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Work–Family Conflict, Family-Supportive Supervisor Behaviors (FSSB), and Sleep Outcomes

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Although critical to health and well-being, relatively little research has been conducted in the organizational literature on linkages between the work–family interface and sleep. Drawing on conservation of resources theory, we use a sample of 623 information technology workers to examine the relationships between work–family conflict, family-supportive supervisor behaviors (FSSB), and sleep quality and quantity. Validated wrist actigraphy methods were used to collect objective sleep quality and quantity data over a 1 week period of time, and survey methods were used to collect information on self-reported work–family conflict, FSSB, and sleep quality and quantity. Results demonstrated that the combination of predictors (i.e., work-to-family conflict, family-to-work conflict, FSSB) was significantly related to both objective and self-report measures of sleep quantity and quality. Future research should further examine the work–family interface to sleep link and make use of interventions targeting the work–family interface as a means for improving sleep health.

Keywords: work–family conflict, family-supportive supervisor behaviors, sleep, actigraphy, conservation of resources theory

The interconnectedness between work and family has been well documented in the organizational literature (Crain & Hammer, 2013; Hammer & Zimmerman, 2011). However, work–family research has largely failed to consider other life domains (e.g., community involvement, leisure, recovery) that may compete with, or compliment, work and family roles and responsibilities. Recent research has suggested that sleep is an additional domain that should be evaluated alongside those of work and family, given that they all vie for an individual's finite amount of time (Barnes, Wagner, & Ghumman, 2012). Barnes et al. (2012) found that work time is negatively related to sleep time, but especially so under conditions of high family time. They called for future research to examine sleep within stress-based models of work–family conflict.

According to a recent survey of 74,571 individuals in 12 states, 35% reported getting less than 7 hr of sleep on average per night (Centers for Disease Control and Prevention, 2011). Other epidemiological studies have suggested that the shortest sleep durations are experienced by professional-level/management employees (e.g., Jackson, Redline, Kawachi, Williams, & Hu, 2013). However, previous research has indicated that both short (less than 7 hr

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per night) and long sleep (more than 8 hr) are positively associated with chronic disease in the United States, including obesity, diabetes, hypertension, and cardiovascular disease (e.g., Buxton & Marcelli, 2010). Other research indicates that lost work performance due to insomnia may account for up to $63.2 billion dollars per year in the United States (Kessler et al., 2011). Given these unfavorable outcomes, scholars have called for future organizational research to investigate how work experiences influence employee sleep (Barnes, 2012), while there has been a more general call in the sleep literature to uncover those mechanisms that are responsible for deficient sleep (Luyster, Strollo, Zee, & Walsh, 2012).

Drawing on the conservation of resources (COR) theory (Hobfoll, 1989), the current study investigates how work–family conflict is associated with sleep quality and quantity. Family-supportive supervisor behaviors (FSSB) also are examined as an antecedent of sleep quality and quantity and moderator of the relationship between work–family conflict and sleep outcomes. See Figure 1 for a model of these relationships.

This study makes three important theoretical contributions and one important methodological contribution to the organizational literature. First, we extend COR theory beyond waking experience and investigate the impact of work–family conflict on sleep outcomes. Although COR theory has been used widely in the work–family literature, research that has utilized COR theory has failed to incorporate aspects of sleep as outcome variables. As such, Barnes et al. (2012) called for future research incorporating stress-based models of conflict in relation to sleep. Although a few studies have examined and found a relationship between work–family conflict and sleep constructs, they have generally failed to incorporate guiding theoretical frameworks (e.g., Lallukka, Rahkonen, Lahelma, & Arber, 2010; Sekine, Chandola, Martikainen, Marmot, & Kagamimori, 2006) and have not explored additional variables that may be implicated in the relationship. Given that Hobfoll and Shirom (2000) suggested that social support is a primary resource and source of future resources that could offset the loss of other resources, we utilize the COR framework to motivate the inclusion of FSSB within our model.

Concerning our second theoretical contribution, we examine FSSB as both an antecedent of sleep quality and quantity and a moderator of the relationship between work–family conflict and sleep outcomes within the COR framework. We extend previous propositions that social support is a primary resource and source of future resources (e.g., Hobfoll & Shirom, 2000) by focusing on family-specific support from supervisors. We argue that FSSB is particularly appropriate for inclusion in our model because the construct reflects supervisor behaviors associated with emotional support, instrumental support, role modeling, and creative work–family management (Hammer, Kossek, Yragui, Bodner, & Hanson, 2009), all of which allow employees to better attend to competing work and family demands. When work and family demands are more manageable for employees, employees are more likely to attain adequate and sufficient sleep, both because they have more time for sleep and experience less strain that may affect sleep quality. Thus, we argue that this specific form of social support from supervisors is ideal for investigation within the current study.

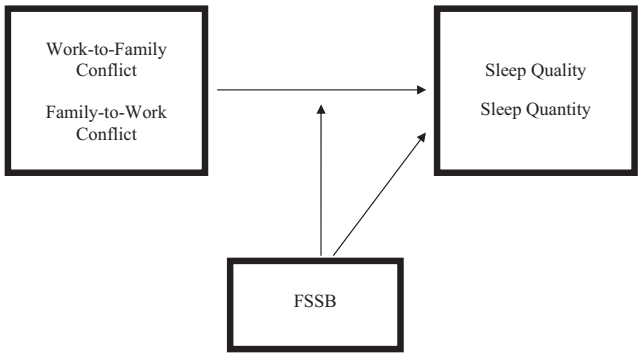

Figure 1. Theoretical model. FSSB = family-supportive supervisor behaviors.

The third theoretical contribution results from the incorporation of both sleep quality and sleep quantity into the current study as health outcomes. The limited studies on this topic have generally included only one sleep construct or the other. For example, Lallukka et al. (2010) examined sleep complaints, or aspects of sleep quality, but did not assess sleep quantity with their sample, whereas Berkman, Buxton, Ertel, and Okechukwu (2010) examined the relationship between manager support for employee family demands and sleep quantity, but did not assess sleep quality. We argue that sleep quality and sleep quantity are particularly sensitive to resource loss brought about by work–family stressors and social support because, as types of health outcomes, they are uniquely affected by both strain and a lack of time. Thus, we attempt to add to the current literature by *creating a consensus* (Grant & Pollock, 2011) around the relationship between work–family conflict, FSSB, and sleep by assessing both sleep quality and sleep quantity within one sample. As a result, we are able to show how these predictors of interest may be differentially related to the separate sleep constructs.

Finally, the study makes a methodological contribution by including objective measures of sleep, in addition to the more common self-report measures of sleep. By doing so, we also attempt to create consensus around the work–family conflict, FSSB, and sleep quantity and quality relationships through the use of multiple methods. The organizational and occupational health psychology literature has emphasized the importance of increased utilization of objective measures of health (e.g., Greenhaus, Allen, & Spector, 2006; Hurrell, Nelson, & Simmons, 1998), such as those measuring sleep. The primary advantage of using such objective measures is that they are not subject to self-report bias (Blascovich, 2000). We address this call by including objective measures of sleep and also triangulate these measures with self-report measures, because the latter is likely to be more prevalent in organizational studies. We utilize actigraphy as an objective outcome measure of sleep quality and quantity and add to the dearth of existing organizational literature that has included sleep variables, albeit almost entirely self-report (for exceptions, see Berkman et al., 2010; Ertel, Berkman, & Buxton, 2011; Pereira, Meier, & Elfering, 2013). This is the first study, to our knowledge, that has examined the relationship between work–family conflict and actigraphic measures of sleep. Although previous research has found a relationship between work–family conflict and self-reported sleep, self-reported and objective sleep measures have thus far been generally uncorrelated (Grandner, Kripke, Yoon, &

Youngstedt, 2006), suggesting that they represent unique constructs or have differing biases.

Sleep

Until recently, sleep has largely been neglected in the occupational health and industrial/organizational psychology literature (e.g., Krauss, Chen, DeArmond, & Moorcroft, 2003). Research from other disciplines has suggested that negative workplace factors, such as low supervisor support, harassment at work, poor ergonomic practices, and job title (i.e., being a staff nurse rather than an assistant nurse manager, clinical nurse specialist, patient care associate, or operations coordinate), are related to deficient sleep (Sorensen, Stoddard, et al., 2011). In addition, recent exceptions within the organizational literature include investigation into relationships among sleep and self-regulation (Barber, Grawitch, & Munz, 2013; Barnes, 2012), unethical conduct (Barnes, Schaubroeck, Huth, & Ghumman, 2011), and affect (Sonnentag, Binnewies, & Mojza, 2008). Although a number of different ways of operationalizing sleep have been utilized, sleep has been primarily defined in the literature in terms of both quality and quantity (Barnes, 2012).

Sleep Quality

Sleep quality refers to an overall evaluation of the sufficiency of sleep, in addition to difficulty initiating or maintaining sleep at night, both of which have sometimes been referred to as insomnia symptoms (e.g., Harvey, Stinson, Whitaker, Moskovitz, & Virk, 2008). In the biomedical sleep literature, Buxton et al. (2009) found that a lack of job strain and increases in supervisor support were related to increases in self-reported adequate or sufficient sleep. Karasek (1979) found that male workers with jobs low in decision latitude and high in demands were likely to report insomnia symptoms. As part of the Helsinki Heart Study, researchers found strong main effects for job demands and job control on self-reported insomnia in a large sample of male employees (Kalimo, Tenkanen, Harma, Poppius, & Heinsalmi, 2000). Work environments with high job demands and low job control have been found to be related to self-reported sleep complaints a year later (De Lange et al., 2009). Likewise, increases in schedule control have been related to increased sleep quality over a 6-month period (Moen, Kelly, Tranby, & Huang, 2011). It also has been found that individuals have a greater risk of self-reported insomnia with increased job strain and decreased job control and social support (Nomura, Nakao, Takeuchi, & Yano, 2009). Self-reported insomnia and insufficient sleep also have been related to decreased productivity, performance, and safety practices (e.g., Kessler et al., 2011; Rosekind et al., 2010). In addition, daily emotional labor has been found to predict nighttime insomnia, partially mediated by anxiety (Wagner, Barnes, & Scott, in press).

Within the work–family and recovery literature, psychological detachment from work and control have been positively related to sleep quality (Sonnentag & Fritz, 2007). An intervention designed to increase employees' recovery experiences, such as psychological detachment from work, relaxation, mastery experiences, and control during off-job time, increased sleep quality 1 week and 2 weeks after the training program (Hahn, Binnewies, Sonnentag, & Mojza, 2011). In conducting research on the positive aspects of the work-family interface and sleep, Williams, Franche, Ibrahim, Mustard, and Layton (2006) found evidence for positive family-to-work spillover being associated with better sleep quality.

Sleep Quantity

Sleep quantity refers to the duration of time an individual remains in a sleeping state (Harvey et al., 2008). Shift work (Costa, 1996) and overtime work (Dahlgren, Kecklund, & Akerstedt, 2006) have been associated with decrements in sleep quantity, whereas increases in employees' control over their working time has been associated with almost an hour extra sleep on nights before work (Moen et al., 2011). Occupational stressors, such as effort-reward imbalance, job strain, and job demands, also have been linked with short self-reported sleep duration (e.g., Utsugi et al., 2005). In the following sections, we review theory and past research motivating the current study of work–family conflict and sleep quality and quantity.

Theoretical Rationale and Hypothesis Development

COR Theory

COR theory (Hobfoll, 1989) suggests that strain results from a loss of resources, the threat of resource loss, or a lack of resource gain after the investment of resources. *Resources* refer to those conditions (e.g., valued work role), objects (e.g., home), personal resources (e.g., self-esteem, mastery), and energies (e.g., time, money) that the individual values and strives to obtain, maintain, and protect. Thus, work–family conflict, a stressor, is likely to result in a loss of resources, primarily valued work roles, home roles, and time. Given the propositions of COR theory, these instances of resource loss are likely to result in strain and a lack of time that prevents individuals from attaining sufficient sleep quality and adequate amounts of sleep.

Work–Family Conflict as a Source of Resource Loss

Greenhaus and Beutell (1985) defined work–family conflict as a form of interrole tension in which the demands of the work role are incompatible with the demands of the family role, and vice versa. Thus, conflict of this nature could occur bidirectionally, from work to family (WTFC) or from family to work (FTWC). These two directions are positively and reciprocally related (Frone, Russell, & Cooper, 1992), although meta-analytic work does provide evidence for discriminant validity between these two constructs (Mesmer-Magnus & Viswesvaran, 2005). Based on a review of the literature, Frone et al. (1992) suggested that there are three types of work–family conflict: time based, strain based, and behavior based. Given that time is a limited resource, time-based conflict occurs when an individual is not able to devote the desired amount of time to one domain because the opposite domain has required more of their time. For example, long work hours are likely to interfere with the time an individual is able to spend with their family or friends. Strain-based conflict occurs when the strain experienced as a result of stressful conditions in one role interferes with an individual's performance in another role. For example, strain resulting from negative interactions with coworkers or supervisors may inhibit individuals from performing adequately as a

caregiver to children or aging parents. Last, behavior-based conflict is experienced when an individual has difficulty transitioning between appropriate roles for a given domain. For example, authoritative behavior may help an individual to succeed in a management role, but this same behavior also may create difficulty at home if used with a spouse or partner. In the remainder of this paper, we primarily focus on the concepts of strain-based and time-based conflict, given their applicability to the research questions at hand.

The work–family conflict literature has been heavily influenced by the scarcity hypothesis, which suggests that human energy is a limited resource and that individuals tend to make use of this resource to a greater degree when engaging in multiple roles (Goode, 1960), such as work and family. Hobfoll and Shirom (2000) suggested that COR theory was particularly applicable to the work–family interface, due in large part because of this focus on limited resources. For example, when an individual experiences strain-based WTFC such that they are preoccupied or distressed by work when at home, their home performance is likely to be impaired. The individual may experience distress, worry, or rumination, which in turn can prevent an individual from attaining quality sleep. These individuals may have difficulty initiating or maintaining sleep throughout the night and may awake feeling unrested. As an alternative, time-based WTFC may occur when work time cuts into family time and individuals must therefore devote additional time to the family domain to preserve their relationships and maintain their valued role as a family member. Such efforts are likely to cut into sleep time, resulting in lower sleep durations. FTWC also may impact both sleep quality and quantity. For example, individuals experiencing strain-based FTWC may experience distress because their preoccupation with family life while at work impairs their work performance and threatens their valued role as an employee. Such distress may prevent an individual from attaining quality sleep if the individual has difficulty falling asleep or wakes up throughout the night. Last, time-based FTWC also may occur, for example, if individuals feel obligated to put additional time resources back toward work to make up for lost time that was devoted to family. Thus, time is likely to be borrowed from sleep time. The limited amount of past research that has been conducted on the relationship between work–family variables and sleep supports such a link.

For example, Barnes et al. (2012) found that time spent working is negatively associated with self-report sleep time, but especially under conditions of high amounts of time spent with family. Other studies have found a relationship between work–family conflict and sleep-related constructs. For example, past research supports relationships between high levels of WTFC and FTWC and poor self-reported sleep quality (Nylén, Melin, & Laflamme, 2007; Sekine et al., 2006). Likewise, Britt and Dawson (2005) found a negative relationship between self-report hours of sleep and soldiers' work–family conflict. A study conducted by Lallukka et al. (2010) found that work–family conflict was strongly associated with self-report sleep complaints. Although our data is cross-sectional and we cannot assume causality, previous research suggests that work–family conflict influences self-report sleep quality, whereas the reverse relationship has not been supported (i.e., sleep quality does not influence work–family conflict; Butts, Eby, Allen, & Muilenburg, 2013). Other longitudinal studies found that reduced individual-level and team-level WTFC was associated with increases in perceptions of adequate time for healthy sleep (Moen, Fan, & Kelly, 2013) and that reducing WTFC promotes longer sleep duration (Moen et al., 2011).

Although a handful of studies have examined the work–family conflict to sleep link (e.g., Lallukka et al., 2010; Sekine et al., 2006), these studies did not measure aspects of both sleep quality and sleep quantity in the same study. In addition, none of these studies measured sleep objectively. Given this past research, in addition to propositions from COR theory, we hypothesize the following:

Hypothesis 1a: Employee WTFC will be negatively related to sleep quality and sleep quantity.

Hypothesis 1b: Employee FTWC will be negatively related to sleep quality and quantity.

The Role of FSSB in Providing Resources and Protecting Against Work–Family Conflict Resource Loss

We argue that family-specific supervisor support is a resource especially relevant in predicting sleep quality and quantity. Family-supportive supervisors empathize with an employee's desire to seek balance between work and family responsibilities (Thomas & Ganster, 1995). Hammer, Kossek, Yragui, Bodner, and Hanson (2009) defined FSSB as a multidimensional superordinate construct consisting of emotional support and instrumental support concerning family demands, in addition to role modeling behavior and creative work–family management. Recent research has provided evidence for the importance of FSSB in reducing work–family conflict (Kossek, Pichler, Bodner, & Hammer, 2011).

COR theory suggests that stressful situations may be attenuated when the individual perceives that they have the necessary resources to cope with a stressor (Hobfoll, 1989). As work–family stressors deplete resources, as suggested by Hobfoll and Shirom (2000), social support acts a protective factor within this process. Hobfoll and Shirom (2000) made the distinction that social support was a condition resource, but the act of being socially supported also resulted in access to objects, conditions, personal characteristics, and energy resources. Furthermore, those individuals with greater resources were less vulnerable to resource loss and more likely to experience resource gain because individuals must use resources they have to offset resource loss, protect resources, and gain new resources, such as when an individual has a supportive supervisor.

In this way, FSSB is likely to directly impact sleep because family-supportive supervisors provide individuals with resources that can improve sleep quality and sleep duration. For example, family-supportive supervisors have the ability to change employees' work schedules on a daily basis, implement creative management practices for employees to better accommodate nonwork life, role model positive ways of integrating work and nonwork life, and discuss with employees the difficulties experienced when trying to navigate work and nonwork conflicts. Thus, family-supportive supervisors have the ability to create opportunities for employees to better manage work and family time demands, leaving employees with more adequate periods of time for sleep, in addition to providing employees with emotional sup-

port for work and nonwork demands that is likely to result in less rumination or worry by the employees, which can impact aspects of sleep quality.

Although general supervisor support has been found to be positively linked with employee sleep adequacy (e.g., Buxton et al., 2009; Sorensen, Stoddard, et al., 2011), no studies to date have examined the association between the construct of FSSB and employee sleep. One study has examined the relationship between manager practices related to family demands and employee sleep. Berkman et al. (2010) found that employees who had managers scoring higher on supportive work–family practices, slept almost 30 min longer a night on average, as measured by actigraphy. These studies suggested that manager support for work and family issues is a critical factor in promoting employee health, especially sleep. Therefore, we hypothesize the following:

> *Hypothesis 2:* FSSB will be positively related to sleep quality and quantity.

Although Berkman et al. (2010) investigated the direct effect of family-specific social support on sleep, we argue that FSSB also can be examined as a moderator, drawing on Hobfoll's (1989) COR framework. As suggested by Cohen and Wills (1985), social support can act as a protective factor in the face of stressful experiences. As such, in the presence of work–family conflicts, FSSB is also likely to have a buffering effect, protecting against further resource loss. Hobfoll and Shirom (2000) suggested that work and family stressors interact to deplete resources, whereas resources from work, such as supportive managers, acted to limit this resource depletion. Family-supportive supervisors provide employees with resources to better cope with work–family conflict, such as emotional support or instrumental scheduling changes, thereby lessening the impact on both sleep quality and quantity. Thus, the following is hypothesized:

> *Hypothesis 3a:* FSSB will moderate the negative relationship between WTFC and sleep quality and sleep quantity, such that the relationships will be attenuated under conditions of high FSSB.

> *Hypothesis 3b:* FSSB will moderate the negative relationship between FTWC and sleep quality and quantity, such that the relationships will be attenuated under conditions of high FSSB.

Method

Participants and Procedure

The present investigation uses baseline data from a study conducted by the Work, Family, and Health Network (WFHN; Bray et al., 2013; King et al., 2012). By using a range of methods to collect data at the organization, work site, manager, employee, and family levels, the study aims to increase understanding of the importance of workplace practices and policies to work, family, and health outcomes (see Bray et al.; King et al.). The current research used a sample of employees located in teams within the information technology division of a large Fortune 500 firm. Trained field interviewers administered face-to-face computer-assisted personal interviews (CAPI) with employees beginning in September 2009 and ending in September 2010. Employees completed a 60-min interview at the worksite and received a $20 incentive. Immediately following the CAPI, interviewers introduced the actigraphy data collection process and requested participation for an additional $20 incentive. If the participant agreed, the interviewer instructed them to wear the sleep monitor actigraph (Spectrum, Respironics/Philips, Murrysville, PA) on their nondominant wrist at all times for the next week except in situations in which the watch could be damaged (e.g., excessive impact, extreme temperatures). Of the total 1,182 eligible employees, 823 employees completed the CAPI interview (69.6% response rate); 61% of the employees were male and 39% were female; 71% percent were White; average employee age was 46 years (SD = 8.38); 79% were married or cohabiting; and 56% had children living in the home. Out of all eligible employees, 655 employees completed the actigraphy data collection, while a total of 637 employees had valid actigraphy data for 3 or more days out of 7 possible days, the criterion considered reliable and valid for participant data (Marino et al., 2013). On average, participants had 6.57 days of valid actigraphy. To ensure that both samples were equivalent, we have restricted our self-report analyses to the same sample of individuals who also provided valid actigraphy data. After listwise deletion, the final self-report and objective actigraphic sleep analyses were conducted on a sample of 623 individuals.

Measures

Work-family conflict. Employee WTFC and FTWC were measured using both of the five item subscales developed by Netemeyer, Boles, and McMurrian (1996). Items were rated on a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores indicated greater WTFC and FTWC. A sample item from the WTFC scale reads, "The demands of your work interfere with your family or personal time," while a sample item from the FTWC scale reads, "The demands of your family or personal relationships interfere with work-related activities." The reliability estimate for the work-to-family subscale was α = .92, while the reliability estimate for the family-to-work subscale was α = .83.

Family-supportive supervisor behaviors-short form (FSSB-SF). Recently, the Family-Supportive Supervisor Behaviors–Short Form (FSSB–SF; Hammer, Kossek, Bodner, & Crain, 2013) was validated as a way to measure the superordinate FSSB construct. This is a parsimonious measure that is reliable and valid. Furthermore, little information is lost when measuring the overall superordinate construct of FSSB with the short form rather than the original long form. Items were rated on a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores indicated greater FSSB. A sample item reads, "Your supervisor makes you feel comfortable talking to him/her about your conflicts between work and nonwork." The overall reliability estimate for the scale was α = .88.

Sleep. In general, few standardized self-report measures of sleep exist. However, the Pittsburgh Sleep Quality Index (PSQI; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989) is the most widely utilized scale (Grandner et al., 2006). Advantages of this set of questions include that it is brief, relatively easy to administer, and includes a variety of sleep dimensions (Buysse et al., 1989). Although an overall quality score can be derived, individual items and combinations of items can be used to determine scores on

separate components such as duration and insomnia. By separating such dimensions from the global sleep quality construct, one can determine how work and nonwork predictors may differentially influence separate aspects of self-reported sleep. When measuring sleep, organizational scholars have tended to use PSQI global scores, as opposed to component scores, sleep diaries, or objective actigraphic measurements (e.g., Williams et al., 2006).

Disadvantages of this scale include that it has a fairly complicated scoring scheme and was validated with a clinical sample. More recent validation work with nonclinical samples suggests that although PSQI global scores correlate well with sleep diaries, they do not correlate with objectively measured actigraphic sleep variables (Grandner et al., 2006). When broken down into component scores, the PSQI's sleep duration component has been found to correlate negatively with actigraphic total sleep time (Grandner et al., 2006). Another review (e.g., Sadeh, 2011) has suggested that while actigraphy corresponds to self-reported sleep schedule parameters, there is very little agreement between actigraphy and self-reported sleep quality parameters. Actigraphic measurements of sleep are likely to be more valid than self-report measurements of sleep, given that actigraphy for both sleep/wake on a minute by minute basis over the sleep period, as well as for wake after sleep onset (WASO), has been more extensively validated against polysomnographic recordings, the gold-standard measurement of sleep (e.g., Marino et al., 2013). Sleep scholars, such as Tryon (2004), have reviewed past actigraphy validation studies and concluded that actigraphy is a valid indicator of sleep–wake, based on the levels of percentage error between actigraphy and polysomnography. These levels are similar to those found in accepted medical, intelligence, and personality tests. In light of this information, we include both self-report component scores for quality (i.e., sleep insufficiency, insomnia symptoms) and quantity (i.e., sleep duration) and objective actigraphic measurements of sleep quality (i.e., WASO) and quantity (i.e., total sleep time) in the current work. Although objective actigraphic methods may be more accurate than self-reports, it may be less feasible for organizational scholars to implement objective actigraphic methods and so we include both self-report and objective actigraphic sleep to motivate future research on sleep in general.

Self-reported sleep insufficiency. Sleep insufficiency, a measure of sleep quality, was measured using one item (Buxton et al., 2012; Buxton et al., 2009). As a measure of sleep insufficiency, participants were asked, "How often during the past four weeks did you get enough sleep to feel rested upon waking up?" Items were rated on a scale ranging from 1 (*never*) to 5 (*very often*). After reverse scoring, higher scores indicated greater sleep insufficiency.

Self-reported sleep duration. Sleep duration, a measure of sleep quantity, was measured using two items adapted from the PSQI (Buysse et al., 1989). As a measure of sleep duration, participants were asked, "Over the past four weeks, what time did you usually turn the lights off to go to sleep?" and "Over the past four weeks, what time did you usually get out of bed?" Sleep duration (i.e., the number of hours slept) was computed from these two times indicated by the participants.

Self-reported insomnia symptoms. Insomnia symptoms, a measure of sleep quality, were measured using two items from the PSQI (Buysse et al., 1989). As a measure of insomnia symptoms, participants were asked, "During the past four weeks, how often could you not get to sleep within 30 minutes?" and "During the past four weeks, how often did you wake up in the middle of the night or early morning?" Items were rated on a scale ranging from 1 (*never*) to 4 (*three or more times a week*), with higher scores indicating more frequent insomnia symptoms. The two scores were then averaged for an overall insomnia symptoms score.

Sleep duration and quality directly measured using actigraphy. Sleep has rarely been measured using objective methods. Objectively-measured actigraphy can be used to assess sleep quality and quantity (Buxton, Klein, Whinnery, Williams, & McDade, 2013). Actigraphy represents a reliable and valid objective measure of sleep not used for the diagnosis of sleep disorders (Ancoli-Israel et al., 2003; Marino et al., 2013). Sleep monitor actigraphs are wristwatch-size devices that contain an accelerometer, continuously measuring movement as a proxy for waking activity (Ancoli-Israel et al., 2003; Barnes, 2012).

Actigraphic total sleep time, or objectively measured quantity, can be derived from actigraphic periods of less frequent movement, indicating sleep, throughout a 24-hr period. *Actigraphic WASO*, or objectively measured quality, refers to the average amount of time spent awake per sleeping period, as evidenced by actigraphically-measured wrist movement patterns. Following data collection, data from each participant's actiwatch was uploaded to databases using the Actiware Sleep Scoring Program, Version 5.71 (Philips Respironics, 2005) and analyzed by at least two members of the study's actigraphic scoring team using a recently validated and standard algorithm (Marino et al., 2013). Scorers determined (a) the validity of each recording, (b) the validity of each day of the recording, and (c) manually inserted sleep periods (main sleep intervals and naps) based on study-specific standard sleep criteria applied similarly to all recordings. In short, a recording was determined to be invalid if there was a device malfunction indicated by constant false activity on the recording or if the data were unable to be retrieved. Certain days within the recording were determined to be invalid if a watch error occurred, such as false activity patterns characteristic of a failing battery, or if the participant did not comply with the study's actigraphic procedures (i.e., greater than 4 hr of actiwatch off-wrist time throughout the day, or an off-wrist period greater than 60 min within 10 min of the determined beginning or end of the main time in bed period for that day). If there were no discrepancies between at least two scorers on determining whether the recording was valid, the number of valid days, and the cut time used to define 24-hr days, the analyses were then checked to ensure that all scorers had determined the recording had the same number of sleep periods and had labeled each sleep period as a main sleep or nap identically. Last, each of the sleep periods were checked on an interval-by-interval basis. Any corresponding intervals that exceeded a 15 min difference in length or exceeded 15 min of either total sleep time or WASO were rescored.

The Actiware sleep scoring program separates an actigraphy recording into 30-s segments of time, or epochs, and calculates a total activity count based on the epoch being evaluated. Figure 2 represents the calculation method used. If the total activity count exceeded the wake threshold level determined by the researchers (i.e., medium wake threshold level selection uses a wake threshold value of 40 total activity counts), then the epoch was labeled "wake." If the total activity count was below the set wake threshold level, the epoch was labeled "sleep." Thus, the initial total sleep time measurement was the total number of epochs deter-

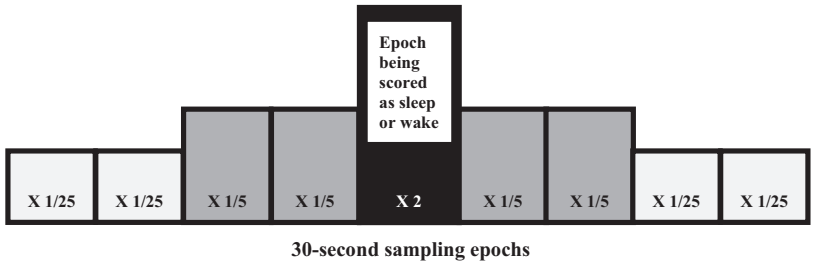

Figure 2. Calculation method for actigraphic scoring.

mined to be sleep multiplied by the set epoch length, while the initial WASO measurement was the total number of epochs determined to be wake multiplied by the set epoch length. For the purposes of the current investigation, these initial values for total sleep time and WASO were further modified to account for the total number of valid days. Actigraphic total sleep time was computed as the average amount of sleep attained per day in minutes (including naps). Thus, the total amount of time scored as sleep over the course of the study was divided by the total number of valid days. Actigraphic WASO was computed as the average amount of time spent waking during nightly sleep in minutes, with the total amount of time scored as wake being divided by the total number of valid days.

Control variables. Several control variables were selected based on theory and past research. Race was coded dichotomously as White versus nonwhite, and included based on past research indicating that poorer sleep is experienced by minorities (e.g., Hale & Do, 2007; Kingsbury, Buxton, Emmons, & Redline, 2013; Mezick et al., 2008). Gender was coded as male versus female. Gender has been related to both sleep quality and duration, with women experiencing poorer sleep (e.g., Reyner, Horne, & Reyner, 1995). Participants also reported on the number of children they had living in their home 4 or more days a week. This also was motivated by past research that suggests that perceptions of work–family conflict are generally higher among individuals with children in the home (e.g., Eby, Casper, Lockwood, Bordeaux, & Brinley, 2005). Work schedule referred to either daytime shift or other shift, as shiftwork is commonly reported with disturbed sleep (e.g., Akerstedt, 2003).

Analytic Strategy

Given that participating employees worked within work groups under the supervision of managers, intraclass correlations (ICC) were calculated to determine the degree of dependency within work groups, using manager as the nesting variable. ICCs for all sleep outcomes ranged from .01 to .03. Although these ICCs are very low, we attempted multilevel modeling as a conservative approach to analyzing the data. However, we experienced convergence issues in a majority of the models due to very little or no variance between managers with respect to employee sleep outcomes. The insomnia, sleep duration, and total sleep time models did not converge. In addition, out of the models that did converge, the random intercept for sleep insufficiency was not significant ($B = .003$, $p = .87$) and the random intercept for WASO was not significant ($B = .43$, $p = .93$). Thus, all analyses were conducted using standard ordinary least squares regression techniques that ignore the very small levels of dependency within groups. All analyses were conducted in SPSS, Version 19.

As demonstrated later, many of our predictor variables of interest were correlated with each other, which is likely to lead to nonsignificant unique effects within a block of added predictors. We therefore use hierarchical multiple regression, with a particular interest on the ΔR^2 and ΔF values for each block of predictors (e.g., work–family interface variables) rather than exclusively on the significance of individual parameters, because the ΔR^2 and ΔF is not subject to this problem. Thus, we assess and focus on the incremental predictive utility of all variables in successive blocks.

The variables were entered into the regression equations in three blocks/steps. First, the control variables were entered. Second, the centered scores for WTFC, FTWC, and FSSB were entered, representing the work–family interface variables in Hypotheses 1 and 2 as well as supervisor support. Third, the WTFC by FSSB interaction term and FTWC by FSSB interaction term were entered, representing interactive effects among work–family interface variables in Hypotheses 3a and 3b.

Results

Table 1 shows descriptive statistics and intercorrelations among all study variables. On average, this sample experienced around 44 min per night of waking time after sleep onset based on actigraphic data, although this varied among participants ($SD = 16.83$), and there was a moderate correlation ($r = .41$) between participants' self-reported sleep time (i.e., 7.28 hr on average, $SD = .95$ hr) and their actigraphically reported sleep time, (i.e., 433.70 min or 7.23 hr on average, $SD = 55.60$ min or .93 hr).

As predicted, race, gender, number of children, and work schedule were all significantly related to the sleep variables. In addition, WTFC, FTWC, and FSSB were all significantly correlated with each other in the expected directions. WTFC was significantly and positively correlated with FTWC and significantly and negatively correlated with FSSB, whereas FTWC and FSSB were significantly and negatively correlated. Furthermore, WTFC was significantly related to sleep insufficiency, insomnia, and sleep duration in the expected directions, whereas FTWC was significantly related to both sleep insufficiency and sleep duration in the expected directions. FSSB was significantly associated with sleep insufficiency, insomnia, and sleep duration in expected directions. No significant relationships were seen between these work–family predictors and actigraphic outcomes. Note some of the small correlations among the sleep variables suggesting that they may

Table 1
Correlations Between Study Variables

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11
1. Race	0.52	0.50	—										
2. Gender	0.31	0.46	.20	—									
3. Number of children	0.99	1.08	−.10	−.07	—								
4. Work schedule	0.62	0.49	.32	.27	.08	—							
5. WTFC	3.06	0.94	.06	.08	.05	−.17	(.92)						
6. FTWC	2.12	0.63	.00	−.03	.15	−.03	.37	(.83)					
7. FSSB	3.76	1.23	−.01	−.06	−.01	.01	−.38	−.15	(.88)				
8. Sleep insufficiency	2.81	0.90	.01	.06	.10	−.04	.28	.15	−.12	—			
9. Insomnia	2.70	0.77	.10	.12	−.05	−.05	.18	.04	−.06	.28	—		
10. Act. WASO	44.12	16.83	−.20	−.01	−.09	−.01	−.03	−.07	.01	.00	.12	—	
11. Sleep duration	7.28	0.95	.05	.07	−.11	.12	−.15	−.09	.06	−.18	.10	.13	—
12. Act. total sleep time	433.70	55.60	.19	.22	−.09	.08	−.07	−.05	−.03	−.07	.12	.10	.41

Note. Reliabilities (Cronbach's α) are on the diagonal in parentheses. Scales used: race (1 = *White*, 0 = *other*); gender (0 = *male*, 1 = *female*); work schedule (0 = *other*, 1 = *daytime*); WTFC, FTWC, and FSSB (1 [*strongly disagree*] to 5 [*strongly agree*]); sleep insufficiency (1 [*never*] to 5 [*very often*]); insomnia (1 [*never*] to 4 [*three or more times a week*]). WTFC = work-to-family conflict; FTWC = family-to-work conflict; FSSB = family-supportive supervisor behavior; Act. = Actigraphic; WASO = wake after sleep onset.
All values greater than |.08| are significant at the .05 level.

tap different constructs. For example, the sleep quality measures (i.e., sleep insufficiency, insomnia, WASO) correlated only between .00 and .28 with each other. Although self-reported sleep duration and actigraphic total sleep time had very similar means and standard deviations, they only correlated .41 with each other.

Hypothesized Results

We hypothesized that employee WTFC and FTWC would be positively related to self-reported sleep insufficiency, self-reported insomnia symptoms, and objectively measured WASO, while being negatively related to self-reported sleep duration and objectively measured total sleep time. In addition, we hypothesized that FSSB would be negatively associated with self-reported sleep insufficiency, self-reported insomnia symptoms, and objectively measured WASO, while being positively associated self-reported sleep duration and objectively measured total sleep time. Results from the WTFC analyses can be found in Tables 2 and 3 for sleep quality and sleep quantity measures, respectively. Rather than discuss each model results sequentially, we present the results thematically as they relate to the study hypotheses. As previously mentioned, we report the ΔR^2 and ΔF values for blocks of pre-

Table 2
Effect of Work–Family Conflict and FSSB on Sleep Quality

	Outcome								
	Sleep insufficiency			Insomnia symptoms			Act. WASO		
Predictor	*B*	*SE B*	β	*B*	*SE B*	β	*B*	*SE B*	β
Step 1									
Constant	2.84	.04		2.69***	.04		45.17***		
Race	−0.03	.07	−.02	0.07	.07	.04	−7.56***	1.35	−.22
Gender	0.14	.07	.08	0.21	.06	.13	−0.08	1.30	.00
Children	0.08	.03	.10	−0.03	.03	−.05	−1.48*	0.59	−.10
Work schedule	−0.08	.08	−.04	−0.12	.08	−.06	−0.42	1.57	−.01
ΔR^2	0.03			0.04			0.06		
ΔF	4.92**			5.70***			9.34***		
Step 2									
WTFC	0.24***	.04	.26	0.13***	.04	.16	0.33	0.77	.02
FTWC	0.06	.06	.04	−0.01	.05	−.01	−1.72	1.09	−.07
FSSB	−0.05	.05	−.05	−0.05	.04	−.05	−0.10	0.84	.00
ΔR2	0.08			0.03			0.00		
ΔF	19.22***			7.09***			0.81		
Step 3									
WTFC × FSSB	0.01	.05	−.05	0.03	.04	.03	0.46	0.84	.02
FTWC × FSSB	−0.10	.05	.01	0.01	.06	.01	−0.91	1.31	−.03
ΔR^2	0.00			0.00			0.00		
ΔF	1.03			0.28			0.28		

Note. *B*, *SE B*, and β reported based on the full model. FSSB = family-supportive supervisor behavior; Act. = Actigraphic; WASO = wake after sleep onset; WTFC = work-to-family conflict; FTWC = family-to-work conflict.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3
Effect of Work–Family Conflict and FSSB on Sleep Quantity

	Outcome					
	Sleep duration			Act. total sleep time		
Predictor	*B*	*SE B*	β	*B*	*SE B*	β
Step 1						
Constant	7.19***	.04		426.16***	2.51	
Race	0.12	.08	.06	22.18***	4.49	.19
Gender	0.05	.08	.03	23.04***	4.31	.21
Children	−0.10**	.04	−.12	−3.67	1.96	−.07
Work schedule	0.29**	.09	.13	7.96	5.23	.06
ΔR^2	0.04			0.09		
ΔF	6.87***			15.91***		
Step 2						
WTFC	−0.11*	.05	−.11	−5.41*	2.54	−.09
FTWC	−0.05	.06	−.03	0.84	3.62	.01
FSSB	0.07	.05	.06	−2.83	2.80	−.04
ΔR2	0.02			0.01		
ΔF	5.35**			2.06		
Step 3						
WTFC × FSSB	−0.01	.05	−.01	−3.72	2.80	−.06
FTWC × FSSB	−0.01	.08	−.01	−0.80	4.34	−.01
ΔR^2	0.00			0.00		
ΔF	0.05			1.18		

Note. *B*, *SE B*, and β reported based on the full model. FSSB = family-supportive supervisor behavior; Act. = Actigraphic; WTFC = work-to-family conflict; FTWC = family-to-work conflict.
* $p < .05$. ** $p < .01$. *** $p < .001$.

dictors in Tables 2 and 3 because of the significant correlations among study predictors.

Sleep quality. As displayed in Table 2, we find that the ΔF is significant for the block of predictors in Step 2 (i.e., WTFC, FTWC, FSSB) with the two self-reported sleep quality measures, sleep insufficiency ($\Delta R^2 = .08$, $\Delta F = 19.22$, $p < .001$) and insomnia symptoms ($\Delta R^2 = .03$, $\Delta F = 7.09$, $p < .001$), but not actigraphic WASO ($\Delta R^2 = .00$, $\Delta F = .81$, $p = .49$). Thus, there appears to be significant variance in self-report sleep quality variables accounted for by the predictors.

In support of these findings regarding sleep quality measures, WTFC was significantly and positively associated with sleep insufficiency, $B = .24$, $t(623) = 5.92$, $p < .001$, and insomnia symptoms, $B = .13$, $t(621) = 3.56$, $p < .001$, but not WASO, $B = .33$, $t(622) = .44$, $p = .66$. However, FTWC was not significantly associated with sleep insufficiency, $B = .06$, $t(623) = 1.06$, $p = .29$, insomnia symptoms; $B = -.01$, $t(621) = -.17$, $p = .83$; or WASO, $B = -1.72$, $t(622) = -1.58$, $p = .12$, despite the significant positive bivariate correlation between FTWC and sleep insufficiency. FSSB was not significantly related to sleep insufficiency, $B = -.05$, $t(623) = -1.16$, $p = .25$; insomnia symptoms, $B = -.05$, $t(621) = -1.12$, $p = .26$; or WASO, $B = -.10$, $t(622) = -.12$, $p = .90$; despite the significant negative bivariate correlation between FSSB and sleep insufficiency and insomnia symptoms. Concerning sleep quality, our results partially support Hypotheses 1a, 1b, and 2.

Last, we model results relating to the moderating effect of FSSB on the relationships between WTFC and FTWC and sleep quality measures. The addition of the two interaction terms in Step 3 was not significant (minimum p value = .35) for any of the three sleep quality measures, and none of the hypothesized interactions themselves were statistically significant (minimum p value = .16). With respect to sleep quality, our results do not support Hypotheses 3a or b.

Sleep quantity. As displayed in Table 3, our results indicate that significant variance in self-reported sleep duration is accounted for by work–family predictors in Step 2, beyond control variables ($\Delta R^2 = .02$, $\Delta F = 5.35$, $p = .001$), although significant results are not found for actigraphic total sleep time ($\Delta R^2 = .01$, $\Delta F = 2.06$, $p = .11$). There appears to be significant variance in self-report sleep quantity accounted for by work–family predictors.

In support of these findings, WTFC was significantly and negatively associated with sleep duration, $B = -.11$, $t(623) = -2.48$, $p = .01$ and actigraphic total sleep time, $B = -5.41$, $t(623) = -2.13$, $p = .03$. However, FTWC was not significantly associated with sleep duration, $B = -.05$, $t(623) = -.70$, $p = .45$ or actigraphic total sleep time, $B = .84$, $t(623) = .23$, $p = .82$, despite the significant negative bivariate correlation between FTWC and sleep duration. FSSB was also not significantly related to sleep duration, $B = .07$, $t(623) = 1.36$, $p = .18$ or actigraphic total sleep time, $B = -2.83$, $t(623) = -1.01$, $p = .31$, despite the significant negative bivariate correlation between FSSB and sleep duration. Concerning sleep quantity, our results partially support Hypotheses 1a, 1b, and 2.

Finally, we report model results relating to the moderating effect of FSSB on the relationships between WTFC and FTWC and sleep quantity measures. The addition of the two interaction terms in Step 3 was not significant (minimum p value = .31) for either of the sleep quantity measures and none of the hypothesized interactions themselves were statistically significant (minimum p value = .48). Thus, when evaluated with respect to sleep quantity, Hypotheses 3a and b were not supported.

Our results provide partial evidence supporting Hypotheses 1a, 1b, and 2. Although significant direct effects are only found with WTFC on sleep quality and quantity outcomes within our regression models, correlations among study predictors are likely contributing to the nonsignificant unique effects of FTWC and FSSB.[1] As such, we find that this combination of predictors accounts for significant variance in sleep quality and quantity models. However, no support is found for moderating effects with Hypotheses 3a or 3b.

Discussion

This study evaluated the relationships among work–family conflict, FSSB, and sleep outcomes within the COR framework. Our results show that a combination of constructs predicts both self-reported and objective sleep quality and quantity. We add to Barnes et al.'s (2012) and Lallukka et al.'s (2010) findings by using objective and subjective measurements of both sleep quality (i.e., self-reported sleep insufficiency, self-reported insomnia symptoms, objectively measured WASO) and sleep quantity (i.e., self-reported sleep duration, objectively-measured total sleep time), with a measure of FSSB, and examining the relationship

[1] We conducted additional analyses with sleep outcomes regressed on WTFC and FSSB in the first set of models and sleep outcomes regressed on FTWC and FSSB in the second set of models. By including WTFC and FTWC in separate models, significant relationships were found between FTWC and sleep insufficiency and sleep duration, while FSSB was significantly related to sleep insufficiency. Relationships between WTFC and sleep outcomes were similar to those mentioned in the results section.

between work–family conflict and sleep in a stress framework. Our findings indicate that the threat and loss of resources, brought on by work–family conflict, extends beyond waking experience and impacts aspects of sleep.

Regarding actigraphic outcomes, only total sleep time was found to be significantly related to WTFC and the combination of work–family predictors did not account for significant variance in actigraphic WASO or total sleep time. One explanation for this is that relationships between self-report work–family conflict and self-report sleep outcomes are likely to be subject to common method bias, thereby inflating the correlations between independent and dependent variables (Podsakoff, MacKenzie, Jeong-Yeon, & Podsakoff, 2003), and thus making it more difficult to detect an effect with objective outcomes in general. In addition, WASO is subject to more measurement error than total sleep time (Marino et al., 2013), which may explain why WTFC was related with total sleep time, but not WASO.

In contrast to our significant results with objectively measured total sleep time, we did not find any support for work–family conflict or FSSB being related to objectively measured WASO, despite relationships between these variables and self-report indicators of sleep quality (i.e., self-reported sleep insufficiency and insomnia symptoms). These results are in alignment with previous research that has found perceived stress to be associated with poor self-reported sleep, but not objectively measured actigraphic assessments (Tworoger, Davis, Vitiello, Lentz, & McTiernan, 2005). It is possible that common method bias may play a role in these differential findings from both our study and Tworoger et al.'s (2005) study. An alternative explanation is that WASO may represent a sleep quality construct that is altogether unique from self-reported sleep insufficiency and insomnia symptoms. WASO is an empirical measure of the amount of time spent awake during a sleep period after having fallen asleep, and is highly related to inhibitory GABA neurotransmitter levels in insomniacs (Winkelman et al., 2008). Thus, it does not directly map on to the construct of self-reported insufficiency (i.e., the extent to which one does not feel rested on awakening).

In addition, we did not find significant relationships between FSSB and sleep quantity. This is in contrast to previous work conducted by Berkman et al. (2010), who found a significant association between manager work–family balance scores and actigraphically-measured total sleep time. Although Berkman and colleagues' conceptualization of managers' practices related to work–family balance was similar to Hammer et al.'s (2013) construct of FSSB, there were some distinctions that may be responsible for the differing results. Berkman et al.'s measure of supervisor support was created by coding supervisor openness and creativity with regard to employee family demands in qualitative interview transcripts. These aspects of openness and creativity appear to reflect the instrumental support and creative work–family management items within Hammer et al.'s FSSB-SF scale. It may be the case that these dimensions from Hammer et al.'s (2009) long-form scale are better predictors of sleep quantity. Moreover, Berkman et al.'s study was conducted in a sample of extended care facilities, rather than in a professional-level industry. As we discuss in further detail later on, interactions between supervisors and employees may be qualitatively different in an hourly workforce.

No significant interaction effects were found between work–family conflict and FSSB on sleep outcomes. These findings were unexpected, given prior research that has found evidence for social support acting as a moderator on the relationship between stressors and well-being (Cohen & Wills, 1985) and between workplace stressors and strains (Viswesvaran, Sanchez, & Fisher, 1999), in addition to predictions from COR theory (Hobfoll, 1989). Other research has suggested that moderating effects are most likely to be found when stressors, resources, and strains all match in terms of being cognitive, emotional, or physical (de Jonge & Dormann, 2006), giving some explanation to our results with sleep as a purely physical outcome and work–family conflict and FSSB being more cognitive and emotionally oriented.

Limitations and Future Directions

Although we contribute to current theory by investigating how the threat or loss of resources impacts sleep, by examining FSSB as a resource, and by including both sleep quality and sleep quantity in our study, in addition to contributing methodologically with the use of both self-report and objective measures of sleep, there are a few limitations that should be addressed and discussed. First, the self-report sleep measures asked participants to report on the previous 4 weeks of sleep while the objective measures of sleep were taken the week after the self-report scales were completed. Therefore, the self-report and objective measurements of sleep are not taken from the same time frame and could have contributed to differential effects for these outcomes. The work–family conflict items referred to the previous 6 months, whereas the FSSB items referred to the previous 4 weeks. Although overlapping, these referent time frames do not share the same level of specificity. Moreover, actigraphy data collection lasted for 1 week. It is likely that more reliable estimates of actigraphy could have been obtained, had the measurement window been longer.

In addition, this study is cross-sectional in nature, making it difficult to determine causal influences of variables. It is possible that employees experience greater levels of work–family conflict as a result of inadequate and insufficient sleep, however, this directional relationship was not supported in a recent conference presentation by Butts et al. (2013). Future research should attempt to examine these relationships in a longitudinal design whereby the direction of relationships among WTFC, FTWC, FSSB, and the different sleep measures of quality and quantity can be determined. Furthermore, it may be the case that the effects of work–family conflict manifest differentially day to day. Because work–family conflict, perceptions of FSSB, and aspects of sleep can vary depending on the day of the week, work schedule, or family schedule, future studies may include a daily diary component to data collection.

For the current study, we utilized the FSSB–SF (Hammer et al., 2013). Given the advantages of using this scale, in addition to the fact that we faced time constraints with survey administration, we opted to use the short form for this study. However, it is possible that additional direct effects or moderating effects may have been found had we been able to measure the four dimensions of FSSB separately (i.e., emotional support, instrumental support, role modeling behavior, creative work–family management). Future research should further address the linkages between FSSB and sleep.

Additional mechanisms/mediators contributing to these findings should be explored in future research. Actual sleep preparatory

behaviors such as sleep scheduling and activities before sleep, also known as sleep hygiene (e.g., Gellis & Lichstein, 2009), are likely to be influenced by work–family conflict and are likely to impact actual sleep outcomes. For example, negative health behaviors are frequently implicated in chronic health outcomes such as exercise behaviors and cardiovascular disease, eating behaviors and obesity, and smoking behaviors and lung cancer. Such health behaviors also have been recognized as occurring in response to stress, and more specifically in response to psychosocial job stressors (e.g., NIOSH, 2012). More recently, negative health behaviors have been associated with the stress associated with work–family conflict, and specifically poor eating and exercise behaviors (e.g., Allen, Shockley, & Poteat, 2008; Lallukka et al., 2010). To our knowledge, no research has examined the relationship between work–family conflict and negative sleep behaviors, which may ultimately mediate the relationship between work–family conflict and both objective and self-report sleep quantity and quality outcomes.

Work–family scholars should attempt to replicate this study in other organizations and industries to determine under what conditions work–family conflict and FSSB influence employee sleep quantity and quality. Supervisors and employees may interact very differently in this information technology (IT) industry, given the use of technology. For example, members of the supervisor—employee dyad may interact less frequently in person, but more frequently online over e-mail and conference calls, which may either result in supervisors providing employees with more or less family-specific support, or different types of family-specific support. Accordingly, Barsade and Gibson (2007) called for future research to investigate the organizational implications of emotions being conveyed through text-based means. Perhaps the absence of findings with regard to FSSB is indicative of this type of industry and little interpersonal contact between supervisors and employees.

Actigraphic and self-report measures of sleep, in addition to different aspects of sleep quality and quantity, should continue to be used in conjunction in future organizational and work–family interface studies. Our results indicated that there were somewhat small to modest relationships between the different sleep quantity and quality outcomes, in line with past research. For example, self-report and objective sleep quality measures correlated between .00 to .12, while self-report and objective sleep quantity correlated .41. This suggests that each measure captures distinguishable aspects of sleep quality and quantity. Thus, there is a need for organizational scholars to include multiple measurements of the different components of sleep quality and quantity in future studies and further determine how the different measures and methodologies are related to work–family interface variables.

In conclusion, we find that work–family constructs are associated with multiple aspects of sleep quality and quantity. Given the relationship between insufficient and inadequate sleep and chronic health outcomes, we argue that work–family scholars have an opportunity to contribute to the prevention of disease. There has been a call in the literature for work–family interventions to be implemented as a means for reducing negative health behaviors and associated chronic health outcomes experienced by workers (Hammer & Sauter, 2013; Sorensen, Landsbergis, et al., 2011). Future studies should continue to examine further the work–family interface—sleep link, and implement worksite interventions targeting proximal work–family variables and distal sleep outcomes.

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