Family Relationships and Troubled Sleep among U.S. Adults: Examining the Influences of Contact Frequency and Relationship Quality*

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Abstract

Sleep is essential for health and daily functioning, and social relationships may be a key social factor influencing sleep, yet sleep has been understudied in the literature on social relationships and health. This study used data from the National Survey of Midlife Development in the United States to examine associations between troubled sleep and family contact, social support, and strain. Results show that having strained family relationships is associated with more troubled sleep, while supportive family relationships are associated with less troubled sleep. Family strain is more consequential for sleep than support and sleep troubles are greatest when family relationships are highly strained and provide inadequate emotional support. Family strain is also more harmful to sleep among individuals who are in frequent contact with family members. These findings underscore the importance of focusing on both negative and positive aspects of relationships and highlight the significance of family relationships for sleep.

INTRODUCTION

The importance of sleep for individual health and well-being cannot be overstated. Adequate sleep is essential for daily functioning, optimal physical and mental health, and longevity (Cappuccio et al. 2009; Dinges 1989; Knutson et al. 2006; Mallon, Broman, and Hetta 2002; Phillips and Mannino 2007; Schwartz et al. 1998). Over 50 million Americans suffer from chronic sleep problems (National Center on Sleep Disorders Research 2003) and, according to data from the National Sleep Foundation's Sleep in American Polls, there has been an upward trend in the prevalence of reported sleep problems since 1999, when their first poll was conducted (NSF 2005).

The growing magnitude of sleep problems in the U.S. has stimulated interest in identifying the causes of poor sleep. Most sleep research has focused on individual biomedical or psychological risk factors for poor sleep (Espie 2002). However, a growing area of research suggests that social factors also shape sleep (Patel 2007) and social relationships in particular may be key to getting a good night's sleep (Cacioppo et al. 2002). Although sociological theory and research highlight the importance of family relationships for shaping health behaviors (Umberson, Crosnoe, and Reczek 2010), and the nascent sociological literature on sleep suggests that gendered responsibilities in families influence sleep (Burgard 2011; Hislop and Arber 2003; Maume et al. 2008, 2010; Venn et al. 2008), little is

known about how family relationships matter for sleep. The few existing sociological studies of sleep in the context of the family have largely focused on how characteristics of spousal relationships and caregiving for children influence sleep. Other family relationships, such as those with parents and siblings, and the importance of the quality of relationships with family members have yet to be studied in relation to sleep.

To address this gap in the literature, the current study focuses on how family contact and relationship quality relate to self-reported sleep problems among U.S. adults. Rather than focus on spousal/partner relationships and relationships with children living in the household, as in previous research, we use a broader definition of family that encompasses relationships with other family members (e.g., parents, siblings, and both young and grown children). Drawing on the theoretical and empirical literature on social relationships and health, we develop expectations for how families influence sleep and examine the role of three key aspects of family relationships: frequency of contact, perceived emotional support, and perceived strain. Identifying how multiple aspects of family relationships influence sleep may help us better understand the role of social relationships in shaping an essential health behavior.

BACKGROUND

Prior Research on Social Relationships and Sleep

Although seminal work on the health benefits of social relationships included sleep among the key behaviors relevant for health promotion (Berkman and Breslow 1983), sleep has since been relatively understudied in the literature on social relationships and health. There are, however, several recent studies of social factors related to sleep that highlight the importance of family relationship structure for sleep duration and quality.

Prior research indicates that marital status and the presence of children in the home are associated with sleep. Several studies of U.S. adults have found that unmarried men and women are more likely to report insufficient and poor quality sleep (Grandner et al. 2010; Hale 2005; Krueger and Friedman 2009). The significance of parental status for sleep is less clear. Some studies have found that having children in the household is associated with longer and better quality sleep (Lauderdale et al. 2006; Troxel et al. 2009), whereas other studies have shown that parents of young children tend to sleep less and experience more sleep interruptions (Burgard 2011; Krueger and Friedman 2009). These studies suggest that relationships with spouses and household children are important for sleep, but do not address whether the amount of contact with other close family members, such as parents, siblings or adult children, may also matter for sleep. These other types of family relationships may represent the closest social relationships available to unmarried individuals or those who do not have children living at home.

In addition to lacking a focus on the broader family context, previous studies offer only limited insight into the importance of qualitative aspects of relationships for sleep. Studies of marital quality and sleep have found associations between being happy and satisfied in one's marriage and reporting less frequent sleep problems (Prigerson et al. 1999; Troxel et al. 2009). In addition, prior research has found that older adults who characterized their significant social relationships positively (e.g., warm, trusting, and satisfying) also reported having better sleep (Friedman et al. 2005). However, a study of married women at mid-life found no association between sleep quality and having relationships with others who provide companionship and support (Troxel et al. 2009). The measure of relationship quality in that study pertained to any social relationships and therefore did not necessarily capture family relationship quality. With the exception of these scattered studies, there is a dearth of

research specifically examining links between sleep and the quality of family relationships, particularly those with non-spousal family members.

Another shortcoming of existing research on social relationship quality and sleep is the exclusive focus on positive aspects of relationships. This is an oversight because in addition to providing support, social relationships can also be a source of conflict and demands. Both social support and strain are considered key mechanisms through which social relationships influence health behaviors (Umberson, Crosnoe, and Reczek 2010). Moreover, theory and evidence indicate that negative aspects of social relationships may be more consequential for well-being than positive aspects (Mavandadi et al. 2007; Newsom et al. 2005). However, we know of no study that has examined the importance of both positive and negative aspects of family relationships for sleep.

How Do Families Influence Sleep?

Relationships with close family members are among our most important social relationships and prior research suggests that they have important implications for sleep. However, we lack an established conceptual framework that details the mechanisms by which families influence sleep. We draw on theory and empirical research on social relationships and health to develop expectations for how family relationships affect sleep. The literature on social relationships highlights three key mechanisms linking family relationships to health: provision of social support, relational demands and conflicts, and companionship (House, Umberson, and Landis 1988; Thoits 2011).

Social support, an aspect of relationship quality that has received considerable attention in research on social relationships and health, is one potential mechanism through which family relationships influence sleep. Supportive family relationships provide emotional care and comfort that can promote health or buffer against the harms of stressful events and chronic problems (Cohen, Gottlieb, and Underwood 2000; Thoits 2011). Previous research has found that supportive family relationships encourage good health habits, such as physical activity and quitting smoking (Murray et al. 1995; Treiber et al. 1991), and family support may also facilitate good sleep habits. In addition, individuals who can rely on family members to help them cope with stressful events and situations may be less likely to experience emotional distress (Kawachi and Berkman 2001; Thoits 1986), thereby limiting the effects of stressors that would otherwise undermine sleep quality (Morin, Rodrigue, and Ivers 2003). We therefore expect that supportive family relationships will be associated with less trouble sleeping.

We also consider whether negative qualities of family relationships are harmful to sleep. Relationships characterized by conflict and demands represent a major source of stress in people's lives (Burg and Seeman 1994; Rook 1984), and relationship stress may contribute to poor health habits (Umberson, Liu, and Reczek 2008). Using data from sleep diaries and sleep laboratory-based measurements, Hall and colleagues (2000) found that stress-related intrusive thoughts and subjectively assessed stress burden were significant contributors to sleep disturbances. Individuals who are upset about family conflicts or are thinking about how to handle the demands of family members may find it difficult to fall asleep or stay asleep. Thus, our expectation is that strained family relationships will be associated with more troubled sleep.

Interactions with family members likely have both positive and negative content and family support and strain may jointly influence sleep. Prior research shows that psychological distress is greatest when relationship demands are high and emotional support is low (Durden, Hill, and Angel 2007). Thus, strained and demanding family relationships may be particularly harmful to sleep in the absence of the buffering influence of supportive family

relationships. We therefore expect that the association between family strain and troubled sleep will be greatest in the absence of social support and that family support will be most beneficial to sleep when family relationships have minimal strain.

In addition to incorporating a broader range of relationship types and more attention to the positive and negative components of relationship quality, we also consider the amount of contact individuals have with their family members in assessing how these relationships are associated with sleep. There is considerable theory and evidence for the health benefits of social connections and the harms of social isolation (Berkman et al. 2000; House, Umberson, and Landis 1988). The companionship that results from social contact may enhance health, while the loneliness that arises from lack of companionship may be detrimental to health and well-being (Thoits 2011). Prior research has shown that feelings of loneliness are associated with worse sleep (Cacioppo et al. 2002). Frequent contact with family members may provide companionship and reduce feelings of loneliness (Shiovitz-Ezra and Leitisch 2010), thereby decreasing the likelihood of experiencing poor sleep. This leads us to expect that more frequent family contact will be associated with less trouble sleeping.

Although we hypothesize that family contact will generally benefit sleep, we also recognize that interactions with family members can consistent of both positive and negative exchanges and that the association between family contact and sleep may depend on the extent of support and strain present in family relationships. For example, more frequent contact with supportive family ties may be beneficial to sleep, while more frequent contact with stressful family ties may be detrimental for sleep. Therefore, we further expect that family contact will only benefit sleep for individuals whose family relationships are characterized as being highly supportive, but that family contact will be associated with more trouble sleeping among individuals whose family relationships are highly strained.

DATA AND METHODS

Data

We use the 1995 survey of Midlife in the United States (MIDUS), a nationally representative random-digit-dial sample of non-institutionalized adults aged 25 to 74, with oversampling of men and older adults. The overall response rate for completion of the phone and self-administered interview is estimated to be about 60.8%. We limit our analysis to the 3,034 respondents who completed both the phone interview and the self administered questionnaire. After excluding 163 respondents missing information on the dependent variable and other covariates, our final analytic sample consisted of 2,871 individuals. Compared to Current Population Survey data (Bureau of Labor Statistics 1994) the study sample slightly under-represents minorities and those with low income and low education.

Measures

Troubled Sleep—*Troubled sleep* is assessed with the question: "During the past 30 days, how often have you experienced trouble getting to sleep or staying asleep?" The response categories were, not at all, once a month, several times a month, once a week, several times a week, and almost every day. Reports of difficulty initiating or maintaining sleep have been used in other large, population-based studies (Grandner et al. 2010) and have been shown to be reliable measures for distinguishing between good and poor sleep quality (Buysse et al. 1989). Prior studies of sleep quality dichotomized responses to compare those who rarely have sleep problems to those who report more frequent experiences of sleep problems (Burgard and Ailshire 2009; Grandner et al. 2010). We further differentiate among respondents who report more frequent sleep problems by coding responses to our troubled

sleep measure into three categories: not at all or *never* (reference), *monthly* (once a month-several times a month), or *weekly-daily* (once a week-almost every day)").

Family Contact and Relationship Quality—We consider respondent assessments of the frequency of contact with family members who do not live with them as well as assessments of emotional support and strain from non-spousal family members. *Family contact* is measured with the question: "How often are you in contact with any members of your family -- that is, any of your brothers, sisters, parents, or children who do not live with you -- including visits, phone calls, letters, or electronic mail messages?"[1] The response categories were: never or hardly ever = 1, less than once a month = 2, about once a month = 3, 2 or 3 times a month = 4, about once a week = 5, several times a week = 6, about once a day = 7, and several times a day = 8. We treat family contact as a continuous measure (ranging from 1 to 8) with higher scores indicating more frequent family contact. Although categorical specifications of the family contact measure yielded substantively similar results, we choose to use the continuous measure because it facilitated interpretation of interactions in the analytic models.

Social support is a four-item scale assessing perceived emotional support from family members (α = .82). Respondents were asked how much family members (not including spouses or partners): (i) really care about you? (ii) understand the way you feel about things? (iii) can be relied on for help if you have a serious problem? and (iv) can be opened up to if you need to talk about your worries? The four response categories ranged from a lot to not at all; responses were reverse-coded so that higher scores indicated more support. *Strain* is a four-item scale assessing negative interactions with family members (α = .80). Respondents were asked how much family members (not including spouses or partners): (i) make too many demands on you? (ii) criticize you? (iii) let you down when you are counting on them? and (iv) get on your nerves? The four response categories ranged from often to never; responses were reverse-coded so that higher scores indicated more strain. The support and strain scales are described in greater detail by Walen and Lachman (2000).

In addition to the independent effects of support and strain on troubled sleep, we also consider the combination of support and strain. We created a categorical measure capturing combinations of family support and strain. First, we created two dichotomous indicators representing either high support or high strain that provide a contrast between those reporting median or above median scores on the support or strain scales and those who report lower than median scores for support or strain. We then combined the low/high dichotomous indicators into a four-category measure of high support/low strain (reference), high support/high strain, low support/low strain, and low support/high strain.

Control Variables—Multivariate analyses include adjustments for age, gender, race/ethnicity, marital status, parental status, education, household income, and employment status. Age is measured in years and treated continuously. Gender is coded 0 for males and 1 for females. We use dichotomous variables for race that distinguish between whites (reference), blacks and/or African Americans, Hispanics, and "other" race/ethnic groups.

Marital status is a categorical variable that distinguishes among those who were married (reference), divorced or separated, widowed, or never married. *Parental status* is assessed with respect to both whether one has children and the ages of the children and is coded into

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[1]The wording of the family contact question may result in underreporting of contact with family members if they reside in the same household with the respondent. However, only a small number of respondents lived in households with more than one additional adult woman or man (N=285), though the data do not allow us to determine if these additional adult household members are family members.

three categories: no children (reference), any children under 18 years of age, and only children ages 18 or older.

Educational attainment is coded categorically as less than high school, high school, and some college or more (reference). Annual *household income* is measured in 1995 dollars and treated continuously in $10,000 increments. We also include an indicator of whether the respondent was unemployed or not in the labor force and therefore *not working for pay* at the time of the survey.

We also adjust for self-rated physical health and depression, which are significant health risk factors for poor sleep (Vgontzas and Kales 1999) that may also influence perceptions of family relationships. *Self-rated physical health* is treated as a continuous measure and is assessed with the question: "In general, would you say your physical health is poor = 1, fair = 2, good = 3, very good = 4, or excellent = 5?" Given robust associations between sleep disturbances and major depressive episodes (Ohayon 2002), we also include a measure of *depression*, adapted from the Composite International Diagnostic Interview (CIDI), that is a count of zero to six symptoms, experienced for two weeks or longer in the year prior to the interview, that typically accompany depression and are used in clinical settings to diagnose major depression; symptoms include problems with lack of interest, appetite, energy, concentration, feelings of self-worth, and suicidal thoughts (Kessler, Mickelson, and Williams 1999).[2]

Analytic Strategy

The influence of family relationship contact and quality on sleep troubles is assessed through multinomial logistic regression analysis, which estimates the log-odds of being in a more frequent sleep trouble category (monthly, weekly-daily) compared with the reference category (no sleep trouble). This allows us to identify family relationship characteristics that are associated with more frequent troubled sleep, compared to the ideal situation of not experiencing sleep troubles. We first examine the independent associations of family contact, strain, and support with troubled sleep, as well as the joint contribution of support and strain to sleep troubles. We then examine interactions between frequency of family contact and support, strain, and support/strain combinations. Multivariate models adjust for sociodemographic and health characteristics. All analyses are weighted to account for differential probability of selection and non-response and were conducted using Stata/SE 11.

RESULTS

Descriptive Statistics

Table 1 shows descriptive statistics for all analysis variables. Slightly less than half of respondents (48 percent) reported never experiencing trouble sleeping, while 29 percent had problems sleeping on a monthly basis and 23 percent had problems sleeping on a weekly or daily basis. On average, respondents reported being in contact with family members several times a week (mean=5.9), perceived high levels of emotional support from their family relationships (mean=3.4), and rarely perceived their family relationships to be strained and demanding (mean=2.1). About one-third of respondents reported having a combination of high support/low strain relationships and another one-third reported having a combination of low support/high strain relationships. The remaining respondents reported low support/low strain (21 percent) or high support/high strain (15 percent) combinations.

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[2]CIDI symptoms for major depression typically also include problems falling asleep, but we did not include this symptom in our depression measure. However, we conducted analyses using a 7-symptom depression measure that did include an item for sleep problems and the results were essentially the same as those obtained using the 6-symptom depression measure.

The average age of respondents was 45, women constituted just over half the sample, and a majority of respondents were white, married, had children, and had at least a high school level of education. The average household income was about $39,500 and nearly 28 percent of respondents were not working for pay at the time of the interview. Respondents reported their physical health as good to very good (mean=3.4) and reported experiencing less than one depressive symptom on average.

Associations between Family Relationship Characteristics and Troubled Sleep Frequency

Results from multinomial logistic regression models for the influence of family contact and relationship quality on troubled sleep frequency are shown in Table 2. Relative risk ratios are presented, which indicate the probability of experiencing troubled sleep either monthly (first column for each model) or weekly-daily (second column for each model) divided by the probability of never experiencing troubled sleep. Ratios between zero and one indicate less risk of experiencing troubled sleep, and ratios greater than one indicate more risk of experiencing troubled sleep.

Model 1 shows the association between family contact and troubled sleep, adjusted for all control variables. Contrary to our expectations, increasing frequency of family contact is associated with greater risk of experiencing weekly-daily sleep troubles, though it is not associated with risk of moderately frequent (i.e., monthly) troubled sleep. Models 2–5 further add relationship quality indicators. The association between family contact frequency and troubled sleep persists even after accounting for levels of relationship support and strain.

Results from models 2 show that having more supportive family relationships is associated with lower risk of troubled sleep. By contrast, model 3 shows that family strain is associated with greater risk of troubled sleep, particularly very frequent troubled sleep. In model 4 we include both support and strain to determine how they relate to troubled sleep independently of each other. When support and strain are considered together only strain continues to be associated with troubled sleep, suggesting that the greater risk of troubled sleep associated with family strain persists even among individuals reporting similar levels of family support. Finally, model 5 suggests that family support has a buffering effect on the association between family strain and troubled sleep. Compared to relationships characterized as being high in support and low in strain, all other combinations of support and strain are associated with a greater risk of having troubled sleep. Relationships low in support but high in strain carry the greatest risk of very frequent (i.e., daily) sleep troubles.

Associations between control variables and troubled sleep were consistent across models and with findings reported in previous studies (coefficients are not shown but full results are available upon request from the first author). Inclusion of covariates did not change the associations between family relationship characteristics and troubled sleep frequency, although the magnitude of the coefficients for family support and strain were slightly reduced with the adjustment for self-rated physical health and depression.

Interactions between Family Contact Frequency and Relationship Quality

In Table 3 we test how the association between relationship quality and troubled sleep varies according to family contact frequency by including interactions between contact and support, strain, and support/strain combinations. All models are adjusted for the control variables, but we only present coefficients for the main effects and interaction terms (full results available upon request). As Model 1 shows, the interaction between family contact and family support is not significant. However, Model 2 shows a significant interaction between contact and strain, and this interaction is particularly strong with respect to weekly-daily frequency of troubled sleep. We plot this interaction in Figure 1.[3] The interaction

suggests that for individuals who never experience family strain, the probability of having troubled sleep declines as family contact becomes more frequent. However, as the frequency of contact increases among those who have some or frequent strain in their family relationships, the risk of troubled sleep increases. For example, among individuals who report often experiencing family strain, the probability of having very frequent troubled sleep increases from 24% when family contact occurs only a few times a month to 46% when family contact occurs several times a day. Consequently, the lowest and highest probability of frequent troubled sleep occurs among individuals who are in contact with family members multiple times a day, suggesting the importance of considering both the positive and negative aspects of family exchange.

We also find significant interactions between family contact and support/strain combinations. As shown in Model 3, the interactions are strongest for weekly-daily troubled sleep, with the exception of the interaction between contact and low support/low strain, which is stronger for monthly troubled sleep. Figure 2 illustrates the interactions for weekly-daily troubled sleep.[4] Among individuals whose family relationships are high in support but low in strain, the probability of having troubled sleep declines from about 20% to 17.5% with increasing family contact. Individuals with family relationships low in both support and strain have a similar probability of troubled sleep regardless of the frequency with which they are in contact with their family. Among individuals whose family relationships are high in strain, the probability of troubled sleep increases with more frequent family contact.

Additional analyses

We include a number of control variables in our analyses to reduce the likelihood that unmeasured confounders influence the results presented above, but we were unable to include two key potential confounders in our analyses: preexisting insomnia and the use of sleep aids. Although MIDUS respondents were not asked about preexisting insomnia specifically, they were asked if they had experienced or been treated for chronic sleeping problems in the twelve months prior to their interview. In addition, the data do not include measures of sleep aid use but do include a measure of whether respondents used sedatives, including sleeping pills, on their own in the prior twelve months. Reliable measures of insomnia and sleep aid use were not available in the data, but we replicated all analyses with the additional inclusion of these indicators of prior experience of chronic sleep problems and sedative use. The coefficients for family relationship characteristics were somewhat attenuated with the inclusion of these additional covariates, but the results were otherwise unchanged.

One additional concern was whether the associations we observed were consistent across age and by gender. Thus we also examined interactions between all family relationship characteristics and both age and gender. We did not find any significant interactions in fully adjusted models, but in models unadjusted for health covariates there were significant interactions between frequency of family contact and age (rr=1.1, p=0.02) and family strain and female gender (rr=1.4, p=0.07) for weekly/daily sleep troubles.

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[3]This plot is derived by substituting into the equation the mean values for all variables, with the following exceptions: family strain is plotted at values that represent experiencing strain never, sometimes, or often and family contact is plotted at categories representing contact occurring 2–3 times a month, several times a week, and several times a day.
[4]This plot is derived in the same way as in Figure 1, except that values are plotted for each category of the combined family support/ strain variable and for categories of family contact that represent contact occurring 2–3 times a month, several times a week, and several times a day.

CONCLUSION

Efforts to identify the social determinants of poor sleep have not fully considered the role of family relationships and there has been a notable absence of attention to sleep in much of the literature on social relationships and health. This is an oversight because sleep is a major daily activity that everyone engages in, and one that could be highly responsive to the content of social exchanges. Exchanges with family in particular may have considerable importance for sleep quality. In this study we bring together theoretical and empirical research on social relationships with evidence from the growing sleep literature to highlight the importance of considering sleep in the context of the family and to gain insights into how family relationships influence a key health behavior.

The findings from this study show that family relationship characteristics influence sleep in ways largely consistent with prior theory and research on social relationships and health. Family support was associated with less troubled sleep and family strain was associated with more troubled sleep. Importantly, family strain was a stronger predictor of experiencing troubled sleep than was family support. However, we also found that family strain is most harmful to sleep when support is low, suggesting that the stress of family demands and conflict may be somewhat offset by supportive exchanges with family members. This finding is consistent with prior research that has found that psychological distress is greatest among people whose relationships are both overly demanding and lack emotional support (Durden et al. 2007).

In the absence of emotional support from family members, strained and demanding family relationships may contribute to sleep problems in several ways. Demanding family relationships may be particularly distressing when individuals feel they can't rely on family members for assistance in dealing with their own serious problems. In addition, the combination of dealing with demands from family members in addition to one's own problems may compound feelings of worry and anxiety that can disrupt sleep (Hall et al. 2000). Family influences on sleep are complex because family exchanges include both positive and negative content. This study underscores the importance of considering the joint distribution of both positive and negative aspects of relationship quality.

Our expectation that increased family contact would benefit sleep was not supported by the results, which showed that more frequent family contact was associated with greater risk of troubled sleep. Although social relationships are generally assumed to promote health and well-being, not all social contact benefits health and some forms of social contact may undermine health and health-related habits (Burg and Seeman 1994; Umberson, Crosnoe, and Reczek 2010). Our data demonstrate this point nicely, showing that the risk of troubled sleep associated with family strain increased as family contact became more frequent. Although we thought family contact would provide companionship, and buffer against feelings of loneliness, frequent contact with family members can also be accompanied by increased demands and irritations that may interfere with sleep.

Our findings also suggest that family contact can be beneficial to sleep when relationships are not strained. This is more consistent with the prevailing perspective that having social ties and frequent social contact is beneficial to health and well-being. Thus, this study demonstrates how the role of social contact in promoting health largely depends on the content of the social exchange and provides support for the perspective that there are limits to the health benefits of social ties.

The study conclusions should be considered in light of several limitations. First, our data are cross-sectional and thus we are not able to assess the temporal ordering between sleep quality and family relationship characteristics. Prior research using longitudinal data

suggests that relationship demands and support influence subsequent psychological well-being (Durden et al. 2007) and at least one study has shown that relationship quality affects subsequent sleep quality (Prigerson et al. 1999). However, the association between social relationships and sleep quality is likely reciprocal (Troxel et al. 2007). Stressful relationships may interfere with sleep and as a result of inadequate sleep, relationships may become more strained.

In addition, we were unable to disentangle the role of health status in the association between family relationships and sleep. We wanted our results to be robust to potential confounders and therefore included adjustments for physical and mental health characteristics that are known risk factors for poor sleep and that might influence frequency of family exchanges and the assessment of the content of social exchanges. However, it is possible that our health controls are actually on the causal pathway linking family relationships to sleep. It is also plausible that sleep mediates the association between social relationships and health (Cacioppo et al. 2002b). Longitudinal studies are needed to assess the temporal ordering of social exchanges, sleep quality, and health.

Third, our measure of sleep quality is based on self-reports of sleep trouble and may be subject to reporting error. However, research suggests that self-reports of diminished sleep quality are valid indicators of clinical sleep problems that may not be captured using objective sleep assessments (Regestein et al. 2004). Moreover, we use a measure of sleep quality that has been shown to differentiate between "good" and "poor" sleepers in population-based studies (Buysse et al. 1989; Levine et al. 2003). This measure does not identify individuals with clinically-significant sleep disorders, such as insomnia or sleep apnea, but rather is a general measure of sleep quality that can be used to identify those experiencing troubled sleep in the larger U.S. population of both normal and disordered sleepers. However, our results were robust to the inclusion of an indicator of chronic sleeping problems, suggesting the effects of family relationships are not limited to those with sleep disorders.

A fourth limitation is that we lacked potentially important information on sleep-related behaviors. In 1999 an estimated one-quarter of Americans used prescription or over-the-counter medication to help them sleep (NSF 1999). Individuals experiencing family stress may be more likely to use sleep aids and as a result may report less troubled sleep than they would in the absence of these medications. Our data lacked optimal measures for exploring this possibility, but our findings were very similar in sensitivity analyses that included an approximate indicator of sleep medication use.

However, use of medication for sleep is more common among women than men. According to a 1999 Sleep in America Poll, 29 percent of women reported taking medication to help them sleep compared to only 19 percent of men (NSF 1999). The same report found that women were more likely to say that stress affected their sleep, suggesting that family-based stress may be more consequential for women's sleep. Yet we found only weak evidence of a gender difference in the association between family strain and troubled sleep, though the interaction suggested family strain was more consequential for women's sleep. However, because we were unable to fully account for sleep medication use in the analysis of gender interactions we may have underestimated the association between family strain and troubled sleep among women.

Another limitation is that the measures of family characteristics do not specifically identify particular family members. Whereas most of the previous literature on social relationships and health and nearly all of the previous research on sleep has focused on marital and parental relationships, we examined non-spousal family relationships, such as those with

parents, siblings, and grown children. Our study findings are thus applicable to people who are not married and who both do and do not have children. However, our measures of family relationship characteristics are not specific to particular family members and we thus cannot identify which family relationships are most beneficial or harmful to sleep. For instance, demands from children may be more detrimental to sleep than a general sense of irritation with siblings. In addition, we are not able to determine if assessments of support and strain are based on interactions with one family member or multiple family members. However, it may be the case that it doesn't matter who the source of conflict or support is, but simply that one's family relationships are perceived as being supportive or strained.

This study makes important contributions to research on social relationships and health and the burgeoning literature on the social determinants of sleep. Whereas many studies of the health effects of social ties, and nearly all research on families and sleep, has focused on the role of marriage and parenting, our study assessed the influence of family relationships more generally and demonstrated the importance of these understudied relationships. In addition, by analyzing the independent and interactive effects of support and strain, rather than focusing on their separate effects, our analysis provides a more balanced view of how negative and positive aspects of relationships combine to influence sleep quality. Finally, by highlighting the importance of family relationships for sleep, our study provides further evidence that social relationships may be a key factor contributing to sleep problems among U.S. adults.

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Biographies

Jennifer A. Ailshire is a National Institute on Aging postdoctoral fellow in the Multidisciplinary Training Program in Gerontology at the University of Southern California and the USC/UCLA Center for Biodemography and Population Health. Her research focuses on neighborhood context, social relationships, and health and well-being over the life course. She recently received funding from the National Institute on Aging to study the psychosocial and physiological pathways linking neighborhoods and social relationships to health in older adults.

Sarah A. Burgard is Associate Professor of Sociology and Epidemiology and Research Associate Professor at the Population Studies Center at the University of Michigan. Her research focuses on the ways that stratification by race/ethnicity, gender and socioeconomic position influence people's opportunities in life and how this influences their health. Burgard uses large-scale social surveys and other data to examine a variety of health outcomes that chart the boundaries of the healthy life course. She is currently engaged in several data collection projects aimed at understanding links between the Great Recession and population health.

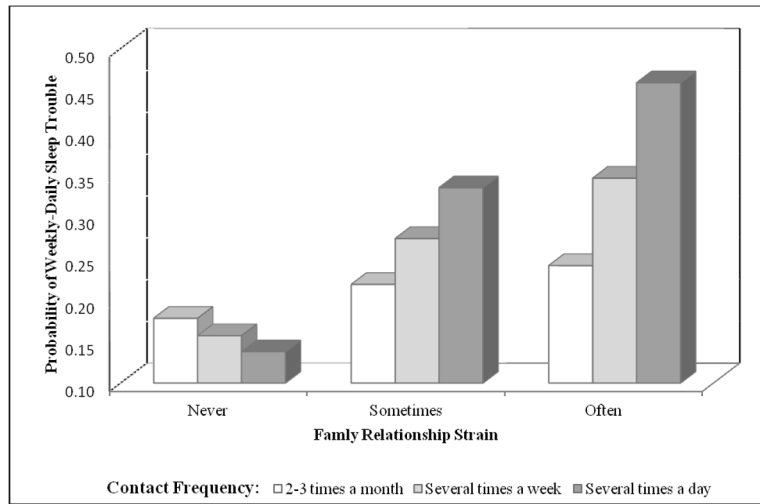**Figure 1.**
Probability of Weekly-Daily Sleep Trouble by Family Relationship Strain and Contact
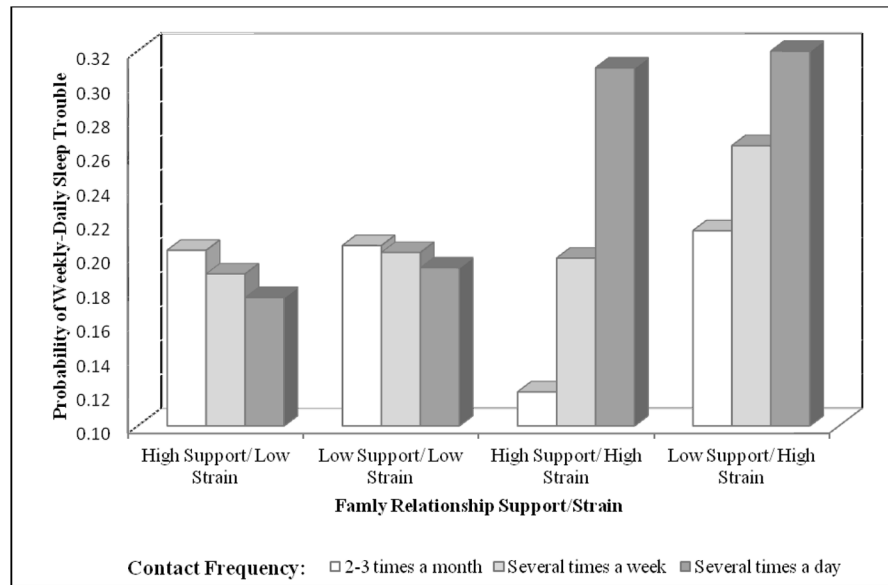Frequency

Figure 2.
Probability of Weekly-Daily Sleep Trouble by Family Contact Frequency and Combinations of Family Relationship Support and Strain

Table 1

Descriptive Statistics, MIDUS 1995 (N=2,871)

	Mean	SD
Troubled sleep frequency		
Never	.48	
Monthly	.29	
Weekly-daily	.23	
Family Relationship Characteristics		
Family Contact	5.9	1.6
Relationship Quality		
Support	3.4	.6
Strain	2.1	.6
High support/Low strain	.32	
Low support/Low strain	.21	
High support/High strain	.15	
Low support/High strain	.31	
Control Variables		
Age, years	45.3	13.5
Female	.56	
Race/Ethnicity		
White	.81	
Black	.10	
Hispanic	.06	
Other	.03	
Marital Status		
Married	.69	
Divorced/Separated	.16	
Widowed	.05	
Never married	.11	
Parental Status		
No Children	.17	
Children under 18 yrs	.45	
Children 18 yrs or older	.38	
Education		
Less than high school	.13	
High school or equivalent	.39	
Some college or more	.49	
HH Income, dollars	39,536	36,622
Not working for pay	.28	
Self-rated physical health	3.4	1.0
Depression	0.6	1.6

Note: Means and standard deviations are presented for continuous variables; proportions are shown for categorical measures. Numbers are weighted.

Table 2

Multinomial Logistic Regression Estimates of the Risk of Monthly and Weekly Sleep Trouble Relative to No Sleep Trouble (N=2,871)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Monthly	Weekly-Daily	Monthly	Weekly-Daily	Monthly	Weekly-Daily	Monthly	Weekly-Daily	Monthly	Weekly-Daily
Family Relationship Characteristics										
Contact	1.03 (.03)	1.09 (.04) *	1.06 (.04)	1.13 (.04) **	1.03 (.03)	1.08 (.04) *	1.05 (.04)	1.10 (.04) *	1.05 (.04)	1.10 (.04) *
Support			.82 (.07) *	.76 (.07) **			.86 (.08)	.89 (.09)		
Strain					1.18 (.10) +	1.49 (.15) ***	1.11 (.10)	1.42 (.16) **		
Support/Strain (ref=High support/Low strain)										
Low support/Low strain									1.36 (.19) *	1.32 (.22) †
High support/High strain									1.16 (.18)	1.34 (.24) †
Low support/High strain									1.34 (.18) *	1.74 (.26) ***
Constant	1.15 (.52)	1.21 (.58)	1.79 (.90)	2.21 (1.2)	.79 (.39)	.46 (.25)	1.28 (.74)	.66 (.43)	.78 (.38)	.70 (.36)
Log Likelihood	−2,873		−2,867		−2,861		−2,859		−2,862	

***
p<.001,

**
p<.01,

*
p<.05,

†
p<.10

Note. Estimates of relative risk are presented. Standard errors are in parenthesis. Models are adjusted for age, gender, race/ethnicity, marital status, parental status, education, income, working status, self-rated physical health, and depression.

Table 3

Multinomial Logistic Regression Estimates of Interactions between Family Contact and Relationship Quality (N=2,871)

	Model 1		Model 2		Model 3	
	Monthly	**Weekly-Daily**	**Monthly**	**Weekly-Daily**	**Monthly**	**Weekly-Daily**
Family Relationships Characteristics						
Contact	1.32 (.20) †	1.34 (.19) *	.86 (.09)	.79 (.10) †	.92 (.06)	.93 (.07)
Support	1.17 (.30)	1.01 (.25)				
*Contact	.93 (.04)	.95 (.04)				
Strain			.73 (.21)	.65 (.21)		
*Contact			1.09 (.05) †	1.15 (.06) **		
Support/Strain (ref=High support/Low strain)						
Low support/Low strain					.31 (.17) *	.57 (.35)
*Contact					1.29 (.12) **	1.14 (.12)
High support/High strain					.87 (.62)	.13 (.11) *
*Contact					1.05 (.12)	1.43 (.18) **
Low support/High strain					.52 (.28)	.41 (.25)
*Contact					1.17 (.10) †	1.27 (.13) *

***
p<.001,

**
p<.01,

*
p<.05,

†
p<.10

Note: Estimates of relative risk are presented. Standard errors are in parenthesis. Models are adjusted for age, gender, race/ethnicity, marital status, parental status, education, income, working status, self-rated physical health, and depression.