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# Putting Work to Bed: Stressful Experiences on the Job and Sleep Quality*

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*Most adults spend one-third of every day sleeping and another third of most days at work. However, there is little analysis of the possible connections between common workplace experiences and sleep quality. This study uses the longitudinal and nationally-representative Americans' Changing Lives study to examine whether and how common conditions and experiences at work may "follow workers home" and impinge on their quality of sleep. We also explore how competing stressful experiences at home may influence sleep quality, and whether these are more salient than work experiences. Results show that frequently being bothered or upset at work is associated with poorer sleep quality, and the association is not explained by stressful experiences at home. These findings are discussed in relation to the sociological literatures on work, stress, and emotion.*

Most adults spend about one-third of most 24-hour days in paid employment, and another third sleeping, but our understanding of the links between experiences at work and sleep quality is limited. Biomedical studies have suggested an association between workplace conditions and sleep, but they have focused on particular employee populations. In the social scientific literature, there is substantial evidence that stressful working conditions are linked to poorer health, while paid employment involving positive aspects such as autonomy and creativity is associated with better health and functioning (House 1987; Kohn and Schooler 1982; Kohn and Schooler 1983; Lennon 1994; Link, Lennon, and Dohrenwend 1993; Mirowsky and Ross 2007). With only a handful of exceptions (e.g., Arber et al. 2007; Hochschild and Machung [1989] 2003), however, sociologists have all but ignored the contribution of experiences in the workplace to sleep quality. This is a major shortcoming because poor sleep quality may act as a sensitive marker of the consequences of stressful experiences in major macrosocial systems like the workplace or at home. A better understanding of the work-sleep relationship in the general population is needed because sleep is a basic human need and inadequate sleep has costs for individuals, in terms of their health and safety, and for society, in the form of lost productivity and medical care costs (Lamberg 2004). This study uses a nationally-representative, prospective sample of U.S. workers to examine whether and how common conditions and experiences at work may "follow workers home" and impinge on their quality of sleep, and how this may vary for those who are married or co-

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habiting or have children, compared to people without these family characteristics.

Extant research has generally neglected the range of stressors that are prevalent in the contemporary workplace, focusing mainly on the sleep consequences of night shift and, in particular, rotating shift work (for a review, see Akerstedt 2003). Shift work makes it difficult to achieve a typical sleep schedule, disrupting sleep duration, timing, and the circadian rhythm. While understanding the consequences of shift work is important, a focus solely on this exposure limits our understanding of the range of mechanisms by which the work role may influence individuals' lives outside of work hours. Other, more common, occupational stressors could exert their effects on sleep via very different means, and could affect sleep quality more than, or in addition to, its duration. Perceived low control on the job (Karasek 1979), perceived job insecurity (Heaney, Israel, and House 1994), and negative emotional experiences at work may create or indicate stress responses that raise hormonal levels and make it difficult for workers to "unwind" at the end of the day. However, unlike rotating shift work, which is likely to present significant objective obstacles to achieving adequate hours of sleep for most who perform it, common psychosocial stressors, such as low control or perceived job insecurity, may not affect all those who experience them, but only workers who appraise them as threatening.

Another serious limitation of most existing studies is that they rely on cross-sectional data, limiting researchers' ability to understand how reverse causality, spurious association, or selection mechanisms may influence the relationship. Sleepy workers may have a more negative view of their working conditions than the well-rested, for example, rather than, or in addition to, troubles at work acting to reduce sleep quality. Also, workers are not randomly selected into jobs with negative working conditions, and the same characteristics that make them more likely to face low control or other negative experiences on the job could be the underlying causes of poor sleep quality. For example, healthier people are more likely to be selected into employment and into particular kinds of jobs than their less healthy counterparts (Pavalko, Gong, and Long 2007), and healthier people may have better workplace experiences that could promote an existing advantage in sleep quality. Moreover, when studying self-reported occupational stressors such as perceived job insecurity, and also using self-reported measures of sleep outcomes, as is typically done in survey-based studies, an underlying negative reporting style could lead to a spurious association that can best be addressed if longitudinal data are available (Brief et al. 1988). Our study uses repeated measures of working conditions and sleep to eliminate the impact of stable individual characteristics, and we include baseline measures of respondents' negative reporting style and health to provide more robust estimates of the association.

This study thus has several strengths. First, we add to the very limited empirical analysis of the importance of common experiences at work for sleep quality in the general population. We examine three stressful experiences at work that have engaged sociologists and others interested in the ways social structure influences individuals, and that are associated with other aspects of well-being. Importantly, we are able to address shortcomings of prior studies of sleep quality by using nationally-representative, prospective data from a U.S. sample followed for about three years. This study appears to be the first using U.S. data to do so, as existing nationally-representative longitudinal studies of sleep quality have been conducted on samples of European and Japanese workers, where working conditions and employment contexts may differ. Additionally, we explore potentially competing stressors at home—including financial, spousal/partner, and child-related strains—to explore how important these experiences are, and how workers with different family characteristics are influenced by their experiences in the workplace. Everybody sleeps, and most people will spend the major part of their adult life working, so improving understanding of the connection between the two is important for an understanding of the way that social institutions and roles structure individual well-being.

## THEORY AND EVIDENCE

### *Workplace Experiences and Sleep Quality*

Inadequate sleep has serious consequences ranging from increased risk for traffic accidents (National Highway Traffic Safety Administration 2006), health problems (Moore et al. 2002), chronic disease (Tasali et al. 2008), and mortality (Ferrie et al. 2007). Moreover, while estimates vary considerably

across studies and depend on the definition of sleeping problems, they appear to be relatively common. A recent report suggests that 50 to 70 million Americans suffer from a disorder of sleep and wakefulness (Colten and Altevogt 2006). The majority of research on the predictors of sleep quality has been biomedical or psychological in nature and has focused on proximate risk factors, such as health conditions (Kutner, Bliwise, and Zhang 2004), personality dispositions (Espie 2002), or other individual or behavioral causes.

Psychological stress and reactivity to stress also have been implicated in the development of insomnia, one of the major diagnosed conditions that indicates poor sleep quality (Espie 2002; Morin, Rodrigue, and Ivers 2003). The stress response increases neurological arousal that involves the release of key neurotransmitters (such as adrenaline and noradrenaline) and neuron-effective hormones (such as cortisol). The presence of cortisol, in particular, can interfere with a worker's ability to "switch off" at the end of the work period and could also lead to depressed mood or enduring agitation or anxiety about the day's events, all of which could prevent adequate sleep (Linton 2004). While not intrinsically harmful, the stress responses that lead to a poor night's sleep could become maladaptive if they occur chronically (House 2002; Pearlin et al. 1981). Thus, people who are more likely to encounter psychologically stressful experiences and those who are more likely to appraise given conditions as threatening may be at greater risk of poor sleep quality. This suggests that, beyond individual-level risk factors, social structure is also important for sleep quality. Specifically, we argue that social stratification across jobs and within workplaces leads to variation in the negative experiences individuals encounter at work, and determines exposure to the chronic psychological stressors that could lead to poor sleep quality.

Work-related stress is frequently cited by workers themselves as a cause of sleeping difficulties (Henry et al. 2008; Linton 2004), but since researchers have examined different working conditions and generally have not considered a variety of potentially stressful experiences in the same models, there is limited understanding of which common working conditions have robust associations with sleep quality (but see, as exceptions, Knudson, Ducharme, and Roman 2007; Ribet and Derriennic 1999; Sekine et al. 2006). We focus on three common workplace experiences—perceived low control, perceived job insecurity, and feeling bothered or upset on the job—that are likely to be perceived as stressful by a substantial fraction of individuals who experience them.

Low control over tasks and decisions on the job has received considerable attention from social scientists, psychologists, and epidemiologists. Longitudinal studies have shown that occupational self-direction enhances self-directed personality orientations, increasing the overall sense of control (Kohn and Schooler 1982) and lowering the risk for depression, psychological distress, and anxiety (Kohn and Schooler 1982; Kohn and Schooler 1983; Link et al. 1993). By contrast, low control prevents an individual from resolving problems on the job or exercising autonomy or creativity, and the stress and frustration of these experiences could be carried home after work. A few studies have shown that low control at work is linked with poor sleep quality, though prior studies have examined workers outside the United States (Kalimo et al. 2000) and/or used cross-sectional data (Knudson et al. 2007; Sekine et al. 2006), so further assessment of the association is needed.

Perceived job insecurity can involve anticipating problems associated with a job loss, experiencing the mental strain of being in a powerless position, and feeling ambiguity about what the future might hold and what actions would be most appropriate to reduce the strain (Heaney et al. 1994; Joelson and Wahlquist 1987). We have found no studies that directly examined the association between perceived job insecurity and poor sleep quality as we measure it here, though prior studies have found links between impending job loss and short or long sleep duration among British male civil servants (Ferrie et al. 1998a), and have noted sleep disturbance among Swedish male shipyard workers in the midst of major industrial reorganization (Mattiasson et al. 1990). Another study found that workers who actually lost jobs during a major economic recession in Finland experienced increased insomnia (Hyyppä, Kronholm, and Alanen 1997). Perceived job insecurity also has been linked to depressive symptoms and physical health indicators that reflect the impact of stress (Burgard, Brand, and House 2009; Ferrie et al. 1995; Ferrie et al. 1998b), so a link be-

tween perceived job security and sleep quality is plausible.

We have found no prior studies that directly examine the association between being bothered or upset at work and sleep quality, though there are several that deal with it indirectly. A cross-sectional study of Australian nurses suggested that psychologically stressful experiences reflecting negative emotional load and poor relations with coworkers, as well as other psychological demands, were much more strongly related to poor sleep quality than the physical demands of nursing (Winwood and Lushington 2006). A longitudinal study of 47 U.S. men and women also found that daytime interpersonal conflict was associated with poor sleep quality that night (Brissette and Cohen 2002). Interpersonal conflict or negative emotional load could contribute to feeling bothered or upset at work, but without prior empirical evidence for the measure we use in this study, we rely on related theoretical and empirical findings about emotion in the workplace. Sociologists have examined how workers express emotions (Lively and Powell 2006) and face challenges in regulating their emotions in the workplace (Hochschild 1983), and how stressful emotional experiences at work may spill over into life at home, influencing family interactions (Menaghan 1991). These studies lead us to argue that being bothered or upset at work indicates a negative emotional experience linked to psychological stress that could influence sleep quality.

Importantly, unlike low control and perceived insecurity, feeling bothered or upset is an explicit measure of emotional reaction to conditions at work, rather than a measure of simply being exposed to specific working conditions. As such, it is a more direct measure of stress and arousal, because all workers who report it have necessarily appraised their conditions as threatening or disturbing. This means that being bothered or upset at work may have a stronger or more consistent relationship with sleep quality than reports of low control or perceived job insecurity, which may or may not be viewed as threatening by a given individual. On the other hand, underlying stable personality characteristics may more completely explain emotional reaction to working conditions, so our controls for those characteristics may explain any link with sleep quality, leaving no remaining association in longitudinal models. Based on prior theoretical and empirical research on stressful experiences in the workplace, our first research question asks:

*Question 1:* Are perceived low control, perceived job insecurity, and feeling bothered or upset at work prospectively associated with poor sleep quality?

### *Competing Stressful Experiences at Home*

For many adults, the remaining third of the day when they are not at work or asleep is filled by family and home experiences and responsibilities. Home life could provide competing stressful experiences that may be as important, or more important, than working conditions for sleep quality. After all, individuals who experience stress in interactions with a spouse or partner often share a bed with that person, which could make such experiences particularly salient for sleep quality. Additionally, time spent dealing with bills and financial issues or disciplining children may occur closer to bedtime than problems arising at work. However, there is very little literature that examines how these various realms of stressors intersect to influence sleep.

Individuals with a spouse or children may be more heavily influenced by home and family experiences than by experiences at work, compared to individuals who do not hold the competing roles of parent or spouse. For example, the stresses associated with having children in the home, particularly if they do not sleep consistently or are out late, could affect parents' sleep (Meltzer and Mindell 2007). Moreover, negative experiences in the workplace could influence the way individuals interact with their partners or children (Menaghan 1991), and this spillover could create interpersonal problems at home that more proximally influence sleep. In this study we examine how competing stressful experiences in the home sphere may overshadow or explain the association between negative experiences at work and sleep quality for working-aged individuals who have a spouse/partner or who live with their children, compared to the sample of working individuals overall.

Focusing on finances, a spouse or partner, and children as key sources of potential sleep-disrupting stress, we explore self-reports of relatively objective conditions as well as direct measures of emotional response to negative experiences, to parallel our measures of working conditions and experiences. For example, we assess the association between poor sleep qual-

ity and reported difficulty paying bills (a more objective measure) as well as dissatisfaction with finances (better reflecting the appraised threat of one's financial situation). Among individuals living with a spouse or partner, we examine the association between poor sleep quality and the degree of negative hassles from the spouse/partner, as well as feeling bothered or upset by one's marriage or relationship. Among those with children in the home, we examine the importance of feeling bothered or upset as a parent. We examine three exploratory research questions to assess negative experiences at home as competing risks for poor sleep quality, compared to those at work.

*Question 2:* Are financial, spousal/partner, and/or child-related negative experiences prospectively associated with poor sleep quality?

*Question 3:* Are financial, spousal, and/or child-related negative experiences more strongly associated with poor sleep quality than workplace experiences?

*Question 4:* Do financial, spousal, and/or child-related negative experiences explain the association between workplace experiences and poor sleep quality?

## DATA AND METHODS

### *Data*

We use the Americans' Changing Lives (ACL) study and focus on respondents working at least 20 hours per week at baseline. We limit the sample in this way because only those with at least 20 hours of work per week have data on low workplace control. This means that we study respondents whose exposure to negative working conditions is likely to be substantial, but when we re-estimated simpler models using all employed respondents (not shown), our conclusions did not change. The ACL is a stratified, multi-stage area probability sample of 3,617 non-institutionalized adults 25 years and older living in the United States in 1986, with oversampling of adults 60 and older and of African Americans. Follow-up interviews were conducted in 1989, 1994, and 2001/2002, but our analysis uses data from 1986 and 1989 because some necessary questions were omitted in later waves. Sample weights designed to adjust for oversampling of special populations and sample nonresponse or noncoverage at baseline, as well as loss to follow-up due to attrition or death, are used in all appropriate descriptive statistics and multivariate models. Excluding ACL respondents who did not work at least 20 hours per week in 1986 (N = 1,930), the vast majority of whom were already retired or not working for pay; those who were not present for the 1989 interview (N = 297); and cases missing on covariates (N = 60), 1,330 individuals are eligible for inclusion in analyses using information on working conditions in 1986. In most of the multivariate analyses, we focus on those who were working for pay for at least 20 hours per week in both 1986 and 1989 (N = 1,101). In some analyses we use subsamples of respondents who were married and working in 1986 (N = 869) or who were both married and working in both 1986 and 1989 (N = 670); and subsamples of those who were working and had children 18 years old or younger living in the home in 1986 (N = 596) and those who were working and had children in the home both in 1986 and 1989 (N = 435).

### *Measures*

*Sleep quality.* Poor sleep quality is typically measured in surveys with indicators of delayed, disrupted, or nonrestorative sleep. We measure poor sleep quality with a global item obtained from the Center for Epidemiologic Studies Depression Scale, or CES-D (Radloff 1977): "During the past week my sleep was restless: most of the time, some of the time, or hardly ever." We dichotomize the responses so that 0 = hardly ever and 1 = some or most of the time, focusing on respondents who reported troubled sleep for at least some meaningful fraction of the last week. Additionally, we collapsed "some" and "most" of the time because only a small percentage of respondents reported the response "most of the time" (about 10% in 1986 and 7% in 1989). This item was dichotomized similarly in a prior study of social factors and sleep quality (Kutner et al. 2004); results using an alternative coding are discussed below.[1]

*Working conditions.* Perceived low control is derived from three items based on Karasek's (1979) measure of decision latitude, including: "I get to do a variety of different things in my work," "I have a lot to say about what happens in my work," and "I have very little chance to decide how I do my work" (reverse-coded). Response categories are strongly agree = 1, agree somewhat = 2, disagree somewhat = 3, and strongly disagree = 4; we create a measure of low control by summing all items (ranging 3–12); these items have an alpha of .61. To

measure perceived job insecurity, respondents were asked the following question: "How likely is it that during the next couple of years you will involuntarily lose your main job—not at all likely = 1, not too likely = 2, somewhat likely = 3, or very likely = 4?" To capture negative emotional experiences at work we use a single item: "In general, how often do you feel bothered or upset in your work—almost always = 4, often = 3, sometimes = 2, rarely = 1, or never = 0?" For each working condition measure, we also created an indicator of change over follow-up by subtracting the value for 1986 from the value for 1989. A positive value on the change score means that the negative exposure worsened over time, while a negative value indicates that it lessened.

*Home conditions.* Measures of financial strain include reported difficulty paying bills (not difficult = 1, slightly difficult = 2, somewhat difficult = 3, very difficult = 4, extremely difficult = 5) and an indicator of dissatisfaction with the respondent's present financial situation (completely satisfied = 1, very satisfied = 2, somewhat satisfied = 3, not very satisfied = 4, not at all satisfied = 5). A negative hassles index referring to the respondent's spouse or live-in partner uses two items: (1) "How much do you feel (he/she) makes too many demands on you?" and (2) "How much is (he/she) critical of you or what you do?" Response categories for each were "a great deal, quite a bit, some, a little, or not at all," and reverse-coded values for the two items were averaged and the index standardized with a mean of 0 and a standard deviation of 1. The spouse/partner negative hassles index ranges from –1.3 to 2.9. To capture negative emotional experiences with family members, respondents were asked how often they felt bothered or upset (1) by their marriage/relationship or (2) as a parent, with response categories coded so that almost always = 4, often = 3, sometimes = 2, rarely = 1, and never = 0. Change scores were created for each of these measures of negative experiences at home by subtracting the 1986 value from the 1989 value, with positive values on the change measure indicating conditions that worsened over time.

*Other predictors.* To explore whether the association between working conditions and sleep quality is spurious, we adjust for neuroticism and health at baseline, as well as adjusting for prior poor sleep quality. Neuroticism is a relatively stable underlying personality trait that may mark a negative reporting style, and we use a neuroticism index based on four questions from the Eysenck Personality Inventory (Eysenck and Eysenck 1975), such as "Are you a worrier?" The standardized scale ranges from –1.2 to 2.2 (most neurotic). Self-rated health, a general indicator used to distinguish respondents who may have health conditions that influence their ability to sleep, is measured with a single item: "How would you rate your health at the present time— poor = 1, fair = 2, good = 3, very good = 4, and excellent = 5?" We also control for obesity, a risk factor for sleep apnea, which could negatively impact sleep quality. Using self-reported weight and height, obesity is coded so that 0 = body mass index less than 30, while 1 = body mass index 30 or above.

In multivariate analyses we also adjust for baseline sociodemographic characteristics that are predictive of sleep quality, working conditions, or both. Age is measured in years, and a squared term for age is included in multivariate models to adjust for nonlinearities in the association between age and sleep. Respondent's race is coded into a series of dichotomous indicator variables denoting whites, African Americans, and "other" race-ethnicity.[2] Sex is coded so that 0 = female and 1 = male; marital status is coded so that 0 = married or living with a partner and 1 = unmarried/not living with a partner; and parental status is coded so that respondents without children under 18 living with them = 0 and those with children = 1. Educational attainment at baseline is coded as 0 = some college or more and 1 = high school graduate or less. We also include a measure of household income, reported in Table 1 in 2008 dollars, but transformed for multivariate analysis by adding $500 before taking the log so that individuals with a score of zero on the measure are retained. Work hours at the main job are measured as average hours per week. Employment status in 1989 (0 = not employed, 1 = employed) is included in Table 1 to indicate the loss of respondents from the paid labor force between 1986 and 1989.

### *Analytic Strategy*

We first examine simple associations between negative experiences at work and home and poor sleep quality. We then estimate logistic regression models to explore the association between negative working conditions and sleep quality in 1986. Next, in longitudinal models,

**TABLE 1. Descriptive Statistics for Dependent and Independent Variables by Analytic Sample, ACL Respondents**

| | Working in 1986 | | Working in 1986 and 1989 | |
|---|---|---|---|---|
| | Mean/% | S.D. | Mean/% | S.D. |
| Poor sleep quality 1986 | 49.5% | | 49.0% | |
| Poor sleep quality 1989 | 48.1% | | 48.0% | |
| Perceived Low Control 1986 | 5.10 | (2.00) | 5.06 | (2.01) |
| Change 1986–1989 | — | | –.08 | (1.95) |
| Perceived Job Insecurity 1986 | 1.73 | (.859) | 1.73 | (.852) |
| Change 1986–1989 | — | | –.03 | (.967) |
| Bothered/Upset at Work 1986 | 1.62 | (.829) | 1.62 | (.812) |
| Change 1986–1989 | — | | .06 | (.950) |
| Difficult to Pay Bills 1986 | 1.93 | (1.012) | 1.93 | (.990) |
| Change 1986–1989 | — | | –.12 | (.973) |
| Dissatisfaction with Finances 1986 | 2.79 | (.993) | 2.79 | (.962) |
| Change 1986–1989 | — | | –.05 | (.963) |
| Spouse/Partner Negative Hassles 1986[a] | .05 | (.954) | .04 | (.949) |
| Change 1986–1989 | — | | .10 | (.869) |
| Bothered/Upset by Marriage/Relationship 1986[a] | 1.03 | (.819) | 1.02 | (.797) |
| Change 1986–1989 | — | | .02 | (.792) |
| Bothered/Upset as Parent 1986[b] | 1.80 | (.833) | 1.79 | (.834) |
| Change 1986–1989 | — | | –.06 | (.833) |
| Neuroticism Score 1986 | –.093 | (.947) | –.116 | (.933) |
| Self-rated Health 1986 | 4.01 | (.871) | 4.04 | (.846) |
| % Obese (BMI 30 or higher) 1986 | 13.5% | | 13.6% | |
| Age (years) 1986 | 40.5 | (11.3) | 39.6 | (10.4) |
| % Male | 56.4% | | 58.4% | |
| Race | | | | |
| % White | 85.1% | | 84.7% | |
| % African American | 9.7% | | 9.6% | |
| % Other | 5.2% | | 5.6% | |
| % Unmarried/No Partner 1986 | 22.9% | | 21.8% | |
| % Has Children under 18 years in 1986 | 52.6% | | 53.7% | |
| % High School or less Education 1986 | 45.8% | | 43.9% | |
| Household Income 1986 in 2007 dollars | 74,845 | (47,350) | 76,390 | (47,109) |
| Work Hours per Week 1986 | 44.0 | (11.7) | 44.7 | (11.7) |
| % Employed in 1989 | 91.9% | | 100.0% | |
| *N* | 1,330 | | 1,101 | |

*Note:* Figures are weighted using 1986 sampling weight, column totals unweighted.

[a] Reports about spouses only collected from those who are married; for those working in 1986 and married in 1986, $N = 869$; for those working in 1986 and 1989 and married in both years, $N = 670$.

[b] Reports about children only collected from those who have children; for those working in 1986 and with children under 18 years in 1986, $N = 596$; for those working in 1986 and 1989 and with children under 18 in both years, $N = 435$.

we consider the association between working conditions in 1986 and change in working conditions between 1986 and 1989 with changes in sleep quality between 1986 and 1989. Using a parallel set of models, we explore the competing risks of negative experiences at home for sleep quality in 1989. We use different subsamples to target respondents who were at risk of particular exposures; the importance of financial strain is examined for all respondents, while models that examine spousal/partner strain include only respondents who were married or lived with a partner at both waves, and those that examine child-related strain are restricted to respondents living with their children under age 18 at both waves. Attrition of respondents is always a concern when using longitudinal samples. All longitudinal models use wave two survey weights, which adjust for survey attrition, while cross-sectional figures use baseline sampling weights. All analyses are conducted using Stata 10SE software.

## RESULTS

### *Descriptive Results*

Table 1 presents means and standard deviations or percentages for all variables used in the analysis separately for the two main analytic samples described above. The first column presents characteristics for all respondents working at baseline, and the second column presents characteristics for the sample working in 1986 and 1989. Comparison across columns shows that sample means are very similar on most characteristics. Across samples, respondents were about 40 years old at baseline, on average, with a higher fraction of males than females in this sample of individuals working more than 20 hours per week (56–58%). Most are white, almost four out of five were married at baseline, and close to half had a high school education or less.

As shown in Table 1, about 49 percent of the respondents reported poor sleep quality at baseline in 1986, and about 48 percent did so in 1989. By comparison, a study of U.S. workers using data from the 2002–2003 National Employee Survey showed that about 58 percent reported at least some trouble falling asleep in the past month and about 56 percent reported at least some trouble staying asleep (Knudson et al. 2007), suggesting that our figures are reasonable. Turning to negative working conditions at baseline, respondents average a low control score of 5.1, close to the bottom of the possible range. The average response on perceived job insecurity is about 1.7, closer to "not too likely" than to "not at all likely," and the average score for being bothered or upset at work is 1.6, which is closer to "sometimes" than "rarely" on this measure. The average amount of change was very close to zero on all three working conditions, but tabulations not shown indicate that only about one-third of respondents had the same low control score in 1986 and 1989, while about half reported no change in job insecurity or being bothered or upset at work. About one-quarter to one-third of respondents showed improvement over this period, while the remainder reported worse working conditions.

Table 2 presents the percentages reporting poor sleep quality across categories of stressful experiences at work or at home. The first column shows the percentage of respondents reporting poor sleep quality in 1986 for each category of the exposure variables in 1986 (low control at work and spouse negative hassles are presented categorically here for ease of interpretation, but used as linear terms in multivariate models), while the second column shows the percentages reporting poor sleep quality in 1989. The *p*-values for chi-square tests of difference are presented for the low control and spousal hassles comparison groups, and for nonparametric tests of trend for comparisons across categories of the other measures. Results in Table 2 suggest that before adjusting for any individual characteristics, respondents reporting negative experiences at work or at home were significantly more likely to report poor sleep at all survey waves. The only exceptions were for the comparison of sleep quality in 1989 across categories of low control and spousal/partner hassles.

### *Multivariate Results*

Table 3 presents odds ratios and 95 percent confidence intervals from logistic regression models predicting poor sleep quality, with sample sizes and tests of model fit presented at the bottom of the table. Model 1 examines the association between low control and perceived job insecurity and poor sleep quality in 1986, adjusting only for age, age-squared, and sex. Model 2 adds the measure of feeling bothered/upset at work in 1986 to test whether this indicator of emotional response mediates the impact of the other working conditions, and model 3 adds controls for all other baseline

**TABLE 2. Percentage of Respondents Reporting Poor Sleep Quality in 1986 or 1989 by Categories of Stressful Work or Home Conditions, ACL Respondents Working in 1986**

| | % Poor Sleep Quality 1986 | % Poor Sleep Quality 1989 |
|---|---|---|
| Low Control 1986 | | |
| Control at or above median | 45.9% | 48.1% |
| Control below median | 55.0% | 48.2% |
| *p*-value for difference | .001 | .254 |
| Perceived Job Insecurity 1986 | | |
| Job loss not at all likely | 45.3% | 44.4% |
| Not too likely | 48.9% | 48.9% |
| Somewhat likely | 61.2% | 60.8% |
| Very likely | 65.0% | 44.3% |
| *p*-value for trend | < .001 | .002 |
| Bothered/Upset at Work 1986 | | |
| Never | 37.1% | 39.8% |
| Rarely | 40.2% | 41.7% |
| Sometimes | 55.6% | 51.4% |
| Often | 62.8% | 63.4% |
| Almost always | 77.0% | 61.8% |
| *p*-value for trend | < .001 | < .001 |
| How Difficult to Pay Bills 1986 | | |
| Not difficult | 47.1% | 44.0% |
| Slightly difficult | 48.9% | 47.9% |
| Somewhat difficult | 50.5% | 53.2% |
| Very difficult | 62.1% | 53.0% |
| Extremely difficult | 68.2% | 73.5% |
| *p*-value for trend | < .001 | < .001 |
| Dissatisfaction with Finances 1986 | | |
| Completely satisfied | 37.4% | 34.8% |
| Very satisfied | 44.9% | 42.8% |
| Somewhat satisfied | 50.6% | 50.5% |
| Not very satisfied | 56.9% | 49.2% |
| Not at all satisfied | 65.3% | 71.7% |
| *p*-value for trend | < .001 | < .001 |
| Spouse/Partner Negative Hassles 1986[a] | | |
| Hassles below median | 46.5% | 45.2% |
| Hassles at or above median | 51.4% | 51.3% |
| *p*-value for difference | .073 | .212 |
| Bothered/Upset by Marriage/Relationship 1986[a] | | |
| Never | 44.6% | 40.3% |
| Rarely | 46.3% | 48.9% |
| Sometimes | 57.7% | 52.8% |
| Often | 65.3% | 70.2% |
| Almost always | 60.8% | 68.0% |
| *p*-value for trend | .001 | < .001 |
| Bothered/Upset as Parent 1986[b] | | |
| Never | 37.1% | 33.3% |
| Rarely | 41.2% | 42.9% |
| Sometimes | 51.2% | 44.7% |
| Often | 59.3% | 52.0% |
| Almost always | 92.1% | 80.8% |
| *p*-value for trend | < .001 | .006 |

*Note: p*-values obtained from chi-square or nonparametric tests for trend across ordered categories.

[a] Only respondents who were married/living with a partner reported on that person.

[b] Only respondents with children under 18 years reported on them.

**TABLE 3. Odds Ratios and 95% Confidence Intervals from Logistic Regression Models of Poor Sleep Quality in 1986 or 1989, ACL respondents**

| | Model 1: Poor Sleep Quality 1986 | | Model 2: Poor Sleep Quality 1986 | | Model 3: Poor Sleep Quality 1986 | | Model 4: Poor Sleep Quality 1989 | | Model 5: Poor Sleep Quality 1989 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | O.R. | (95% C.I.) | O.R. | (95% C.I.) | O.R. | (95% C.I.) | O.R. | (95% C.I.) | O.R. | (95% C.I.) |
| Low Control | 1.07* | (1.008–1.127) | 1.05 | (.990–1.109) | 1.03 | (.968–1.094) | 1.01 | (.935–1.094) | .99 | (.917–1.077) |
| Change 1986–89 | — | | — | | — | | 1.05 | (.969–1.133) | 1.03 | (.952–1.116) |
| Job Insecurity | 1.29*** | (1.135–1.472) | 1.27*** | (1.110–1.445) | 1.21** | (1.051–1.385) | 1.11 | (.911–1.341) | 1.09 | (.895–1.322) |
| Change 1986–89 | — | | — | | — | | 1.04 | (.879–1.232) | 1.04 | (.873–1.228) |
| Bothered/Upset at Work | — | | 1.56*** | (1.359–1.796) | 1.40*** | (1.201–1.623) | — | | 1.35** | (1.089–1.676) |
| Change 1986–89 | — | | — | | — | | — | | 1.27** | (1.067–1.502) |
| Age (years) | .98 | (.920–1.054) | .98 | (.915–1.052) | .98 | (.906–1.056) | .89* | (.810–.979) | .88* | (.805–.972) |
| Age$^2$ (years) | 1.00 | (.999–1.001) | 1.00 | (.999–1.001) | 1.00 | (.999–1.001) | 1.00* | (1.000–1.002) | 1.00* | (1.000–1.002) |
| Male | .95 | (.763–1.183) | .92 | (.740–1.156) | .98 | (.773–1.255) | 1.03 | (.783–1.354) | 1.01 | (.768–1.332) |
| African American | — | | — | | .98 | (.662–1.453) | 1.30 | (.843–2.019) | 1.33 | (.855–2.058) |
| Other Race | — | | — | | 1.88* | (1.104–3.211) | 1.36 | (.805–2.293) | 1.38 | (.813–2.338) |
| Unmarried/No Partner | — | | — | | .98 | (.713–1.344) | .80 | (.560–1.152) | .81 | (.562–1.158) |
| Has children < 18 in home | — | | — | | .96 | (.733–1.251) | .59** | (.439–.800) | .62** | (.456–.835) |
| High School or less | — | | — | | 1.32* | (1.029–1.698) | .79 | (.592–1.042) | .83 | (.621–1.100) |
| Household Income | — | | — | | .97 | (.796–1.190) | 1.08 | (.860–1.360) | 1.06 | (.845–1.339) |
| Hours/Week | — | | — | | 1.00 | (.993–1.014) | .99 | (.981–1.005) | .99 | (.980–1.004) |
| Neuroticism Score | — | | — | | 1.45*** | (1.269–1.660) | 1.40*** | (1.210–1.624) | 1.33*** | (1.138–1.553) |
| Self-rated Health | — | | — | | .74*** | (.645–.856) | .85* | (.723–.992) | .85* | (.721–.991) |
| Obese | — | | — | | 1.44* | (1.027–2.032) | .88 | (.603–1.293) | .90 | (.617–1.323) |
| Poor Sleep 1986 | — | | — | | — | | 3.03*** | (2.332–3.949) | 2.89*** | (2.212–3.774) |
| *N* | 1,330 | | 1,330 | | 1,330 | | 1,101 | | 1,101 | |
| LR Chi$^2$ | 25.3*** | | 66.6*** | | 151.9*** | | 153.7*** | | 163.1*** | |

*Note:* *** $p < .001$; ** $p < .01$; * $p < .05$.

predictors. Taken together, the cross-sectional models 1 through 3 suggest that perceived job insecurity and feeling bothered or upset at work are most strongly linked to poor sleep quality at baseline, and that feeling bothered/upset may mediate a limited amount of the impact of low control and job insecurity.

Turning to longitudinal models that examine change in sleep quality, model 4 examines the impact of 1986 low control and job insecurity, and change in these working conditions between 1986 and 1989 on poor sleep quality in 1989, controlling for all predictors used in model 3 and adding a measure of poor sleep quality in 1986. Model 5 adds measures of feeling bothered/upset at work in 1986 and change between 1986 and 1989 in feeling bothered/upset. The results for models 4 and 5 show that only being bothered or upset at work in 1986 (OR = 1.35) and increases in being bothered or upset by 1989 (OR = 1.27) are independently associated with subsequent poor sleep quality, net of sleep quality in 1986.

Table 4 presents models that assess the associations between negative experiences at work and poor quality sleep when competing stressful experiences at home are added. The top panel presents results with controls for financial stress, the middle panel considers spousal/partner-related stress, and the bottom panel considers the stress of parenting. Model 1 for each panel considers cross-sectional relationships and includes all predictors from model 3 in Table 3, though we present only the focal odds ratios. Models 2 and 3 for each panel consider models of change in sleep quality. Model 2 adds baseline and change values of more "objective" indicators of working conditions (low control and job insecurity), financial strain (difficulty paying bills), or spousal/partner stress (negative hassles), while model 3 adds indicators of emotional responses to work (bothered/upset at work), finances (dissatisfaction with finances), spouse/partner (bothered/upset with spouse/partner), and children (bothered/upset as a parent).

Results presented in Table 4 show that while dissatisfaction with finances in 1986 (OR = 1.40) and an increase in dissatisfaction between 1986 and 1989 (OR = 1.29) are independently and significantly associated with poor sleep quality in 1989 (model 3, panel 1), these and the other additional predictors do not substantially alter the main findings from Table 3. Being bothered/upset at work is still prospectively associated with change toward poorer sleep quality in all models except model 3 in panel 3. In that model for ACL respondents living with children under 18 years in both 1986 and 1989, perceived job insecurity in 1986 is significantly associated with changes in sleep quality (OR = 1.49), while being bothered or upset at work in 1986 is no longer a significant predictor, though an increase in feeling bothered or upset at work remains a significant predictor (OR = 1.38). Being bothered or upset as a parent is not associated with sleep quality in panel 3, so the differences in the results observed among those living with their children compared to the sample overall are probably partially due to the reduction in sample size and to factors not measured here.

### *Sensitivity Analyses*

Given the exploratory nature of our study, we conducted additional analyses to verify the robustness of our results; all are available on request. First, our classification of poor sleep quality may be too generous because we include respondents who report "sometimes" experiencing troubled sleep. In models not shown here we re-estimated the models in Table 3 using an indicator that distinguished those respondents reporting troubled sleep "most of the time" (coded 1; about 10% in 1986, about 7% in 1989) from all others (coded 0). The associations between feeling bothered or upset at work and poor sleep quality in 1986 and 1989 were very similar to those reported in Table 3, though change in feeling bothered/upset at work between 1986 and 1989 was no longer significantly associated with worsening sleep quality over follow-up. With this more conservative coding of poor sleep quality, low control, and perceived job insecurity were never significant predictors. We also explored the ways that selection on measured or unmeasured characteristics may influence our results. To further clarify the temporal ordering of events and address concerns about selection, we predicted change in sleep quality between 1989 and 1994 as a function of 1986 working characteristics and changes in these working characteristics between 1986 and 1989. Results were substantively identical to those presented in Table 3.

Because work and home roles are strongly gendered in the United States, and thus could affect sleep differently for men and women, we

**TABLE 4. Odds Ratios and 95% Confidence Intervals from Logistic Regression Models of Poor Sleep Quality in 1986 or 1989 with Adjustment for Other Stressors, ACL respondents Working in 1986 (Model 1) or in 1986 and 1989 (Models 2 and 3)**

| | *Financial Stress* | | | | | |
|---|---|---|---|---|---|---|
| | M 1: Poor Sleep 1986 | | M 2: Poor Sleep 1989 | | M 3: Poor Sleep 1989 | |
| | O.R. | (95% C.I.) | O.R. | (95% C.I.) | O.R. | (95% C.I.) |
| Low Control | 1.02 | (.959–1.085) | 1.00 | (.928–1.088) | .98 | (.907–1.067) |
| Change 1986–89 | — | | 1.04 | (.965–1.130) | 1.03 | (.948–1.116) |
| Job Insecurity | 1.19* | (1.037–1.368) | 1.09 | (.893–1.319) | 1.05 | (.858–1.276) |
| Change 1986–89 | — | | 1.03 | (.869–1.221) | 1.01 | (.850–1.199) |
| Bothered/Upset at Work | 1.39*** | (1.194–1.614) | — | | 1.30* | (1.044–1.614) |
| Change 1986–89 | — | | — | | 1.22* | (1.029–1.457) |
| Difficult to Pay Bills | .90 | (.776–1.035) | 1.17 | (.992–1.387) | 1.00 | (.822–1.224) |
| Change 1986–89 | — | | 1.15 | (.982–1.344) | 1.01 | (.851–1.210) |
| Dissatisfaction with Finances | 1.24** | (1.069–1.431) | — | | 1.40** | (1.126–1.750) |
| Change 1986–89 | — | | — | | 1.29** | (1.067–1.556) |
| *N* | 1,330 | | 1,101 | | 1,101 | |
| LR Chi$^2$ | 160.1*** | | 158.0*** | | 177.6*** | |
| | *Spousal/Partner Stress* | | | | | |
| | M 1: Poor Sleep 1986 | | M 2: Poor Sleep 1989 | | M 3: Poor Sleep 1989 | |
| | O.R. | (95% C.I.) | O.R. | (95% C.I.) | O.R. | (95% C.I.) |
| Low Control | 1.02 | (.939–1.098) | 1.03 | (.930–1.146) | 1.00 | (.901–1.116) |
| Change 1986–89 | — | | 1.04 | (.942–1.154) | 1.02 | (.920–1.135) |
| Job Insecurity | 1.21* | (1.012–1.442) | 1.07 | (.831–1.381) | 1.07 | (.822–1.383) |
| Change 1986–89 | — | | .95 | (.765–1.176) | .96 | (.773–1.197) |
| Bothered/Upset at Work | 1.43** | (1.174–1.732) | — | | 1.42* | (1.063–1.896) |
| Change 1986–89 | — | | — | | 1.38** | (1.093–1.742) |
| Spouse/Partner Negative Hassles | .92 | (.786–1.087) | 1.16 | (.947–1.433) | 1.10 | (.877–1.383) |
| Change 1986–89 | — | | 1.21 | (.968–1.503) | 1.12 | (.891–1.419) |
| Bothered/Upset by Marriage/ Relationship | 1.17 | (.964–1.427) | — | | 1.14 | (.859–1.503) |
| Change 1986–89 | — | — | — | | 1.28 | (.986–1.657) |
| *N* | 869 | | 670 | | 670 | |
| LR Chi$^2$ | 117.2*** | | 98.7*** | | 110.1*** | |
| | *Parenting Stress* | | | | | |
| | M 1: Poor Sleep 1986 | | M 2: Poor Sleep 1989 | | M 3: Poor Sleep 1989 | |
| | O.R. | (95% C.I.) | O.R. | (95% C.I.) | O.R. | (95% C.I.) |
| Low Control | 1.04 | (.939–1.143) | — | | 1.12 | (.971–1.281) |
| Change 1986–89 | — | | — | | 1.12 | (.985–1.280) |
| Job Insecurity | 1.23 | (.980–1.533) | — | | 1.49* | (1.055–2.112) |
| Change 1986–89 | — | | — | | 1.12 | (.830–1.500) |
| Bothered/Upset at Work | 1.29* | (1.016–1.645) | — | | 1.10 | (.738–1.645) |
| Change 1986–89 | — | | — | | 1.38* | (1.020–1.878) |
| Bothered/Upset as Parent | 1.20 | (.952–1.519) | — | | 1.08 | (.766–1.530) |
| Change 1986–89 | — | | — | | 1.19 | (.856–1.643) |
| *N* | 596 | | — | | 435 | |
| LR Chi$^2$ | 112.6*** | | — | | 92.7*** | |

*Note:* *** $p < .001$; ** $p < .01$; * $p < .05$; † $p < .10$. Model 1 adjusts for all covariates included in Model 3, Table 3; Models 2 and 3 adjust for all covariates included in Model 5, Table 3.

also re-estimated all the models presented in Tables 3 and 4 with interactions by respondent's sex. While the association between feeling bothered/upset at work and poor sleep quality is stronger for men in cross-sectional models, there are not significant differences by sex in the association between working conditions and sleep quality in longitudinal models. Moreover, there is little indication that the associations between spousal/partner or parental stressors and sleep quality varies substantially by sex, though our sample sizes are not optimal

for testing these interactions and these findings should be verified in future research.

We also tested potential confounders of the associations shown here. First, pre-existing depression could influence respondents' reports of their working conditions and sleep quality, or, alternatively, repeated exposures to work role-related stressors could increase depressive symptoms that account for sleep difficulties (Link et al. 1993).[3] While we already control for neuroticism, a characteristic strongly associated with depressive symptoms, we also re-estimated our models after eliminating respondents in the top fourth of depressive symptoms at baseline. The results were substantively identical to those presented here. Second, we examined other relevant health behaviors including measures of smoking status, alcohol use, and an index of physical activity. Measures of these behaviors in 1986 and of changes in behaviors between 1986 and 1989 were not associated with sleep quality, and did not change the results of the main analysis. Finally, negative experiences at work may make it difficult for individuals to get enough sleep, thereby leading them to report negatively about both work and sleep quality. However, the magnitude of the correlation between sleep duration and quality measures is –.2 or less among ACL respondents. Sleep duration in 1986 is negatively associated with poor sleep quality in 1986, but it is not a significant predictor in longitudinal models and did not change the associations between working conditions and sleep quality.

## DISCUSSION

For past generations of workers, the strain of physical effort on the job tended to push them toward physical fatigue and restorative sleep, but emerging research shows that common psychosocial stressors at work seem to exert the opposite effect, making it more difficult for individuals to achieve restful sleep (Linton 2004; Ota et al. 2005; Winwood and Lushington 2006). Most of the prior evidence, however, is based on cross-sectional data or samples of workers who have unusually difficult work conditions (such as rotating shift work). Instead, we prospectively examine the way that common negative experiences in the U.S. workplace may "follow workers home" and impinge on sleep quality.

We explored four research questions. First, we asked whether perceived low control, perceived job insecurity, or being bothered or upset at work are prospectively associated with poor sleep quality. Second, we asked if financial, spousal/partner, or child-related negative experiences are independently associated with subsequent poor sleep quality. Our third and fourth research questions asked if negative experiences at home were stronger predictors than negative experiences at work, and if they explained the impact of workplace experiences on sleep quality. The results showed mixed support for our first hypothesis, some support for the second, and little support for the remaining two; below, we discuss each in turn. Most centrally, our results show that being bothered or upset frequently at work predicts changes toward poorer sleep quality, an association robust to multiple alternative specifications. By contrast, perceived low control was not significantly associated with change in sleep quality in longitudinal models, while there was limited and inconsistent evidence that job insecurity is associated with poorer sleep quality.

Why does being bothered or upset at work show the most robust prospective association with poor sleep quality when compared to the other measures of stressful experiences at work that we explored here? One possibility is that low control and job insecurity as measured here reflect individuals' perceptions of their objective working conditions, but do not necessarily capture their appraisal of how threatening or disturbing these conditions may be. While perceived job control or job insecurity may lead to a negative stress response for some workers, being bothered or upset at work is a direct measure of emotional response. Moreover, frequently being bothered or upset may indicate that an individual has to take direct action to remediate the bothersome or upsetting experiences, while direct action is not required by the other working conditions examined here. To better understand this new finding, future research could more carefully explore what kinds of negative experiences lead workers to report being bothered or upset at work. The sociological literature on emotions in the workplace suggests that power and status differentials in the workplace (Lively and Powell 2006; Lovaglia and Houser 1996), and the difficulties of managing emotions, particularly for those working in the service economy (Hochschild 1983), would be fertile directions to explore.

Among the indicators of negative experiences at home studied here, we found that only dissatisfaction with one's financial situation had a significant independent association with subsequent poor sleep quality in 1989, an association suggested by prior studies (Steptoe et al. 2008). Additionally, the magnitude of the associations showed that negative experiences at home are not more strongly associated with sleep quality than workplace experiences, and do not explain the impact of negative emotional experiences at work. Moreover, by including multiple measures of feeling bothered or upset (i.e., at work, with one's marriage/relationship, as a parent) we show that feeling bothered or upset at work does not simply reflect a general reporting tendency, but appears to have a domain-specific association with sleep quality. The only subsample that showed distinct patterns was workers living with children under 18 years of age, and this group deserves further study with larger samples. However, we may not have adequately specified stressful experiences associated with the spousal/partner or parental roles; other measures and mechanisms should be proposed and explored in future work. Additionally, these findings should be interpreted in light of the analytic sample used: All respondents were working at least 20 hours per week at baseline and at follow-up, and findings may vary for persons with greater care-giving responsibilities that limit their participation in paid work, for example.

Several other limitations should be considered when assessing these results. First, the measure of poor sleep quality used here is based on a single item drawn from a scale of depression items; a more detailed set of questions designed specifically to measure disturbed sleep or insomnia symptoms could more accurately reveal the association between working conditions and sleep quality, but surveys that include higher quality measures, such as the Pittsburgh Sleep Quality Index (Buysse et al. 1989), generally do not observe nationally-representative samples of U.S. workers or follow workers over time. Compared to survey-based measures, laboratory polysomnography is the gold standard for measuring sleep disturbance, but it is typically not applied to large population-based samples. Fortunately, self-reports have been found to provide reasonable estimates of sleep quality (Karacan et al. 1976).

Second, the ACL data capture job quality and experiences from the late 1980s, and the world of work has changed in the interim. As perceived job security has declined further in declining industries, such as manufacturing, and even in the growing service sector, the importance of this stressor for sleep quality may have grown, and associations with insecurity and job control should be explored using more recent data. Our results suggest that emotional responses to experiences at work may be most salient for sleep quality, however, so it is not clear how changes in more objective working conditions since the late 1980s may have affected the nature or prevalence of these emotional experiences. In future studies, other working conditions deserve attention, as do more direct measures of their appraised threat to the individual. For example, we have no measure of shift work in our study, though it has been shown to strongly influence sleep patterns in other research. Larger samples of workers and additional waves of survey data also would be helpful for isolating associations within subgroups and more carefully investigating the temporal ordering of changes in exposures and outcomes.

Despite these limitations, the ACL sample provides the best data currently available to gain insight into the links between stressful working conditions and poor sleep quality among U.S. workers. Our conclusions are strengthened by our access to longitudinal data on workers from across the occupational spectrum, and results are consistent across multiple alternative specifications. Controls for neuroticism and baseline health in our longitudinal models mean that our findings are not likely unduly affected by negative reporting styles or selection into particular jobs on the basis of health. Future research is needed, however, to substantiate these results and further explore the factors that could buffer workers from these negative conditions or interventions that could break the link between conditions in the workplace and maintenance of healthy sleep patterns.

## NOTES

1. Supporting the validity of this measure of sleep quality, we found significant associations between this CES-D item for restless sleep and other, more detailed items, specifically designed to measure sleep quality in the Chicago Community Adult Health

Study in 2001 (Morenoff et al. 2007) and in the NLSY 79 cohort (among 40 to 50 year olds) in 1998–2006. Future studies would benefit from more detailed measures of sleep quality to verify our results.

2. The racial-ethnic backgrounds of ACL respondents reflects the population composition of the United States in 1986 when the fraction of groups other than non-Hispanic whites and blacks was smaller than it is today. The indicator for "other" race-ethnicity includes the small number of Hispanic, Asian, and other respondents.
3. The reciprocal associations between depression and poor sleep quality have been noted in the biomedical and psychological literatures, and the relationship may be self-reinforcing. For example, if workers with low control develop depressive symptoms that make it more difficult to achieve high quality sleep, they may come to work fatigued and subsequently have more difficulty on the job, reinforcing their depressive symptoms and creating a vicious cycle leading to longer-term insomnia (Espie 2002).

## REFERENCES


Akerstedt, T. 2003. "Shift Work and Disturbed Sleep/Wakefulness." *Occupational Medicine* 53:89–94.

Arber, S., J. Hislop, M. Bote, and R. Meadows. 2007. "Gender Roles and Women's Sleep in Mid and Later Life: A Quantitative Approach." *Sociological Research Online* 12. Retreived July 14, 2008 (http://www.socresonline.org.uk/index.html).

Brief, A. P., M. J. Burke, J. M. George, B. S. Robinson, and J. Webster. 1988. "Should Negative Affectivity Remain an Unmeasured Variable in the Study of Job Stress?" *Journal of Applied Psychology* 71:193–98.

Brissette, I. and S. Cohen. 2002. "The Contribution of Individual Differences in Hostility to the Associations between Daily Interpersonal Conflict, Affect, and Sleep." *Personality and Social Psychology Bulletin* 28:1265–74.

Burgard, Sarah A., Jennie E. Brand, and James S. House. 2009. "Perceived Job Insecurity and Worker Health in the United States." *Social Science and Medicine* 69(5):777–785.

Buysse, D. J., C. F. Reynolds, T. H. Monk, S.R. Berman, and D.J. Kupfer. 1989. "The Pittsburgh Sleep Quality Index: A New Instrument for Psychiatric Practice and Research." *Psychiatry Research* 28:193–213.

Colten, Harvey R. and Harvey R. Altevogt. 2006. *Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem.* Washington, DC: The National Academies Press.

Espie, Colin A. 2002. "INSOMNIA: Conceptual Issues in the Development, Persistence, and Treatment of Sleep Disorder in Adults." *Annual Review of Psychology* 53:215–43.

Eysenck, H. J. and S. B. G. Eysenck. 1975. *The Eysenck Personality Questionnaire.* London: Hodder & Stoughton.

Ferrie, Jane E., Martin J. Shipley, Francesco P. Cappuccio, Eric Brunner, Michelle A. Miller, Meena Kumari, and Michael G. Marmot. 2007. "A Prospective Study of Change in Sleep Duration; Associations with Mortality in the Whitehall II Cohort." *Sleep* 30: 1659–1666.

Ferrie, Jane Elizabeth, Martin John Shipley, Michael Gideon Marmot, Stephen Alfred Stansfeld, and George Davey Smith. 1995. "Health Effects of Anticipation of Job Change and Nonemployment: Longitudinal Data from the Whitehall II Study." *British Medical Journal* 311: 1264–69.

———. 1998a. "The Health Effects of Major Organizational Change and Job Insecurity." *Social Science and Medicine* 46:243–54.

———. 1998b. "An Uncertain Future: The Health Effects of Threats to Employment Security in White-Collar Men and Women." *American Journal of Public Health* 88:1030–36.

Heaney, Catherine A., Barbara A. Israel, and James S. House. 1994. "Chronic Job Insecurity among Automobile Workers: Effects on Job Satisfaction and Health." *Social Science and Medicine* 38:1431–37.

Henry, Doug, Dana McClellen, Leon Rosenthal, David Dedrick, and Melissa Gosdin. 2008. "Is Sleep Really for Sissies? Understanding the Role of Work in Insomnia in the US." *Social Science and Medicine* 66:715–26.

Hochschild, Arlie. 1983. *The Managed Heart.* Berkeley: University of California Press.

Hochschild, Arlie and Anne Machung. [1989] 2003. *The Second Shift: Working Parents and the Revolution at Home.* New York: Penguin Books.

House, James S. 1987. "Chronic Stress and Chronic Disease in Life and Work: Conceptual and Methodological Issues." *Work and Stress* 1:129–34.

———. 2002. "Understanding Social Factors and Inequalities in Health: 20th Century Progress and 21st Century Prospects." *Journal of Health and Social Behavior* 43:125–42.

Hyyppä, Markku T., Erkki Kronholm, and Erkki Alanen. 1997. "Quality of Sleep during Economic Recession in Finland: A Longitudinal Cohort Study." *Social Science and Medicine* 45:731–38.

Joelson, L. and L. Wahlquist. 1987. "The Psychological Meaning of Job Insecurity and Job Loss: Results of a Longitudinal Study." *Social Science and Medicine* 25:179–82.

Kalimo, Raija, Leena Tenkanen, Mikko Harma, Esko Poppius, and Pertti Heinsalmi. 2000. "Job Stress and Sleep Disorders: Findings from the Helsinki Heart Study." *Stress Medicine* 16:65–75.

Karacan, Ismet, John I. Thornby, Michael Anch, Charles E. Holzer, George J. Warheit, John J. Schwab, and Robert L. Williams. 1976. "Prevalence of Sleep Disturbance in a Primarily Urban Florida County." *Social Science and Medicine* 10:239–44.

Karasek, R. A. 1979. "Job Demands, Job Control, and Mental Strain: Implications for Job Redesign." *Administrative Science Quarterly* 24:285–308.

Knudson, Hannah K., Lori J. Ducharme, and Paul M. Roman. 2007. "Job Stress and Poor Sleep Quality: Data from an American Sample of Full-Time Workers." *Social Science and Medicine* 64:1997–2007.

Kohn, Melvin L. and Carmi Schooler. 1982. "Job Conditions and Personality: A Longitudinal Assessment of their Reciprocal Effects." *American Journal of Sociology* 87:1257–86.

———. 1983. *Work and Personality: An Inquiry in the Impact of Social Stratification.* Norwood, NJ: Ablex Publishing.

Kutner, Nancy G., Donald L. Bliwise, and Rebecca Zhang. 2004. "Linking Race and Well-Being within a Biopsychosocial Framework: Variation in Subjective Sleep Quality in Two Racially Diverse Older Adult Samples." *Journal of Health and Social Behavior* 45:99–113.

Lamberg, Lynne. 2004. "Promoting Adequate Sleep Finds a Place on the Public Health Agenda." *Journal of the American Medical Association* 291: 2415–17.

Lennon, Mary Clare. 1994. "Women, Work, and Well-Being: The Importance of Work Conditions." *Journal of Health and Social Behavior* 35:235–47.

Link, Bruce G., M. C. Lennon, and B. P. Dohrenwend. 1993. "Socioeconomic Status and Depression: The Role of Occupations Involving Direction, Control, and Planning." *American Journal of Sociology* 98:1351–87.

Linton, Steven J. 2004. "Does Work Stress Predict Insomnia? A Prospective Study." *British Journal of Health Psychology* 9:127–36.

Lively, Kathryn J. and Brian Powell. 2006. "Emotional Expression at Work and at Home: Domain, Status, or Individual Characteristics?" *Social Psychology Quarterly* 69:17–38.

Lovaglia, Michael J. and Jeffrey A. Houser. 1996. "Emotional Reactions to Status in Groups." *American Sociological Review* 61:867–83.

Mattiasson, I., F. Lindgarde, J. A. Nilsson, and T. Theorell. 1990. "Threat of Unemployment and Cardiovascular Risk Factors: Longitudinal Study of Quality of Sleep and Serum Cholesterol Concentrations in Men Threatened with Redundancy." *British Medical Journal* 301:461–66.

Meltzer, L. J. and J. A. Mindell. 2007. "Relationship between Child Sleep Disturbances and Maternal Sleep, Mood, and Parenting Stress: A Pilot Study." *Journal of Family Psychology* 21:67–73.

Menaghan, Elizabeth A. 1991. "Work Experience and Family Interaction Processes: The Long Reach of the Job?" *Annual Review of Sociology* 17:419–44.

Mirowsky, John and Catherine E. Ross. 2007. "Creative Work and Health." *Journal of Health and Social Behavior* 48:385–403.

Moore, Philip J., Nancy E. Adler, David R. Williams, and James S. Jackson. 2002. "Socioeconomic Status and Health: The Role of Sleep." *Psychosomatic Medicine* 64:337–44.

Morenoff, Jeffrey D., James S. House, Ben B. Hansen, David R. Williams, George A. Kaplan, and Haslyn E. Hunte. 2007. "Understanding Social Disparities in Hypertension Prevalence, Awareness, Treatment, and Control: The Role of Neighborhood Context." *Social Science and Medicine* 65:1853–66.

Morin, Charles M., Sylvie Rodrigue, and Hans Ivers. 2003. "Role of Stress, Arousal, and Coping Skills in Primary Insomnia." *Psychosomatic Medicine* 65:259–67.

National Highway Traffic Safety Administration. 2006. "The Impact of Driver Inattention on Near-Crash/Crash Risk." Washington, DC: U.S. Department of Transportation.

Ota, Atsuhiko, Takeshi Masue, Nobufumi Yasuda, Akizumi Tsutsumi, Yoshio Mino, and Hiroshi Ohara. 2005. "Association between Psychosocial Job Characteristics and Insomnia: An Investigation Using Two Relevant Job Stress Models—The Demand-Control-Support (DCS) Model and the Effort-Reward Imbalance (ERI) Model." *Sleep Medicine* 6:353–58.

Pavalko, Eliza, Fang Gong, and J. Scott Long. 2007. "Women's Work, Cohort Change, and Health." *Journal of Health and Social Behavior* 48:352–68.

Pearlin, Leonard I., Elizabeth G. Menaghan, A. Lieberman Morton, and Joseph T. Mullan. 1981. "The Stress Process." *Journal of Health and Social Behavior* 22:337–56.

Radloff, Lenore S. 1977. "The CES-D Scale: A Self-Report Depression Scale for Research in the General Population." *Applied Psychological Measurement* 1:385–401.

Ribet, C. and F. Derriennic. 1999. "Age, Working Conditions, and Sleep Disorders: A Longitudinal Analysis in the French Cohort ESTEV." *Sleep* 22:491–504.

Sekine, M., T. Chandola, P. Martikainen, M. Marmot, and S. Kagamimori. 2006. "Work and Family Characteristics as Determinants of Socioeconomic and Sex Inequalities in Sleep: The Japanese Civil Servants Study." *Sleep* 29:206–16.

Steptoe, A., K. O'Donnell, M. Marmot, and J. Wardle. 2008. "Positive Affect, Psychological Well-Being, and Good Sleep." *Journal of Psychosomatic Research* 64:409–15.

Tasali, E., R. Leproul, D. A. Ehrmann, and E. Van Cauter. 2008. "Slow-Wave Sleep and the Risk of Type 2 Diabetes in Humans." *Proceedings of the National Academy of Sciences of the United States of America* 105:1044–49.

Winwood, Peter C. and Kurt Lushington. 2006. "Disentangling the Effects of Psychological and Physical Work Demands on Sleep, Recovery and Maladaptive Chronic Stress Outcomes within a Large Sample of Australian Nurses." *Journal of Advanced Nursing* 56:679–89.

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