent improvements in discrete disease risk outcomes (Berkman, Buxton, Ertel, & Okechukwu, 2010; Moen, Fan, & Kelly, 2013). These emerging results are largely consistent with the wider multidisciplinary literature focused on the health-related implications of combining paid work and family (see Grzywacz, in press, for a recent review). Contributions of the Work, Family & Health Network notwithstanding, several commentators have lamented the modest number of practical solutions resulting from the voluminous work–family literature (Kossek, Baltes, & Matthews, 2011), whereas others point to fundamental and methodological shortcomings in this literature (Casper, Eby, Bordeaux, Lockwood, & Lambert, 2007; Grzywacz, in press). These critiques can be reasonably summarized in terms of great depth in describing potential linkages between every day and cumulative experiences at the work–family interface and health outcomes. However, there is relatively scant evidence of causation and even less understanding of the mechanisms and processes by which work–family experiences get “under the skin” to affect health.

The goal of this paired article is to stimulate an alternative conception and approach to work, family, and health research. To achieve this goal, we refine a recent review of the broader work, family, and health literature (Grzywacz, in press) by emphasizing research on paid work, parenting, and health in order to better isolate fundamental questions and issues that remain unaddressed. The focus on working parents complements Repetti and Robles's (2016) paired cogent discussion of the salient role of parents in shaping children's responses to and recovery from stressors. Next, consistent with the theme of this special issue, we introduce *social neuroscience* and highlight how this emerging multidisciplinary science offers promise for informing key weaknesses in the paid work, parenting, and health literature. We conclude with suggestions for promising areas of research wherein family scientists and social neuroscientists could build collaborative research to address gaps in the work, family, and health literature. In addition, we attempt to illustrate why the cross-fertilization of family science and social neuroscience is meaningful to family practitioners.

Paid Work, Parenting, and Health: A Critical Review and Summary

Conceptual Foundations

This review focuses on the intersection of paid employment with parenting and subsequent implications for the health of the working parent (see Figure 1). “Paid work” and “parenting,” or the social address indicators of employment and parental status, respectively, are not the primary focus of research; instead, parenting-focused work–family research focuses on discrete aspects of employment and parenting activities. Figure 1 depicts this predilection by listing “paid employment” and “parent status” as exogenous factors, each of which condition an individual's exposure to, or involvement in, discrete workplace conditions and parenting practices, respectively. In terms of workplace conditions, our conceptualization uses the National Institute for Occupational Safety and Health's concept

of “work organization,” which is conceived as a multidimensional and multilevel concept transcending the way jobs are designed (i.e., task and job characteristics), supervision and management models, and organizational policies (Sauter et al., 2002). Similarly, parenting is conceived along multiple dimensions of parent–child interaction (Skinner, Johnson, & Schneider, 2005), spanning basic caregiving and nurturance (e.g., warmth and responsiveness, cognitive stimulation), to inculcation of social norms (e.g., gatekeeping, control, and discipline) and intergenerational transfer of beliefs and practices (e.g., modeling, family routines).

Work organization is conceived to have unidirectional effects on parenting (see Figure 1). The conception is informed by Kohn and Schooler’s (1973) early investigations noting that workers in blue collar jobs interacted with their children in a way that emphasized compliance with authority, whereas those in white collar jobs emphasized autonomy and creativity in their interactions with children. This research provided the impetus for the “socialization of work” literature and an entire field of research articulating how the temporal, sociostructural, and psychosocial aspects of employment shape parenting and family life (Perry-Jenkins, Repetti, & Crouter, 2000).

Work–family conflict, the most commonly studied experience at the work–family interface, is classically defined as “a form of inter-role conflict in which the role pressures from the work and family domains are mutually incompatible so that participation in one role [home] is made more difficult by participation in another role [work]” (Greenhaus & Beutell, 1985, p. 77). Work–family conflict is inherently nondirectional (Greenhaus & Beutell, 1985, proposition 5a, p. 84); however, once a decision is made for resolving the work–family conflict (either passive or deliberate), work–family conflict results in work-to-family interference (WFI) or family-to-work interference (FWI). WFI and FWI are conceived as reciprocally related (Frone, Yardley, & Markel, 1997), and several meta-analyses indicate small to medium correlations between measures of WFI and FWI (Byron, 2005; Mesmer-Magnus & Viswesvaran, 2005).

Health is a more complex concept that is often under- or ambiguously conceptualized in work, family, and health research (Grzywacz, in press) as well as in families and health research (Grzywacz & Ganong, 2009). A common definition of *health* comes from the World Health Organization, which conceives health as a state of complete physical, psychological, and social well-being that is more than the absence of morbidity (“Re-Defining ‘Health’,” 2005). Although philosophically compelling, this all-inclusive definition proves to be operationally challenging (Huber et al., 2011; Saracci, 1997); consequently, many health researchers refer to more discrete dimensions of health-related quality of life, such as *health self-appraisal*, *functional ability of discrete bodily systems* (e.g., cardiovascular recovery; joint range of motion), *health-related role ability/limitation*, and *morbidity* (Ware & Sherbourne, 1992).

The implicit model underlying much of the paid work, parenting, and health research is a stress-based, biobehavioral framework; that is, work–family conflict and the social and emotional sequelae of the individual’s decision for resolving the work–family conflict (i.e., work interference with family and family interference with work) have historically been

conceived of as stressors (Greenhaus & Beutell, 1985; Klitzman, House, Israel, & Mero, 1990; Weiss, 1990). These stressors, in turn, are presumed to undermine human health through both behavioral (e.g., maladaptive coping, like alcohol use) and biophysiological (e.g., cortisol dysregulation) pathways.

The Evidence

Employment has long been believed to play a fundamental role in parenting (Repetti & Wang, 2014). Research on the role of employment status, in particular that of women with young children, was originally concerned that mothers' paid work would interfere with mothering and produce a host of deleterious outcomes for children. A series of reports resulting from the landmark National Institute Child Health and Human Development (NICHD) Study of Early Child Care definitively concluded that maternal employment has modest and potentially beneficial results for children's development in early childhood and that children placed in high-quality early child care have better developmental outcomes than children whose mothers were not employed (NICHD Early Child Care Research Network, 2000, 2001; NICHD Early Child Care Research Network, 2002a, 2002b).

Moreover, following from theories of potential benefits of role expansion (Barnett & Hyde, 2001; Marks, 1977; Sieber, 1974), there is evidence suggesting that employment may enhance parenting. More recent analyses of data from subsequent panels of the NICHD Study of Early Child Care indicated that full-time and part-time working mothers with "standard work schedules," or those that follow a Monday thru Friday 8-to-5-like format, reported more sensitive and engaging parenting practices with their infants and toddlers than did nonworking adults (Grzywacz, Daniel, Tucker, Walls, & Leerkes, 2011). Buehler and colleagues (Buehler, O'Brien, Swartout, & Zhou, 2014), also using data from the NICHD Study of Early Child Care, reported that mothers who worked part time were more sensitive to their infants and preschool-age children than were non-employed mothers (mothers employed full time did not differ from those employed part time). Mothers employed full time were more engaged in child learning than were mothers employed part time in early childhood, although this difference was attenuated by middle childhood (Buehler et al., 2014). Other analyses of these same data indicated that both full-time and part-time employed mothers engaged in more generative parenting practices than non-employed mothers (Augustine, 2013).

During the 1990s, attention in the work-family literature began to shift from the effects of employment status, per se, on parenting to variation in different aspects of work (Perry-Jenkins et al., 2000). Proponents of *role expansion theory* (e.g., Barnett & Hyde, 2001) argued that *job role quality*, or the extent to which the job fit the needs of the working individual, was more relevant to parenting than employment per se. Similarly, the *socialization of work model* argues that ongoing involvement in job-related activities results in corresponding shifts in nonwork activities. This model—which was informed by the observation that differential involvement by members of various social classes in workplace activities such as decision making in ambiguous situations—was associated with differences in parenting activities (Kohn & Schooler, 1982), led to several studies that explored how different job characteristics may shape parenting and subsequent child outcomes. Recently,

Augustine (2013) reported that women who were employed in higher prestige, more professional jobs engaged in more developmentally generative parenting than lower status mothers and that the beneficial association of prestige with parenting was stronger among women with lower educational attainment. Similarly, controlling for selection effects and other confounds, Yetis-Bayraktar and colleagues (Yetis-Bayraktar, Budig, & Tomaskovic-Devey, 2013) reported greater math and reading scores among children whose mothers had higher levels of occupational complexity. In regard to fathers, Goodman and colleagues (Goodman, Crouter, Lanza, & Cox 2008) reported that lower occupational self-direction was associated with less father engagement in parenting, especially for those in rural areas. Other features of work and their implications for parenting have been investigated, including nonstandard work schedules (Grzywacz et al., 2011; ; Strazdins, Clements, Korda, Broom, & D'Souza, 2006; Strazdins, Korda, Lim, Broom, & D'Souza, 2004) and levels of job control (Costigan, Cox, & Cauce, 2003; MacDermid & Williams, 1997).

The evidence base documenting workplace sources of variability in work–family conflict is far more developed than research focused on employment or work conditions and parenting. Informed heavily by the fields of industrial/organizational psychology, organizational behavior, and management, there is substantial evidence indicating that several features of a working parent's job is associated with work–family conflict. The most recent meta-analysis of the antecedents of work–family conflict (Michel, Kotrba, Mitchelson, Clark, & Baltes, 2011), which reviewed 142 studies and 178 unique samples, reported that employee appraisals of overload at work was the strongest correlate of work interference with family; the average correlation adjusted for unreliability in measurement (i.e., ρ) was .55. Generic job stressors and role conflicts within the workplace had the second and third strongest associations with work interference with family ($\rho = .50$ and $\rho = .41$, respectively). Organizational support, supervisor support, and coworker support are consistently associated with less work interference with family, and the beneficial effects of coworker support are stronger for parents than for childless individuals (Michel et al., 2011). Separate meta-analyses of the effects of organizational supports (Kossek, Pichler, et al., 2011) and policies (Butts, Casper, & Yang, 2013) suggest they are associated with less work interference with family, particularly for workers with children (Butts et al., 2013).

Michel and colleagues (2011) reported associations of several work conditions with family interference with work. Overload at work had the strongest association with appraisals of FWI ($\rho = .26$), whereas job role conflicts and generic job stressors had the second and third strongest associations with this outcome ($\rho = .25$ and $\rho = .24$). The average adjusted correlations of work conditions with FWI are notably smaller than those reported WFI. Working at a family-friendly organization was also associated with less family interference with work, and there was no evidence that any of the organizational predictors of FWI differed by parental status. The vast majority of studies included in these meta-analyses were cross-sectional in nature and thus provide very limited ability to infer causation. However, results from a pilot intervention conducted under the auspices of the Work, Family & Health Network suggested that workplace shifts toward a “results-only work environment” resulted in less work interference with family (Moen et al., 2011).

The pathway linking parenting practices to work–family conflict is comparatively underdeveloped. We have not been able to locate any studies of parenting practices (e.g., parental monitoring, solicitation, sensitivity, or responsiveness) and their associations with work–family conflict. There is evidence indicating that working parents experience more family interference with work than childless adults (Grzywacz & Marks, 2000a) and that work–family conflict varies across childhood (Buehler & O’Brien, 2011). In other words, work interference with family appears most problematic for parents of infants, is least problematic for parents of 3-year-olds, and then increases through the school-age years. Workers with more children at home experience more frequent work interference with family and family interference with work (Byron, 2005). Greater self-appraised family stressors are associated with greater work interference with family ($\rho = .35$) and family interference with work ($\rho = .40$; Michel et al., 2011). Likewise, Michel et al. (2011) found that greater perceived role overload in the family was associated with greater work interference with family and family interference with work ($\rho = .24$ and $\rho = .35$, respectively).

Shifting attention to the putative health-related implications of work–family conflict, Mesmer-Magnus and Viswesvaran (2005) reported consistent evidence that work–family conflict was associated with poorer health outcomes. Although “health” was typically operationalized in terms of depressive symptoms or other indicators of mental health, Mesmer-Magnus and Viswesvaran reported small average adjusted correlations of work interference with family and family interference with work with health ($\rho = -.26$ and $-.27$, respectively). More recently, Amstad and colleagues’ (Amstad, Meier, Fasel, Elfering, & Semmer, 2011) meta-analysis reported that work interference with family had small but variable correlations with different health outcomes, including self-reported health problems ($\rho = .28$), psychological strain ($\rho = .35$), somatic symptoms ($\rho = .29$), and depressive symptoms ($\rho = .23$). Although fewer studies were included in their meta-analysis, Amstad and colleagues reported that family interference with work had smaller but significant associations with self-reported health problems ($\rho = .24$), psychological strain ($\rho = .21$), somatic symptoms ($\rho = .14$), and depressive symptoms ($\rho = .22$). Although not reported in meta-analyses, individual studies linking work–family conflict with health control for generalized stressors such as job pressure and family demands (e.g., Frone, Russell, & Cooper, 1997) or self-reported previous health (Grzywacz, 2000), suggesting the deleterious potential health consequences of work–family conflict are not confounded by more ambient stressors or health processes, such as health history or family history of disease.

The work–family conflict and health literature is heavily reliant on cross-sectional research designs. Nevertheless, longitudinal research has linked strains associated with work–family conflict with incident hypertension (Frone, Russell, & Cooper, 1997), self-reported symptoms (Grzywacz, Butler, & Almeida, 2008), and indicators of morbidity like sickness absence (Clays, Kittel, Godin, Bacquer, & Backer, 2009) and use of health care services (Christiaens & Bracke, 2014) over time. Shockley and Allen (2013) reported that heart rate and blood pressure are higher on days with elevated work–family conflict, although this association may depend on levels of supervisor support. The most definitive evidence to date of the health effects of work–family conflict will ultimately come from Work, Family & Health Network randomized trials; these data are currently being analyzed, but results from

pilot work implicate work–family conflict in musculoskeletal pain (Kim et al., 2013), and elevated cardiovascular risk scores (Berkman et al., 2010).

There is a small but growing body of evidence linking work–family conflict with diverse health behaviors. Frone and colleagues (Frone, Barnes, & Farrell, 1994) were among the first to document associations between elevated work–family conflict and greater alcohol use, which was subsequently replicated in a cross-sectional and nationally representative sample (Grzywacz & Marks, 2000b). Work–family conflict has also been found to predict greater alcohol use over time (Frone, Russell, & Cooper, 1997; Leineweber, Baltzer, Magnusson Hanson, & Westerlund, 2013; Wolff, Rospenda, Richman, Liu, & Milner, 2013) and in daily diary research (Wang, Liu, Zhan, & Shi, 2010). In addition, work–family conflict has been associated with greater intensity of daily smoking (Macy, Chassin, & Presson, 2013; Nelson, Li, Sorensen, & Berkman, 2012), poorer eating habits (Grace, Williams, Stewart, & Franche, 2006; Roos, Sarlio-Lahteenkorva, Lallukka, & Lahelma, 2007), less physical activity (Moen et al., 2011), and sleep disruption (Crain et al., 2014; Jacobsen et al., 2014). Several innovations in biomarker research will equip researchers to test biological or physiological mechanisms linking work–family conflict with health outcomes (Buxton, Klein, Whinnery, Williams, & McDade, 2013), although this area of research awaits attention.

Unresolved Issues and Remaining Questions

Historical and ongoing research has answered several important questions about the role of work–family conflict in shaping the health of working parents. Several recent reviews (Grzywacz, in press) and meta-analyses (Amstad et al., 2011; Butts et al., 2013; Michel et al., 2011) point to gaps in this literature and high-priority areas for additional research. In this review we emphasize three of these gaps because they are especially pertinent to this special issue. First, work–family researchers have yet to focus on a fundamental issue; that is, when a working parent confronts an experience of work–family conflict, how and under what conditions is the decision made to attend to the work responsibility (producing work interference with family) or the family responsibility (producing family interference with work)? Second, despite early claims by Frone, Russell, and Cooper (1997) of differential health threat, it remains unclear whether family interference with work is a more damaging stressor than work interference with family. Third and finally, there is very little theory or evidence explaining how work–family conflict gets “under the skin” to affect discrete health outcomes of working parents. A central issue underlying all three of these gaps likely are selection biases shaping entrance into, and type of, paid employment that may affect decision making and subsequent processes linking work–family conflict with health (Repetti & Wang, 2014).

Social Neuroscience: Introduction and Potential

We maintain that social neuroscience has substantial potential for addressing several of the unresolved issues and gaps in the paid work, parenting, and health literature. Consequently, we begin this section with a basic overview of social neuroscience, including its basic focus and key propositions. Given the breadth of social neuroscience, this material is intended to

be introductory rather than definitive. Next, we summarize selected areas of research in social neuroscience, emphasizing areas that have the potential to offer insight into one or more of the unresolved issues or gaps in research focused on paid work, parenting, and health. We then use these reviews to articulate recommendations for future research, and then we describe the practical value of pursuing the advocated lines of research.

Introduction to Social Neuroscience

Social neuroscience was birthed at the launch of the congressionally labeled “decade of the brain” (Cacioppo & Berntson, 1992). Cacioppo and Berntson (1992) cogently argued for the importance of studying phenomena across difference scales or perspectives, ranging from the microscopic (i.e., neurophysiological) to the macroscopic (i.e., social psychological), emphasizing the integration of findings from both perspectives. They pointed out the reality that neurological processes underlie everyday thoughts and behaviors and that social forces shape the expression and power of those neurological processes. As such, social neuroscience is an emerging interdisciplinary field focused on the relations of the neural, hormonal, cellular, and genetic processes needed to implement and maintain social behavior and how the social environment acts upon these biological processes (Cacioppo & Cacioppo, 2013).

Cacioppo and Berntson (1992) argued that the doctrine of *multilevel analysis*, including its three principles and one corollary, is at the core social neuroscience. The first principle, *multiple determinism*, is the premise that a phenomenon on one level is likely to have multiple causes on the same level, as well as adjacent and subsequent levels. This principle is clearly evidenced in our brief review of the antecedents of work–family conflict. An individual’s experience of work interference with family, for example, may be “caused” by individual-level factors such as work role overload and the number of hours worked, as well social-level factors (e.g., availability of family-friendly policies, supervisor support) and psychological factors like personality and the salience of the work role (Butts et al., 2013; Michel et al., 2011).

The *corollary of proximity* states that, as the number of levels in the organization of phenomenon increases, there is a proportionate increase in the number of linkages between elements at each level. The corollary of proximity can be illustrated through a decision tree following a hypothetical experience of work–family conflict resulting from a working father’s realization that his son’s state soccer tournament is during the same period as a mandatory business trip. The decision to prioritize one responsibility over the other will be informed by affect (e.g., fear of limited career advancement, disappointment for missing the game), cognitive processes (e.g., predictions of how far his son’s team will make it in the tournament, the relative importance of this one business trip to his career trajectory), social cognitive processes (e.g., how disappointed this son would be if his father missed the game) and impression management (e.g., not wanting to look selfish). Underlying each of these processes is a host of attitudes and beliefs (e.g., how does a “good dad”/“good employee” behave) and corresponding neural circuitry. Underlying each of the (minimally) four decision-making forces for resolving the work–family conflict are myriad linkages across the various neurological and psychological levels.

The second principle of the doctrine of multilevel analysis is that of *non-additive determinism*. This principle states that properties of the collective whole cannot be accurately predicted from the properties of its parts until the properties of the whole are documented and studied across multiple levels (Cacioppo & Berntson, 1992). Schieman and Glavin (2011) clearly illustrated this principle in their analysis of data from the 2002 National Study of the Changing Workforce, which examined educational variation in the sources and mental health consequences of work–family conflict. Schieman and Glavin identified differential exposure to elevated work–family conflict by individuals with both the lowest and highest levels of educational attainment. Work–family conflict was driven by the stresses of supervision and responsibility for higher education workers, but it was driven by precarious work and poor predictability of scheduling among workers with less than a high school education. Furthermore, the association of work–family conflict with psychological distress differed by education, such that the psychological consequence of work–family conflict was higher for those with a high school degree relative to college graduates. Clearly, understanding how paid work may affect the health of working parents requires a thorough understanding of each part of the constituent model and different levels in the social hierarchy.

The third principle, *reciprocal determinism*, states there likely are bidirectional and mutual influences between the biological and social elements underlying brain and behavior. This principle is consistent with the “punctuated equilibrium” view of working parents’ experience of work–family conflict (Majomi, Brown, & Crawford, 2003); that is, working parents can minimize experiences of work–family conflict by developing adaptive strategies (Moen & Wethington, 1992) for managing daily work and family responsibilities. Work–family conflict (and subsequent experience of work–family interference) arises when threats or contingencies not specific to the parent’s family-adaptive strategies become manifest, and they will continue until the adaptive strategy is refined to accommodate the new threat. The only empirical illustration of the principle of reciprocal determinism that we could locate was provided by Demerouti, Bakker, and Bulters (2004), who used three panels of data to identify the mutual and bidirectional effects among burnout, exhaustion, and work–family conflict: They documented that work–family conflict predicted subsequent experiences of burnout and exhaustion and that these psychological phenomena potentiated further work–family conflict.

Selected Review of Social Neuroscience Research

In this section we summarize selected areas of social neuroscience research and make linkages back to unresolved issues or gaps in the work–family and health literature. We begin by highlighting the results of research focused on resolving conflict because it may be useful for understanding how individuals make decisions in response to experiences of work–family conflict. Then we highlight the results of stress and health research in social neuroscience because it offers potential insight into determining whether different work–family experiences should be conceived as “stressors” and, if so, how they may get “under the skin” to affect health outcomes. A detailed review and summary of each of these areas is beyond the scope of this article; consequently, the highlights are intended to be illustrative rather than detailed and definitive.

Conflict resolution—When confronted with mutually incompatible role pressures from the work and family domains (i.e., work–family conflict), a working parent will ultimately resolve the conflict, either by attending to the work–role pressure (thereby allowing work to interfere with family) or the family–role pressure (thereby allow family to interfere with work). A key unresolved issue in the work–family literature is how the working parent resolves the conflict. In the next paragraph we provide a high-level overview of three neuroscience articles that focus on different elements of this issue and then illustrate their relevance to work–family researchers.

Egner and Hirsch (2005) attempted to isolate the mechanisms used to resolve conflicting stimuli. In their study, which was based on a modified Stroop protocol, participants were presented with a series of images containing the face of widely known actors or political figures and either the word *actor* or *political figure* imposed onto the facial image. Concordant (the word *actor* was imposed on an actor’s face) and discordant (the word “actor” was imposed on a political figure’s face) images were presented, and participants were asked to record a response under two separate conditions: (a) when they were instructed to focus on the facial image and (b) when they were instructed to focus on the word. Functional magnetic resonance imaging (fMRI) captured activity in different regions of the brain believed to reflect initiation of two possible mechanisms for resolving conflict: (a) amplification of neural representations of task-relevant information or (b) inhibition of representations of task-irrelevant information. The collected data suggested that the brain’s cognitive control system, when under conflict (i.e., the word–image combination is discordant), is resolved by amplifying task-relevant information.

Horga and colleagues (2011) took on the issue of whether the brain encodes previously experienced conflicts and uses that experience to inform subsequent, similar experienced conflicts. These authors also used a modified Stroop task and fMRI to capture brain activation and reported that previous experiences of conflict (i.e., responses to a discordant image following one or more discordant images) influenced subsequent responses to conflict. Put differently, conflict resolution at one point in time was a function of both the current conflict and previous similar conflict experiences.

Whereas previous neuroscience studies examined conflicting cognitive cues, Zaki and colleagues (Zaki, Hennigan, Weber, & Ochsner, 2010) argued that humans navigate a social world wherein they need to interpret and resolve potentially conflicting social cues, such as an individual who is smiling while describing a presumably distressing situation. They concluded that both a general cognitive control system and specialized brain systems (i.e., the mirror neuron system and the mental state attribution system) are activated to resolve conflicting social cues.

These studies of how the brain is activated in response to conflicting inputs offer several valuable inputs for family scientists interested in advancing understanding of how working parents process and potentially resolve a work–family conflict. Results reported by Egner and Hirsch (2005) relative to those reported by Zaki and colleagues (2010) are compelling because they suggest that, by mapping the basic neural circuitry used, researchers could gain insight into the extent to which the social world is considered when working parents resolve

an experience of work–family conflict. If the resolution of a work–family conflict is largely asocial, the neural circuits involved should be those activated primarily by the general cognitive control system and will emphasize regions that accentuate task-relevant (potentially goal-oriented) information (Egner & Hirsch, 2005). However, if work–family conflict resolution involves the consideration of specific (e.g., spouse, coworkers) or generalized others (e.g., social appraisals of how well one is meeting one’s roles), the neural circuits involved in the mirror neuron and the mental state attribution systems are likely to be activated (Zaki et al., 2010). Moreover, this basic mapping could also be used to evaluate theoretical propositions about the circumstances that may shape the conflict resolution strategy. For example, if Pleck’s (1977) *asymmetrical boundary hypothesis* is valid, men’s neural circuitry might be more characteristic of a general cognitive control response because they are socialized as breadwinners, whereas women’s neural circuitry for resolving work–family conflict would be more complex, involving more brain systems because they are socialized to be caregivers and more responsive to the emotional needs of specific others, such as their children or partner.

Horga and colleagues’ (2011) study is also instructive for work–family researchers, particularly those interested in building interventions to help working parents balance work and family. Their findings, which suggest that higher order brain functions may “save” previous experiences of conflict and apply them to subsequent similar conflicts, are consistent with the notion of *punctuated equilibrium* (Majomi et al., 2001), or the idea that working parents modify their operational strategy for managing work and family responsibilities on the basis of new experiences of conflict. Furthermore, assuming that relevant tasks can be created to simulate work–family conflict resolution while undergoing fMRI, Horga and colleagues’ results may offer a window through which to study how discrete attempts to resolve experiences of work–family conflict are organized into broader family-adaptive strategies used by working parents to meet their responsibilities in the domains of paid work and family (Moen & Wethington, 1992).

Stress—Work–family conflict and subsequent experiences (e.g., work interference with family and family interference with work) are widely conceived as stressors (Grzywacz, in press). However, it remains entirely unclear whether a stress framework is the most appropriate theoretical tool for understanding work–family experiences and for building models of the health effects of work–family experiences. In the next paragraphs we provide a high-level overview of a recent review of neuroscience research focused on stress and health (Muscatell & Eisenberger, 2012), and we use the conclusions of this review to illustrate how social neuroscience may be useful for advancing understanding of paid work, parenting, and health.

Muscatell and Eisenberger (2012) began by identifying neural regions believed to be involved in discrete stages of stressor interpretation (i.e., threat appraisal, safety appraisal, and self- and social cognitive processing). They reviewed several sets of results suggesting that threat appraisal results in activation of brain regions like the dorsal anterior cingulate cortex, the anterior insula, and the amygdala. Results are presented suggesting that safety appraisals are processed in regions of the brain like the ventromedial prefrontal cortex, while

self-reflection and consideration of the thoughts and feelings of others result in activation of brain regions like the medial prefrontal cortex and the dorsomedial prefrontal cortex.

Muscatell and Eisenberger (2012) then reviewed the neuroscience evidence linking activity in each of the neural regions involved in stressor interpretation with indicators of a stress response in either the sympathetic nervous system (SNS) or the hypothalamic–pituitary–adrenal (HPA) axis. In terms of the threat appraisal regions of the brain, the authors concluded there is consistent evidence that activation of these regions is correlated with indicators of physiological stress response such as heart rate, inflammation, and cortisol. It is important to note that the summarized evidence suggests that the association is nonspecific to different types of stressors: Both cognitive stressors (e.g., performing a math problem) and social stressors (e.g., fear of rejection) resulted in similar neural activation and subsequent physiological stress responses. Muscatell and Eisenberger's review of studies of ventromedial prefrontal cortex activation, a region of the brain involved in safety appraisals, found consistent associations with blunted physiological responses to stress. Finally, although less studied and more difficult to interpret, the authors concluded that there is compelling evidence that activation of brain regions resulting from self-reflection (medial prefrontal cortex) or consideration of the thoughts and feelings of others (e.g., dorsomedial prefrontal cortex) is associated with elevated physiological stress responses.

Muscatell and Eisenberger's (2012) summary of evidence underlying the brain regions involved in discrete stages of stressor interpretation has utility for work–family researchers. If an experience of work–family conflict, such as having a business trip on the same day as a son's state soccer tournament, is a stressor, it should become manifest by activation in the threat-processing regions of the brain. Moreover, if the parent experiencing the conflict is attentive to the child's social meaning of his or her presence or absence, attention should be given to discern whether regions of the brain involved in social cognition are also activated. By contrast, if notions that work enhances parenting skills results in activation of the ventromedial prefrontal cortex, this would suggest that experiences of work–family enrichment can be reasonably conceived as a coping resource (Grzywacz & Bass, 2003) that is interpreted by the brain as providing safety. Even simple applications of social neuroscience tools like these would be useful to the work–family literature because they could help resolve whether a stress framework is appropriate for studying parenting in the context of paid employment.

Muscatell and Eisenberger's (2012) review also offers potential insight into unresolved issues surrounding possible differential threat posed by alternative work–family experiences. Their supposition that the brain has a nonspecific response to cognitive and social stressors would suggest that work interference with family and family interference with work would have a nonspecific neural and subsequent stress response. However, this inference is in direct contrast to Frone, Russell, and Cooper's (1997) results indicating that family interference with work was associated with deleterious health outcomes over time while work interference with family was not. This apparent contradiction necessitates a direct test of the neural and subsequent SNS and HPA axis activation resulting from experiences of work interference with family and family interference with work. Similarly, research designed to determine whether time-, strain-, and behavior-based forms of work–family interference

(Greenhaus & Beutell, 1985) elicit specific or general neural responses would be useful for determining the practical value of differentiating various types of work–family experiences.

Finally, conclusions from Muscatell and Eisenberger's (2012) review have potential value for building models of how work–family experiences get “under the skin” to affect the health of working parents. Evidence that activation of threat regions of the brain is associated with blood pressure elevations would suggest that Frone, Russell, and Cooper's (1997) link between family interference with work and incident hypertension may be explained by a neural-mediated activation of the SNS; that is, chronic family interference with work activates the threat regions of the brain, which in turn repeatedly trigger the SNS, resulting in incident hypertension. Likewise, that activation of a region of the brain thought to process safety appraisals (i.e., the ventromedial prefrontal cortex) is associated with a blunted physiological stress response provides a neural explanation for studies indicating that work–family enrichment, or the extent to which work benefits family (or family benefits work), modifies the association of work–family conflict with mental health outcomes (Garies, Barnett, Ertel, & Berkman, 2009; Grzywacz & Bass, 2003). In other words, experiences of work–family enrichment may activate safety regions of the brain while the individual is experiencing work–family conflict, thereby potentially lessening its impact on mental health through down-regulation of the SNS or the HPA axis. Although the absence of social neuroscience research focused on work–family experiences renders speculative both of the explanations above, they are nonetheless instructive for identifying the neural mechanisms and corresponding shifts in physiology involved in linking a social experience like work–family interference or enrichment with a health outcome.

High-priority areas for research—The extension of findings from neuroscience research to inquiries into the intersections of paid work and parenting point to several fruitful areas for collaborative research between family scientists and neuroscientists. A linchpin area for collaborative research is the development of alternative protocols for applying neuroscience tools to the study of work, family, and health. One alternative is the creation of a Stroop paradigm that captures distinct work–family experiences. This would require the collection and testing of alternative images that capture the essence of work–family conflict (e.g., a frenzied mother with a briefcase in one hand and a crying child in the other; a calendar page on which are written a flight and a child's performance at the same time), and developing alternative conditions (e.g., your child recently commented about how much you travel vs. threats of layoffs that are circulating at your employer) and tasks (e.g., identify which role pressure you would attend to) to enable inquiry.

Once a work–family conflict paradigm has been created it can be applied to answer a wide variety of research questions. When connected with fMRI or another form of brain imaging, the task could be used to determine the brain regions activated by discrete types of work–family conflict and under which conditions. In the specific context of parenting, it would be useful to know if a time-based form of conflict (e.g., having to be out of town the same day as a child's state soccer tournament) is appraised differently based on child characteristics (e.g., age, gender), structural features of the family (e.g., the working parent experiencing the conflict is the noncustodial parent), or qualities of the parent–child relationship (e.g., whether the child openly discloses disappointment). Other imaging studies could delineate

whether work interference with family results in similar neural activation as family interference with work, and other research could explore variability in the regions of the brain used when family is protected from the conflict, as opposed to when work is protected from the conflict. The ambiguous potential of selection biases could begin to be evaluated by comparing individuals with and without paid employment, or in different types of paid employment, and empirically quantifying variation in neural activation associated with work–family conflict. Researchers could design studies to test results from imaging studies in real-life situations. For example, a researcher who knows that activation of brain regions believed to process threats is associated with SNS activation could design a study to determine whether heart rate and blood pressure (indicators of possible SNS activation), are elevated on days a work–family conflict is experienced compared to days without such a conflict. A structured manipulation could be added to such a study wherein a family member could call the working parent on random working days and times to simulate a work–family conflict. Cognitive interview data wherein participants “think aloud” how prototypical work–family conflicts are resolved might be useful to neuroscientists interested in social cognition to help identify brain regions and processing systems that may be involved in resolving work–family conflicts. Similarly, biomarker studies of inflammation variability with regular work–family cycles (e.g., before, during, and after 48-hour shifts performed by emergency medical services personnel, regular physical separations from children by overseas flight attendants) may be useful to neuroscientists interested in isolating the social neural circuits involved in effective recovery of circadian disruption.

Practical implications—Social neuroscience research also has benefits for family practitioners. Muscatell and Eisenberger’s (2012) summary of results from brain imaging data are entirely consistent with theoretical ideas that stressors are partly defined by the availability of coping resources like social support. Compelling evidence such as this improves confidence that interventions that strengthen family relationships as one way of helping working parents balance work and family have good mechanistic potential of protecting health. Likewise, evidence indicating activation of brain regions involved in threat appraisal are associated with elevated cortisol provides evidence that family-based decisions that minimize the incidence of stressors (e.g., reducing the number of children’s extracurricular activities, maintaining a family calendar) will improve working parents’ day-to-day experiences while also protecting their health. Finally, evidence suggesting that different brain regions are used to resolve conflicting social cues (Zaki et al., 2010) suggests that family practitioners may need to use different tools to help working parents respond appropriately to strain-based conflicts (those that are more likely to be interpersonally oriented) as opposed to time-based conflicts.

Conclusion

The literature on paid work, parenting, and health has advanced significantly over the past several decades. Nevertheless, several outstanding issues remain, including ambiguity in how work–family conflicts are resolved, the extent to which a stress framework is useful for understanding work–family experiences, and the absence of strong explanation for how fundamentally social experiences (e.g., a business trip conflicting with a child’s state soccer

tournament) can “get under the skin” to affect health. We contend that neuroscience and the emerging subfield of social neuroscience has much to offer paid work, parenting, and health research because the evidence and methods can help resolve identified outstanding issues. As with every new attempt to integrate ideas across different disciplines, there is a substantial amount of work that needs to be done. However, this work is likely to have a high impact in terms of advancing science and building practical solutions to strengthen families and protect human health.

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References

- Amstad FT, Meier LL, Fasel U, Elfering A, Semmer NK. A meta-analysis of work–family conflict and various outcomes with a special emphasis on cross-domain versus matching-domain relations. *Journal of Occupational Health Psychology*. 2011; 16:151–169. doi:10.1037/a0022170. [PubMed: 21280939]
- Augustine JM. Mothers’ employment, education, and parenting. *Work and Occupations*. 2013; 41:237–270. doi:10.1177/0730888413501342.
- Barnett RC, Hyde JS. Women, men, work, and family. An expansionist theory. *American Psychologist*. 2001; 56:781–796. doi:10.1037//0003-066x.56.10.781. [PubMed: 11675985]
- Berkman LF, Buxton O, Ertel K, Okechukwu C. Managers’ practices related to work–family balance predict employee cardiovascular risk and sleep duration in extended care settings. *Journal of Occupational Health Psychology*. 2010; 15:316–329. doi:10.1037/a0019721. [PubMed: 20604637]
- Buehler C, O’Brien M. Mothers’ part-time employment: Associations with mother and family well-being. *Journal of Family Psychology*. 2011; 25:895–906. doi:10.1037/a0025993. [PubMed: 22004432]
- Buehler C, O’Brien M, Swartout KM, Zhou N. Maternal employment and parenting through middle childhood: Contextualizing factors. *Journal of Marriage and Family*. 2014; 76:1025–1046. doi: 10.1111/jomf.12130. [PubMed: 25530631]
- Butts MM, Casper WJ, Yang TS. Meta-analysis of work–family support policies. *Journal of Applied Psychology*. 2013; 98:1–25. doi:10.1037/a0030389. [PubMed: 23106685]
- Buxton, OM.; Klein, LC.; Whinnery, J.; Williams, S.; McDade, T. Biomarkers in work and family research. In: Grzywacz, JG.; Demerouti, E., editors. *New frontiers in work and family research*. Psychology Press; New York: 2013. p. 170-190.
- Byron K. A meta-analytic review of work–family conflict and its antecedents. *Journal of Vocational Behavior*. 2005; 67:169–198. doi:10.1016/j.jvb.2004.08.009.
- Cacioppo JT, Bernston GG. Social psychological contributions to the decade of the brain. *American Psychologist*. 1992; 47:1019–1028. [PubMed: 1510329]
- Cacioppo JT, Cacioppo S. Social neuroscience. *Perspectives on Psychological Science*. 2013; 8:667–669. doi:10.1177/1745691613507456. [PubMed: 26173231]
- Casper WJ, Eby LT, Bordeaux C, Lockwood A, Lambert D. A review of research methods in IO/OB work–family research. *Journal of Applied Psychology*. 2007; 92:28–43. doi: 10.1037/0021-9010.92.1.28. [PubMed: 17227149]
- Christiaens W, Bracke P. Work–family conflict, health services and medication use among dual-income couples in Europe. *Sociology of Health & Illness*. 2014; 36:319–337. doi: 10.1111/1467-9566.12049. [PubMed: 24111523]
- Clays E, Kittel F, Godin I, Bacquer DD, Backer GD. Measures of work–family conflict predict sickness absence from work. *Journal of Occupational and Environmental Medicine*. 2009; 51:879–886. doi:10.1097/JOM.0b013e3181aa5070. [PubMed: 19667836]

- Corporate Voices for Working Families. Business impacts of flexibility: An imperative for expansion. WFD Consulting; Boston: 2005.
- Costigan CL, Cox MJ, Cauce AM. Work–parenting linkages among dual-earner couples at the transition to parenthood. *Journal of Family Psychology*. 2003; 17:397–408. doi: 10.1037/0893-3200.17.3.397. [PubMed: 14562463]
- Crain TL, Hammer LB, Bodner T, Kossek EE, Moen P, Lilienthal R, Buxton OM. Work–family conflict, family-supportive supervisor behaviors (FSSB), and sleep outcomes. *Journal of Occupational Health Psychology*. 2014; 19:155–167. doi:10.1037/a0036010. [PubMed: 24730425]
- Demerouti E, Bakker AB, Bulters AJ. The loss spiral of work pressure, work–home interference and exhaustion: Reciprocal relations in a three-wave study. *Journal of Vocational Behavior*. 2004; 64:131–149. doi:10.1016/s0001-8791(03)00030-7.
- Egner T, Hirsch J. Cognitive control mechanisms resolve conflict through cortical amplification of task-relevant information. *Nature Neuroscience*. 2005; 8:1784–1790. doi:10.1038/nn1594. [PubMed: 16286928]
- Frone MR, Barnes GM, Farrell MP. Relationship of work–family conflict to substance use among employed mothers: The role of negative affect. *Journal of Marriage and the Family*. 1994; 56:1019–1030.
- Frone MR, Russell M, Cooper ML. Relation of work–family conflict to health outcomes: A four-year longitudinal study of employed parents. *Journal of Occupational and Organizational Psychology*. 1997; 70:325–335. doi:10.1111/j.2044-8325.1997.tb00652.x.
- Frone MR, Yardley JK, Markel KS. Developing and testing an integrative model of the work–family interface. *Journal of Vocational Behavior*. 1997; 50:145–167. doi:10.1006/jvbe.1996.1577.
- Gareis KC, Barnett RC, Ertel KA, Berkman LF. Work–family enrichment and conflict: Additive effects, buffering, or balance? *Journal of Marriage and Family*. 2009; 71:696–707.
- Goodman WB, Crouter AC, Lanza ST, Cox MJ. Paternal work characteristics and father–infant interactions in low-income, rural families. *Journal of Marriage and Family*. 2008; 70:640–653. [PubMed: 20011453]
- Grace SL, Williams A, Stewart DE, Franche RL. Health-promoting behaviors through pregnancy, maternity leave, and return to work: Effects of role spillover and other correlates. *Women & Health*. 2006; 43:51–72. doi:10.1300/J013v43n02_04. [PubMed: 17000611]
- Greenhaus JH, Beutell NJ. Sources of conflict between work and family roles. *Academy of Management Review*. 1985; 10:76–88. doi:10.2307/258214.
- Grzywacz JG. Work–family spillover and health during midlife: Is managing conflict everything? *American Journal of Health Promotion*. 2000; 14:236–243. [PubMed: 10915535]
- Grzywacz, JG. Work, family, and employee health. In: Allen, TD.; Eby, LT., editors. *The Oxford handbook of work and family*. Oxford University Press; New York: in press
- Grzywacz JG, Bass BL. Work, family, and mental health: Testing different models of work–family fit. *Journal of Marriage and Family*. 2003; 65:248–262. doi:10.1111/j.1741-3737.2003.00248.x.
- Grzywacz, JG.; Butler, AB.; Almeida, DM. Work, family, and health: Work–family balance as a protective factor against stresses of daily life. In: Marcus-Newhall, A.; Halpern, DF.; Tan, SJ., editors. *The changing realities of work and family: A multidisciplinary approach*. Wiley-Blackwell; Boston: 2008. p. 194–215. doi:10.1002/9781444305272.ch10
- Grzywacz JG, Daniel SS, Tucker J, Walls J, Leerkes E. Nonstandard work schedules and developmentally generative parenting practices: An application of propensity score techniques. *Family Relations*. 2011; 60:45–59. doi:10.1111/j.1741-3729.2010.00632.x. [PubMed: 21532922]
- Grzywacz JG, Ganong L. Issues in families and health research. *Family Relations*. 2009; 58:373–378. doi:10.1111/j.1741-3729.2009.00559.x.
- Grzywacz JG, Marks NF. Family, work, work–family spillover and problem drinking during midlife. *Journal of Marriage and the Family*. 2000a; 62:336–348. doi:10.1111/j.1741-3737.2000.00336.x.
- Grzywacz JG, Marks NF. Reconceptualizing the work–family interface: An ecological perspective on the correlates of positive and negative spillover between work and family. *Journal of Occupational Health Psychology*. 2000b; 5:111–126. doi:10.1037/1076-8998.5.1.111. [PubMed: 10658890]

- Halpern DF. Psychology at the intersection of work and family: Recommendations for employers, working families, and policymakers. *American Psychologist*. 2004; 60:397–409. doi: 10.1037/0003-066X.60.5.397.
- Horga G, Maia TV, Wang P, Wang Z, Marsh R, Peterson BS. Adaptation to conflict via context-driven anticipatory signals in the dorsomedial prefrontal cortex. *Journal of Neuroscience*. 2011; 31:16208–16216. doi:10.1523/JNEUROSCI.2783-11.2011. [PubMed: 22072672]
- Huber M, Knottnerus JA, Green L, van der Horst H, Jadad AR, Kromhout D, Smid H. How should we define health? *British Medical Journal*. 2011; 343:d4163. doi:10.1136/bmj.d4163. [PubMed: 21791490]
- Jacobsen HB, Reme SE, Sembajwe G, Hopcia K, Stoddard AM, Kenwood C, Buxton OM. Work–family conflict, psychological distress, and sleep deficiency among patient care workers. *Workplace Health & Safety*. 2014; 62:282–291. doi:10.3928/21650799-20140617-04. [PubMed: 25000547]
- Kim SS, Okechukwu CA, Buxton OM, Dennerlein JT, Boden LI, Hashimoto DM, Sorensen G. Association between work–family conflict and musculoskeletal pain among hospital patient care workers. *American Journal of Industrial Medicine*. 2013; 56:488–495. doi:10.1002/ajim.22120. [PubMed: 23019044]
- Klitzman S, House JS, Israel BA, Mero RP. Work stress, nonwork stress, and health. *Journal of Behavioral Medicine*. 1990; 13:221–243. doi:10.1007/BF00846832. [PubMed: 2213867]
- Kohn ML, Schooler C. Occupational experience and psychological functioning: An assessment of reciprocal effects. *American Sociological Review*. 1973; 38:97–118.
- Kohn ML, Schooler C. Job conditions and personality: A longitudinal assessment of their reciprocal effects. *American Journal of Sociology*. 1982; 87:1257–1286.
- Kossek EE, Baltes BB, Matthews RA. How work–family research can finally have an impact in organizations. *Industrial and Organizational Psychology*. 2011; 4:352–369. doi:10.1111/j.1754-9434.2011.01353.x. [PubMed: 22247737]
- Kossek EE, Pichler S, Bodner T, Hammer LB. Workplace social support and work–family conflict: A meta-analysis clarifying the influence of general and work–family-specific supervisor and organizational support. *Personnel Psychology*. 2011; 64:289–313. doi:10.1111/j.1744-6570.2011.01211.x. [PubMed: 21691415]
- Leineweber C, Baltzer M, Magnusson Hanson LL, Westerlund H. Work–family conflict and health in Swedish working women and men: A 2-year prospective analysis (the SLOSH Study). *European Journal of Public Health*. 2013; 23:710–716. doi:10.1093/eurpub/cks064. [PubMed: 22683777]
- MacDermid SM, Williams ML. A within-industry comparison of employed mothers' experiences in small and large workplaces. *Journal of Family Issues*. 1997; 18:545–566. doi: 10.1177/019251397018005005.
- Macy JT, Chassin L, Presson CC. Association between work–family conflict and smoking quantity among daily smokers. *Nicotine and Tobacco Research*. 2013; 15:1867–1872. doi:10.1093/ntr/ntt071. [PubMed: 23709611]
- Majomi P, Brown B, Crawford P. Sacrificing the personal for the professional: Community mental health nurses. *Journal of Advanced Nursing*. 2001; 42:527–538. doi:10.1046/j.1365-2648.2003.02652.x.
- Marks SR. Multiple roles and role strain—Some notes on human energy, time and commitment. *American Sociological Review*. 1977; 42:921–936. doi:10.2307/2094577.
- Mesmer-Magnus JR, Viswesvaran C. Convergence between measures of work-to-family and family-to-work conflict: A meta-analytic examination. *Journal of Vocational Behavior*. 2005; 67:215–232. doi:10.1016/j.jvb.2004.05.004.
- Michel JS, Kotrba LM, Mitchelson JK, Clark MA, Baltes BB. Antecedents of work–family conflict: A meta-analytic review. *Journal of Organizational Behavior*. 2011; 32:689–725. doi:10.1002/job.69.
- Moen P, Fan W, Kelly EL. Team-level flexibility, work–home spillover, and health behavior. *Social Science & Medicine*. 2013; 84:69–79. doi:10.1016/j.socscimed.2013.02.011. [PubMed: 23517706]
- Moen P, Kelly EL, Tranby E, Huang Q. Changing work, changing health: Can real work-time flexibility promote health behaviors and well-being? *Journal of Health & Social Behavior*. 2011; 52:404–429. doi:10.1177/0022146511418979. [PubMed: 22144731]

- Moen P, Wethington E. The concept of family adaptive strategies. *Annual Review of Sociology*. 1992; 18:233–251. doi:10.1146/annurev.so.18.080192.001313.
- Muscatell KA, Eisenberger NI. A social neuroscience perspective on stress and health. *Social and Personality Psychology Compass*. 2012; 6:890–904. doi:10.1111/j.1751-9004.2012.00467.x. [PubMed: 23227112]
- National Institute of Child Health and Human Development Early Child Care Research Network. The relation of child care to cognitive and language development. *Child Development*. 2000; 7:960–980. doi:10.1111/1467-8624.00202.
- National Institute of Child Health and Human Development Early Child Care Research Network. Child care and children's peer interaction at 24 and 36 months: The NICHD Study of Early Child Care. *Child Development*. 2001; 72:1478–1500. doi:10.1111/1467-8624.00361. [PubMed: 11699683]
- National Institute of Child Health and Human Development Early Child Care Research Network. Child-care structure → process → outcome: Direct and indirect effects of child-care quality on young children's development. *Psychological Science*. 2002a; 13:199–206. doi: 10.1111/1467-9280.00438. [PubMed: 12009038]
- National Institute of Child Health and Human Development Early Child Care Research Network. Early child care and children's development prior to school entry: Results from the NICHD Study of Early Child Care. *American Educational Research Journal*. 2002b; 39:133–164. doi: 10.3102/00028312039001133.
- Nelson CC, Li Y, Sorensen G, Berkman LF. Assessing the relationship between work–family conflict and smoking. *American Journal of Public Health*. 2012; 102:1767–1772. doi:10.2105/AJPH.2011.300413. [PubMed: 22720765]
- Office of the President, Council of Economic Advisors. Work–life balance and the economics of workplace flexibility. 2010. Retrieved March 7, 2015, from <http://www.whitehouse.gov/files/documents/100331-cea-economics-workplace-flexibility.pdf>
- Perry-Jenkins M, Repetti RL, Crouter AC. Work and family in the 1990s. *Journal of Marriage and the Family*. 2000; 62:981–998. doi:10.1111/j.1741-3737.2000.00981.x.
- Pleck JH. The work–family role system. *Social Problems*. 1977; 24:417–427. doi:10.2307/800135.
- Re-defining “health.”. *Bulletin of the World Health Organization*. 2005. Retrieved from http://www.who.int/bulletin/bulletin_board/83/ustun11051/en/
- Repetti RL, Robles T. Nontoxic family stress: Potential benefits and underlying biology. *Family Relations*. 2016; 65 xx–xx.
- Repetti RL, Wang S-W. Employment and parenting. *Parenting*. 2014; 14:121–132. doi: 10.1080/15295192.2014.914364.
- Roos E, Sarlio-Lahteenkorva S, Lallukka T, Lahelma E. Associations of work–family conflicts with food habits and physical activity. *Public Health Nutrition*. 2007; 10:222–229. doi:10.1017/S1368980007248487. [PubMed: 17288618]
- Saracci R. The World Health Organization needs to reconsider its definition of health. *British Medical Journal*. 1997; 314:1409–1410. doi:10.1136/bmj.314.7091.1409. [PubMed: 9161320]
- Sauter, SL.; Brightwell, W.; Colligan, M.; Hurrell, JJ., Jr.; Katz, TM.; LeGrande, DE.; Tetrack, LE. The changing organization of work and the safety and health of working people. National Institute of Occupational Safety and Health; Cincinnati, OH: 2002. DHHS Publication No. 2002-116Retrieved from <http://www.cdc.gov/niosh/docs/2002-116/pdfs/2002-116.pdf>
- Schieman S, Glavin P. Education and work–family conflict: Explanations, contingencies and mental health. *Social Forces*. 2011; 89:1341–1362. doi:10.1093/sf/89.4.1341.
- Shockley KM, Allen TD. Episodic work–family conflict, cardiovascular indicators, and social support: An experience sampling approach. *Journal of Occupational Health Psychology*. 2013; 18:262–275. doi:10.1037/a0033137. [PubMed: 23834444]
- Siebert SD. Toward a theory of role accumulation. *American Sociological Review*. 1974; 39:567–578. doi:10.2307/2094422.
- Skinner E, Johnson S, Snyder T. Six dimensions of parenting: A motivational model. *Parenting: Science & Practice*. 2005; 5:175–235. doi:10.1207/s15327922par0502_3.

- Strazdins L, Clements MS, Korda RJ, Broom DH, D'Souza RM. Unsociable work? Nonstandard work schedules, family relationships, and children's well-being. *Journal of Marriage and Family*. 2006; 68:394–410. doi:10.1111/j.1741-3737.2006.00260.x.
- Strazdins L, Korda RJ, Lim LL, Broom DH, D'Souza RM. Around-the-clock: Parent work schedules and children's well-being in a 24-h economy. *Social Science & Medicine*. 2004; 59:1517–1527. doi:10.1016/j.socscimed.2004.01.022. [PubMed: 15246179]
- Wang M, Liu S, Zhan Y, Shi J. Daily work–family conflict and alcohol use: Testing the cross-level moderation effects of peer drinking norms and social support. *Journal of Applied Psychology*. 2010; 95:377–386. doi:10.1037/a0018138. [PubMed: 20230077]
- Ware JE Jr, Sherbourne CD. The MOS 36-item Short-Form Health Survey (SF-36): I. Conceptual framework and item selection. *Medical Care*. 1992; 30:473–483. [PubMed: 1593914]
- Weiss, RS. Bringing work stress home. In: Eckenrode, J.; Gore, S., editors. *Stress between work and family*. Plenum Press; New York: 1990. p. 17-38.
- Wolff JM, Rospenda KM, Richman JA, Liu L, Milner LA. Work–family conflict and alcohol use: Examination of a moderated mediation model. *Journal of Addiction & Disorder*. 2013; 32:85–98. doi:10.1080/10550887.2012.759856.
- Yetis-Bayraktar A, Budig MJ, Tomaskovic-Devey D. From the shop floor to the kitchen floor: Maternal occupational complexity and children's reading and math skills. *Work and Occupations*. 2012; 40:37–64. doi:10.1177/0730888412465879.
- Zaki J, Hennigan K, Weber J, Ochsner KN. Social cognitive conflict resolution: Contributions of domain-general and domain-specific neural systems. *Journal of Neuroscience*. 2010; 30:8481–8488. doi:10.1523/JNEUROSCI.0382-10.2010. [PubMed: 20573895]

Figure 1.
CONCEPTUAL FRAMEWORK DELINEATING HOW THE INTERSECTION OF PAID WORK AND PARENTING
MAY AFFECT HUMAN HEALTH.