A growing body of research shows that gendered sleep patterns stem from inequality in the work-family nexus. That is, gender inequality in waking obligations, demands, and stresses associated with work and family roles is associated with gender differences in sleep disruption (Burgard 2011; Burgard & Ailshire 2013; Hislop & Arber 2006, 2003; Maume et al. 2010; Sekine et al. 2006; Venn et al. 2008). Most studies, however, draw on samples from a single country, thus raising the question: if nations vary in promoting gender equality, will the incidence and determinants of gender differences in sleep similarly vary across national contexts?

To our knowledge the sleep literature is silent on this question. This is in stark contrast to a growing body of research showing that gendered time use varies systematically across national contexts. These studies (reviewed below) indicate that men and women’s waking time is driven by gendered allocations of work and family responsibilities and macro environments of gender equality. Sleep time may also be sensitive to contexts of gender equality above and beyond the established gender effects.

We argue that sleep, like paid work and unpaid family work, is situated in the work-family nexus, and can be shaped by national norms promoting gender equality. We test this proposition with individual data from the European Social Survey matched to a country-level measure of gender equality. Our analyses show that work-family stressors differentially affect sleep by gender, but that both men and women sleep better with increased gender equality. This study adds to our understanding of gender inequality in sleep and provides new evidence on the importance of the national context in shaping the pattern of gender inequality in the domestic sphere.

GENDER, THE WORK-FAMILY NEXUS, AND SLEEP
Most adults must both provide and care for family members, and how men and women allocate their time across work-family obligations has been the subject of much research (for a review, see Ridgeway 2011). Often, this research seeks to assess progress toward gender equality through the central question: if men have increased their time in family care work as women increase their time in paid market work, does this signal progress toward gender parity in work-family role obligations (Baxter 1997; Esping-Andersen 2010)?

Recent analyses confirm the persistence of gendered cultural assumptions structuring men's and women's time use (Esping-Andersen 2010; Ridgeway 2011). For example, although cultural expectations of men have expanded to include more involvement in family life, it is still the case that men see their first and primary role as family provider (Baxter 1997; Derickson 2013; Townsend 2002). Similarly, despite expanding definitions of motherhood that include career pursuits, women are still mainly responsible for caring for family members (Monna & Gauthier 2008; Ridgeway 2011). In light of these different expectations of time use it is perhaps not surprising that the latest evidence from time diaries show that men still allocate most of their total work time to paid work in the labor market, while women still do two-thirds of all unpaid care work within the home (Monna & Gauthier 2008; Sullivan 2013).

Scholars are increasingly analyzing gendered patterns of sleep as a dimension of time use within the work-family nexus. While not denying the biological imperative of sleep, social scientists have succeeded in showing that sleep is also a form of discretionary time use that is connected to sentient role obligations. That is, to the extent there is gender inequality in daily role obligations to employers and family members, there will be gender differences in the quality of sleep at night (Burgard 2011; Burgard & Ailshire 2013; Hislop & Arber 2003; Maume et al. 2009, 2010).
Starting with the paid work side of the work-family nexus, findings from analyses of time diaries show that time in paid work has a strong negative effect on sleep (Burgard & Ailshire 2013). Because time is a finite resource, increasing time in paid work should reduce time available for sleep (Chatzitheochari & Arber 2009). But, in addition, the stresses of work can be carried into the home where they can disrupt sleep. In survey data, Burgard and Ailshire (2009) found that full-time workers were more likely to feel upset or bothered at work, which in turn affected their sleep. Another survey of Japanese workers reported that time in paid work accounted for a substantial portion of the gender gap in sleep quality (Sekine et al. 2006). These studies suggest that if men are more likely than women to hold paying jobs and to work longer hours, work-related pressures and stressors are more likely to disrupt men's than women's sleep.

Qualitative studies suggest other ways in which men's commitment to work may disrupt their sleep. Several interview studies of partners showed that men's commitment to breadwinning privileged men's sleep over women's (Hislop and Arber 2006; Maume et al. 2010; Meadows et al. 2008). That is, men viewed sleep as a time to recover from the demands of today's work, and be at their best for tomorrow's work. Further, since men thought their paid work was vital to supporting the family (even if their partners also held a paying job), men's rights to a restful and uninterrupted sleep were elevated over women's sleep needs (Venn et al. 2008). When men did report problems in getting to or staying asleep at night, they almost always cited concerns about the next day's work or how their pay affected family finances (Maume et al. 2010). Of course, it should also be noted that men who most identified as "breadwinners" saw their work as a display of their strength and viewed the need to sleep as a sign of weakness; such men often opted to work longer hours at the expense of getting adequate sleep (Derickson 2013). Across these studies, two generalizations emerge: (1) men’s status as breadwinners privileges their sleep over
women’s; (2) men’s sleep is often disrupted by work-related stressors and concerns about finances.

Although some studies focused on the sleep effects of women's work schedules (e.g., see Garey 1995; Lowson et al. 2013), more studies have focused on how women's caregiving obligations affects their sleep. Most of this research suggests that women as well as men invoke gendered cultural expectations of mothers as caregivers even if mothers hold a paying job and work as much as fathers (Ridgeway 2011). One time-use study showed that going from the least to the most unpaid care work within the home shortened women's nightly sleep by an average of 30 minutes (Burgard and Ailshire 2013). Of course, time in unpaid family work is more intense and demanding when young children are present in the household, and women are more likely than men to disrupt their sleep to attend to children’s needs (Burgard 2011; Sullivan 2013).

Qualitative studies confirm findings from survey studies, and provide additional insight into why women view sleep time differently than men. Rather than seeing sleep as a time to recover for work as men do, women who identify as caregivers view the night as part of a continuing thread of time in which daytime obligations to family members often encroach onto sleep time (Hislop & Arber 2003). This is especially true among parents of younger children who awake in the middle of the night, and it is mothers and not fathers who typically attend to their children to get them back to sleep (Burgard 2011; Maume et al. 2010). Even when children are older and more independent, more women than men worried about children's safety and whereabouts, often staying awake until their children were back at home (Hislop & Arber 2003; Maume et al. 2010; Venn et al. 2008). Later in the life course, women lost more sleep than men while caring for spouses with chronic illnesses, often getting sleep only when their ailing spouse slept (Hislop & Arber 2006). Rarely did men question the fairness of sleep inequality, seeing it
as a manifestation of essential differences between men and women in parenting and caregiving. Women concurred, elevating sleep rights of children and spouses over their own, and accepting disrupted sleep as the price they paid for marital harmony, or as another example of women putting the needs of their family ahead of their own (Garey 1995; Maume et al. 2010). The results of these and the survey studies cited above suggest that parental status may have a greater impact on women's than men's sleep quality.

A small but growing literature has focused on conflict between work and family obligations and the stresses engendered by this conflict. Most of these studies view time as a finite resource and that workers seek to conserve as much time for their family lives as they can; when work obligations conflict with time for family life a stress response occurs (Grandey & Crapazano 1999). Several studies go on to link work-family conflict to stress, leading to shorter and lower quality sleep (Buxton et al. 2016; Crain et al. 2014; Jacobsen et al. 2014; Lallukka et al. 2010; Sekine et al. 2006), yet are limited by drawing on small samples or those working in a single occupation.

Although not part of the work-family nexus of obligations, other risk factors for disrupted sleep have been identified, some of which may vary in their effects by gender. Shorter and more disrupted sleep is associated with advancing age (Patlak 2011; Maume et al. 2009), and it has long been known that women report worse physical and mental health (Verbrugge 1989), which could disrupt their sleep. One study showed that women with lower status and education report higher levels of psychological distress and greater sleep disruption (Arber, Bote, & Meadows 2009). And several studies show that marital discord and strained family relationships were associated with shorter and more troubled sleep (Ailshire and Burgard 2012; Chen, Waite, and Lauderdale 2015; Maume et al. 2009). To the extent, then, that women's health and family
stressors are worse than men's, these experiences may contribute to women's poorer sleep compared with men's.

In sum, the literature reviewed above suggests that gendered cultural expectations of men's and women's work-family responsibilities affects sleep differently for men and women. But, given that all of the studies reviewed above were conducted in a single country (most in the United States, and a few in Europe or Asia) there has been no opportunity to explore cross-national variation in the incidence of troubled sleep or its predictors. It is plausible that the work-family stressors affecting sleep may operate differently in gender unequal versus gender equal societies as discussed in more detail below.

THE WORK-FAMILY NEXUS IN CROSS-NATIONAL CONTEXT

The paucity of research on cross-national variation in sleep quality suggests that we must look to studies of other work-family outcomes to posit an association between national context and gendered sleep patterns. Most prior studies examine the household division of labor, but research findings on work-family conflict and health also bear on theorizing how sleep may vary across important national contexts.

The Division of Household Labor

Gender and family scholars have long recognized that a central site of the struggle for power within a union is the division of household labor. At the micro-level, men and women bring different resources (education, employment status, and income) into the union, and when women's resources are equal to men's, the couple is more likely to depart from a traditional division of household labor in which women do all or most unpaid family work (Monna & Gauthier 2008). At the macro-level, men further benefit from a patriarchal culture that privileges
their work efforts and gives them authority within the family. Of course, the strength of patriarchal culture varies across societies, and it was Blumberg (1984) who theorized that women's power within the marriage was nested within macro-level power structures (e.g., the state). Thus, a woman's net power within her relationship is determined by her relative resources at the micro level, discounted by the power of patriarchy at the macro level.

Fuwa (2004) drew on these perspectives to show that men's proportionate contribution to housework increased in countries where women were empowered in the economy and polity. Perhaps more important, when interacted with the societal level of gender equality, the usual predictors of housework shares -- time availability, gender ideology, and relative resources -- had enhanced effects on women's performance of domestic labor. That is, the effects of women's employment, egalitarian ideology, and contribution to household income were all more strongly negative in predicting women's share of domestic labor as societal gender equality increased. Follow-up studies showed that housework was more evenly divided between partners when they lived in countries where gender equality was encouraged by policies to promote women's employment and men's participation in family life (Geist 2005; Hook 2006). Additional analyses of absolute time in housework found that gender empowerment at the national level reduced both men's and women's time in housework (Knudsen and Wæness 2008; Ruppanner 2010).

These findings may bear on sleep to the extent that sleep, like housework, is a form of time use that is negotiated between partners who vary in their time availability, ideology, and resources. If so, we may anticipate that women's sleep more closely resembles men's sleep when they have similar time availability, ideological predispositions, and resources as men. Further, we may expect that the gender gap in sleep quality is narrower in societies which empower
women, given that women's (men's) power within the family is enhanced (discounted) with increased societal gender equality.

**Work-Family Conflict**

Other research has investigated work-family outcomes that are known predictors of sleep, and as discussed above one such outcome is work-family conflict. Generally speaking, respondents report greater work-family conflict (or lower work-life balance) when they have young children and work longer hours (Ruppanner 2011), and that nations that seek to promote the integration of work and family life reduces work-family conflict (Grönlund & Öun 2010). Other studies found the opposite: workers reported greater work-family conflict when living in gender egalitarian countries (Strandh and Nordenmark 2006; van Der Lippe et al. 2006). It is possible that these contrary results stem from small-sample analyses, or it could be the case that gender progressive countries actually increase reported work-family conflict by heightening expectations that both parents will work and be involved in family life. Yet, in a more recent and larger study of workers in 31 nations Ruppanner and Huffman (2014) found that women reported less family-to-work conflict in countries where women are empowered. If so, given that gendered work and family role obligations disrupt sleep, we may expect that countries that promote gender equality will minimize the incidence of work-family conflict, and thereby shrink gender differences in sleep quality.

**Health**

Another outcome that affects sleep is physical and mental health, and a growing stream of research investigates the link between individual health and societal gender equality. Since it is assumed that women benefit from living in gender equal societies, much of the focus has been
on the question of how men's health may benefit from gender equality. The point of departure for this research is the harmful effects of patriarchy on men's health. In patriarchal societies there are multiple ways to be a man depending on age, class, race, etc., but the most desirable form of masculinity is a successful provider who is also stoic, self-reliant, strong, and autonomous; additionally, being a man means avoiding giving any appearance of being weak or feminine (for reviews see Connell & Messerschmidt 2005; Courtenay 2000). Since taking care of your own health is associated with feminine behaviors, men will neglect their own health and engage in unhealthy behaviors as a way to affirm their masculinity and separate themselves from women. According to Courtenay (2000: 1389):

"Men and boys … reject healthy beliefs and behaviours in order to demonstrate and achieve manhood. By dismissing their health care needs, men are constructing gender. When a man brags, "I haven't been to a doctor in years," he is simultaneously describing a health practice and situating himself in a masculine arena. Similarly, men are demonstrating dominant norms of masculinity when they refuse to take sick leave from work, when they insist that they need little sleep, and when they boast that drinking does not impair their driving."

At the individual level there is much research showing that men who identify with hegemonic masculinity are likely to neglect their health (e.g., see Galdas, Cheater, & Marshall 2005; O'Brien et al. 2005; Springer & Mouzon 2011), and this may extend to getting adequate sleep as well.

If these findings scale up to the societal level we might expect that men's health improves with gender equality because gender equality challenges the norms and behaviors that risk men's health. A nascent literature linking societal gender equality with men's health provides some support for this proposition. Dahlin & Häkönén (2013) found that men's self-reported physical health improved in gender egalitarian societies, and two other studies found that men had lower
levels of depression when living in societies promoting gender equality (Hopcroft and Bradley 2007; van de Velde et al. 2013). Other studies found that men were happier in more gender equal societies (Meisenberg and Woodley 2015), and the gender gap in happiness shrank with increased gender equality (Mencarini & Sironi 2013). Similarly, Holter (2014) reported that a host of men's outcomes, including happiness, positive mental health, safety, and fertility were all positively associated with societal gender equality. Given these findings we may anticipate that gender unequal societies promote a form of masculinity that is associated with a range of unhealthy behaviors, including perhaps, neglecting the need to sleep. In gender equal societies, challenges to hegemonic masculinity may give men license to engage in a range of behaviors that improve their health, including getting adequate sleep at night.

**SUMMARY OF RESEARCH PROPOSITIONS**

Social scientists' contribution to understanding sleep has been greatest when drawing attention to how sleep is linked to gendered inequalities in work-family responsibilities. That is, to the extent men are still expected to be family providers and women family nurturers, we anticipate that the burdens and stresses of family life (having young children, dysfunctional family relations, etc.) will have stronger impacts on women's sleep disruption, whereas work stressors and financial worries will have stronger effects on men's sleep. These propositions suggest that in regression models estimated separately by gender, the family-related covariates will be significant and stronger in their effects on women's than men's sleep, whereas the work-and financial-related covariates will be significant and stronger in their effects on men's than women's sleep. Yet, social context impacts health-related behaviors, and we have suggested above that sleep quality is affected by macro levels of gender equality. Gender-equal societies challenge men's privilege, provide opportunities that benefit women, and promote an ideology
that gives women an equal place in society beside men. We anticipate that macro levels of
gender inequality can impact on individual sleep in one of two ways. First, the individual
stressors and resources that affect men's and women's sleep may be conditioned by the macro
level of gender equality. This suggests that in gender-specific regressions of sleep quality the
predictors of sleep will interact with the macro level of gender equality. Similar to what Fuwa
(2004) found for housework, we may find for example, that women's resources and ideology
affecting sleep quality are discounted in gender unequal societies and enhanced in gender equal
societies (and we may find an opposite effects for men). A second way in which societal gender
equality affects sleep is via a general sense of well-being that affects everyone. Whereas there is
little doubt that patriarchy harms women, some scholarship suggests men, too, are harmed by
patriarchal definitions of masculinity, and are happier, less stressed, and more attentive to their
health in more gender equal societies. If so, we may find that after controlling for individual
covariates affecting sleep, the effect of societal gender equality is to improve the sleep of the
average man and woman, which would be reflected in the intercepts in the gender-specific
regressions of sleep quality. And, if gender equality is beneficial to both genders, then the
positive effect of societal gender equality on the intercepts should be of roughly similar
magnitude for men and women.

DATA AND MEASURES

Data

To test the research propositions above, this study combines individual-level data from
the 2006 European Social Survey (ESS) with macro-level data from the 2005 United Nations
Human Development Report (all data were obtained from the ESS web site:
http://www.europesocialsurvey.org/data/). We drew on the 2006 ESS because it had extensive
information on sleep and its work-family predictors relevant to the analysis below. The 2006 ESS originally interviewed 43,000 respondents, but we imposed several selection criteria to get a salient analytic sample of partnered Europeans enmeshed in the nexus of work-family responsibilities. That is, we omitted those who were single (n = 17,643), and those who were younger than 25 or older than 64 (n = 5,845; those younger than 25 may still be in university or have otherwise not yet settled into a career, while those older than 64 are likely to be retired). Of the remaining 19,512 respondents we retained 15,425 respondents because both they and their partners were either employed in paid work, seeking paid work, or doing care work within the home (i.e., we deleted 4,087 respondents if they or their partners were students, disabled, retired, or in the military). We omitted another 1,282 respondents because of missing data on analytic variables (two-thirds of which were refusals to report hours worked per week), leaving a final analytic sample consisting of 14,143 prime-age partnered Europeans distributed across 23 countries (Austria, Belgium, Bulgaria, Cyprus, Denmark, Estonia, Finland, France, Germany, Great Britain, Hungary, Ireland, Netherlands, Norway, Poland, Portugal, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, or Ukraine).

Restless Sleep

Sleep quality was assessed by a single item that specifically asked about sleep problems. Respondents were asked "how often in the past week their sleep was restless," to which they responded on a four-point ordinal scale. Because responses were highly skewed, we dichotomized the restless sleep measure, giving a score of 0 to those who none of the time or sometimes had restless sleep in the last week, and a score of 1 to those who often or all of the time slept restlessly in the last week.

Individual Predictors
The analytic models included controls for a number of potential demographic and health-related predictors of restless sleep. We measured age categorically (in years) as 25-34, 35-44 (the reference group), 45-54, and 55-64. Poor physical health was assessed by responses on a five-point ordinal scale (1 = very good to 5 = very bad) to the question "...how is your health in general?" ESS respondents were also asked how often in the past week they felt depressed, lonely, sad, bored, or anxious; responses ranged from 1 = none of the time to 4 = all of the time. The poor emotional health index was the mean of the five items (alpha = .75). Household size is the number of people (including the respondent) living in the household (capped at nine to reduce the influence of outliers), and a binary indicator tapped the presence of a young children (< 6 years old) in the household.

As for the respondent's education, employment status, and gender ideology, the models included a control for educational attainment of the respondent (measured on a 5-point ordinal scale ranging from 1 = less than a lower secondary education to 5 = tertiary education completed). Nearly two-thirds of respondents reported that both they and their partners were in paid employment, and most of the rest were providing care work within the home (i.e., relatively few respondents or their partners were seeking paid employment at the time they were surveyed). Thus, respondents and their partners were distinguished by whether or not they were in paid work, and their joint efforts were captured with a vector of three binary variables for respondent employed - partner not employed, partner employed – respondent not employed, and neither respondent nor partner were employed (respondents in dual-employed unions were the reference group). In addition, respondents' hours worked in the past week (capped at 85 hours to reduce the influence of outliers) was controlled; non-working respondents were assigned a value of 0 on the hours worked measure and the employment binaries defined above controlled for this
assignment. The ESS did not ask about the gender ideology of their partners, but respondents were asked a series of questions about women's traditional role within the family. Specifically, respondents answered from 1 = strongly disapprove to 5 = strongly approve if a woman: 1) chooses to never have children, 2) lives with a partner without being married to him, 3) has a child with a partner she lives with but is not married to, 4) has a full-time job while she has children aged under 3, and 5) gets divorced while she has children aged under 12. The progressive gender ideology index was constructed as the mean of the five items (alpha = .80).

To control for specific work/family stresses and worries that could affect sleep, respondents were asked "how much of the time did you find your job stressful" and "how much of the time spent with your immediate family is stressful." Responses to the job is stressful and family time is stressful ranged from 0 = none of the time to 6 = all of the time. Additionally, satisfaction with work-life balance was measured by the response (ranging from 0 = extremely dissatisfied to 10 = extremely satisfied) to the query "How satisfied are you with the balance between the time you spend on your paid work and the time you spend on other aspects of your life." For the job is stressful and work-life balance measures non-working respondents were assigned the mean on the respective measures, and the binary measures of employment defined above control for these assignments. Finally, to account for the stresses of low socioeconomic status that may affect sleep, ESS respondents were asked "how satisfied are you with your present standard of living; responses ranged from 0 = extremely dissatisfied to 10 = extremely satisfied.

We considered a number of additional factors that may affect restless sleep. These included the length of daylight/darkness that could affect sleep (fall was the reference category for being interviewed in winter, spring, or summer), and leading a sedentary lifestyle (assessed
by a 5-point Likert response set to the statement "my life involves a lot of physical activity").
Similarly being a member of an ethnic minority group or a non-citizen (versus being a member of the majority group or a legal citizen) may be stressful to respondents and disrupt their sleep.
We also considered that troubled sleep may depend on where one lived, and we created a vector of dummy variables for living in a large city, the suburb of a large city, a small town or on the farm (the reference group were those living in a country village). In housework studies it is common to account for differences in partners' resources, and we likewise constructed partner differences in educational attainment and weekly work hours (the 2006 ESS did not ask about partners' relative contributions to household income). Finally, we controlled for unemployment in the last five years and expectations about being laid off in the future. None of these additional controls significantly predicted restless sleep and were omitted from the models.

Country Predictors

A country's level of gender equality is measured by the United Nations' gender empowerment index (GEM), a composite of four measures: women's share of legislators in the national parliament, the percent of managers, legislators and senior officials who are female, women's share of workers in the professions, and the female-to-male wage ratio among full-time workers. The GEM index is an overall measure of women's agency in society and control over political and economic resources; it is scaled from 0 to 1 with higher scores indicating greater societal gender equality. The GEM index has been used extensively in prior research, but it has been criticized because wealthier countries tend to be more gender equitable (see Klasen 2006 for criticism of the measure); to account for this, the models will include a control for (log) GDP per capita. We also consider alternative measures of societal gender equality after presenting the main findings.
ANALYTIC MODELS

Due to the clustering of individuals within countries and the inclusion of country-level variables we analyze restless sleep in multi-level logistic regression models. We estimate random-intercept models that can be understood as a mixed model consisting of two equations (Raudenbush and Bryk 2002). First, the log odds of restless sleep for the $i^{th}$ individual in the $j^{th}$ country is modeled as a function of country intercepts ($\beta_o$) and a set of fixed individual characteristics; these logistic regressions are estimated separately by gender. Because the continuous predictors in the first-stage logistic regression are centered on their country-specific means, each country intercept is the log odds of sleeping restlessly for the average male / female resident of country $j$. Second, each country intercept is modeled as a function of a general intercept ($\gamma_{00}$), the gender empowerment index (GEM), log GDP/capita, and an error term. Both the GEM index and log GDP/capita will be centered on their respective grand means when entered into the country equations. Given the limited number of countries in our sample, we initially focus on random-intercept models and treat the individual-level variables as fixed effects; yet, per our discussion above, we will examine whether the individual predictors interact with the macro level of gender equality in predicting sleep. Even so, with a limited number of countries it is important to be parsimonious in estimating the country equations (Bryan and Jenkins 2015). The advantage of estimating a multi-level model is that the variation in restless sleep and the GEM index is conditioned by the individual-level variables; thus, the model assesses the effect of macro gender equality on restless sleep independent of the countries' population compositions.

RESULTS
Table 1 provides a descriptive overview of the measures of the key variables in the analysis. The information in table 1 is arrayed by the country's gender empowerment index score (GEM) shown in column 1 from the most (Norway) to least (Ukraine) gender equality. A cursory glance at column 1 shows that the Nordic states generally are the most gender equal societies, followed by northern European societies, with the southern European and post-socialist societies being the most gender unequal societies. Columns 2 – 3 show the proportion of respondents reporting restless sleep among men and women, respectively, and the gender difference in proportions is shown in column 4. The bottom of columns 2 and 3 show that across Europe, 10.7 percent of men and 16.3 percent of women slept restlessly in the week prior to being surveyed, yet there appears to be large country-to-country variation in restless sleep. Even so, column 4 reveals that in 22 of 23 countries a smaller proportion of men than women slept restlessly in the prior week (Austria being the lone exception), and that the gender gap in sleeping restlessly was significant in 17 of 23 countries. Further, the zero-order correlations between the GEM index in column 1 and men's and women's restless sleep in columns 2 and 3 are -.55 and -.44 (not shown), respectively, suggesting that lower proportions of men and women sleep restlessly with increased societal gender equality. Of course, as we pointed out above, the averages in columns 2 and 3 are based on aggregations of individual characteristics; to accurately assess the association between societal gender equality and restless sleep requires that we control for the demographic and employment compositions of countries.

(Tables 1 and 2 about here)

Table 2 shows descriptive statistics on the individual predictors of restless sleep, by gender. The right-most column in Table 2 shows the results of a t-test for the gender difference in means; given our expectation of gendered effects on sleep, all tests were evaluated in 1-tailed
tests. Men and women in this sample are equally likely to have a young child, subscribe to a progressive gender ideology, have a stressful job, and be satisfied with their standard of living. Otherwise, men and women differ significantly on the factors affecting restless sleep. Men tend to be older than women, yet women are in poorer physical and emotional health and live in larger households than men. Perhaps not surprising, men are more likely to work when their partners do not, and women are more likely to be non-working and have working partners. These gendered employment patterns account for why women's average weekly work hours lags behind men's by 16 hours per week (hours worked ~26 for women and ~42 for men). Perhaps because they are doing more care work than men, women are more likely than men to report that their time with family is stressful. Yet, women are more satisfied than men with the balance of time they spend on work and other aspects of their lives.

(Table 3 about here)

Table 3 shows the metric determinants of restless sleep. Model 1 allows the intercepts to vary across countries, while model 2 attempts to account for variation in the intercepts with GEM and log GDP/capita as predictors. In both models 1 and 2, the individual covariates predicting restless sleep are controlled; the right-most column of Table 3 identifies with "a" and "b" markers a significant gender difference in a covariate's effect on restless sleep in models 1 and 2, respectively. Although the dependent variable is binary, a preliminary OLS equation was run to test for collinearity among the predictors of restless sleep; none of the resultant variance inflation factors exceeded 4, indicating that collinearity was not present in the models of restless sleep (results available on request).

The first research proposition we advanced above is that because of gendered cultural expectations of women and men, family- and work-related covariates had stronger effects on
women's and men's sleep, respectively. We find support for this proposition when examining the presence of children in the household. Compared to women with older or no dependent children in the home (i.e., the reference group), the log odds of sleeping restlessly significantly increase by ~.31 in models 1 and 2 (p < .05) when women have a child younger than six. By contrast, having a young child has no effect on men's sleep, and the gender differences in the effects of having a young child on restless sleep are significant in models 1 and 2. These results are consistent with other studies (Burgard 2001; Maume et al. 2010) showing that mothers are more accountable than fathers for the care of young children, an obligation that disrupts women's sleep to a greater extent than men's. On the other hand, we do not see that women's sleep is uniquely disturbed by strained family relationships, as the effect of stressful family time on restless sleep is nearly identical in magnitude for women and men alike (b ~.09 for women and b~.10 for men in models 1 and 2, all effects p < .05).

Table 3 also provides evidence that adherence to cultural expectations that men work to support the family remains strong among partnered Europeans. Compared with the reference group of those in dual-employed unions, women who work when their partners do not are more likely to report restless sleep (b ~ .65 in models 1 and 2, p < .05). Similarly, the log odds of restless sleep significantly increase among non-employed women whose partners are also not working. Men's sleep, by contrast, is unaffected when they work and their partners do not, or when both they and their partners are not employed. Rather, men are significantly more likely to report restless sleep when it is their partners who are working and they are not (b = .592 in model 2, p < .05); the corresponding effects for women are half as large as men's such that the gender differences in slope effects are not significant. As others have argued, many have come to accept women's career pursuits, but few have abandoned the notion that men should be family providers
(Esping-Andersen 2009; Monna and Gauthier 2008; Ridgeway 2011). These results -- that women sleep restlessly when their partners are not employed, and men sleep restlessly when their partners are breadwinners – are consistent with this notion that cultural expectations of men's role in family life has changed slowly if at all. Similarly, men's expectations that they be family providers is reflected in the negative sleep effect of satisfaction with the household's standard of living among men (b ~ -.08 in models 1 and 2, p < .05), an effect that is significantly larger than the null effect of satisfaction with living standards on women's restless sleep. Finally, having a stressful job is associated with an increase in the log odds of restless sleep, but the positive effect is significant and of similar magnitude for women and women alike.

The sleep effects of the demographic and health variables are largely similar by gender. The exception is age, in which among women only those ages 55-64 report significantly more restless sleep than the reference group of women ages 35-44. By contrast, the youngest (ages 25-34) and oldest (ages 55-64) men in the sample report more restless sleep than men ages 35-44. Otherwise, as physical and mental health worsen, restless sleep increases among men and women alike.

Turning now to the country equations at the bottom of Table 3, the intercepts (βo) shown in models 1 and 2 are the expected log odds of suffering from restless sleep for the average man and women across the 23 countries in Europe. Model 1 omits the country predictors and model 2 includes the GEM index and log GDP/capita in the equations predicting the intercepts. A comparison of the error variances for the intercept in models 1 and 2 (shown at the bottom of the Table) reveals that given the non-significant effect of log GDP/capita in all models, the GEM index largely explains 45.8% (.458 = [.085 - .046] / .085) and 40% of the variation in the women's and men's intercepts, respectively.
The results clearly show that increased societal gender equality is associated with a significantly reduced likelihood of sleeping restlessly. Importantly, the results affirm the research proposition above that one way societal gender equality affects sleep is via is similar effects on the sleep of the average man and women; indeed, the societal GEM score has a similarly beneficial effect on reducing restless sleep for women (b = -3.515, p < .05) and men (b = -3.548, p < .05) alike. To better interpret these results, the predicted probability of sleeping restlessly for the average person was estimated across the range of societal gender equality observed across Europe. That is, we substituted into the country equations (model 2) the centered values for minimum / average / maximum values of gender equality (see Table 1 for minimum for Ukraine = -.25 = .36 - 71; average = 0 = .71 - .71; maximum for Norway = .22 = .93 – 71;) while holding log GDP/capita constant at its centered mean of 0. After transforming the resultant log odds to probabilities, Figure 1 plots the results.

(Figure 1 about here)

Figure 1 shows in a more intuitive way that the incidence of restless sleep varies significantly with societal gender equality. For example, the average woman has a .24 probability of sleeping restlessly if she lives in a country with the lowest level of gender equality (i.e, Ukraine), a probability that is twice as large as the woman who lives in country at the average level of gender equality, while the woman who lives in a country at the maximum level of gender equality has only a six percent chance of sleeping restlessly. The plot line for the average man is always below that of the average women, but exhibits a similar downward trend in the likelihood of sleeping restlessly with increasing gender equality. It is also noteworthy that the gender gap in the probability of sleeping restlessly is four times larger in more gender-unequal (gap = .08 = .24 for women minus .14 for men) than in gender-equal (gap = .02 = .06 - .04) societies. That the
freedoms of living in a society that emphasizes progressive gender norms and guarantees opportunities for women should be associated with an improvement in women's sleep is perhaps understandable, but men also sleep better in gender equal societies. As others have argued, patriarchal gender norms construct expectations of masculinity, the stresses of conforming to which can be injurious to men's health and happiness. Gender equality challenges hegemonic masculinity, giving men greater license to act in ways that improves their health, including getting better sleep at night. Our macro-level results -- men sleep better in gender equal societies -- are consistent with these arguments and with the small but growing body of research showing that men are healthier in more gender equal societies.

Whereas the results in Table 3 and Figure 1 affirm that the average man and woman alike sleep better when they live in a more gender-equal society, we also proposed above that macro gender equality may condition the effects of individual covariates in predicting restless sleep. To test this we freed selected covariates (one at a time) to interact with the GEM index score in predicting restless sleep. These selected covariates included have a young child (<6) in the household, the couple employment status binaries, hours worked per week, stress in family life and on the job, satisfaction with work-life balance, and satisfaction with their standard of living. In no case were the cross-level interactions significant; i.e., gender empowerment had no significant effects on the magnitude of these covariates in predicting restless sleep. Thus, model 2 in Table 3 accurately captures the associations with restless sleep, and the effects of societal gender equality are primarily on the reports of restless sleep for the average man and woman in a given country (i.e., the intercepts) rather than for specific groups (i.e., parents of a young child) living in more (or less) gender equal countries.

Additional Analyses
We performed several additional analyses to examine the robustness of our findings (the results of which are available on request). First, we limited the analytic sample in two ways to examine the restless sleep effects of being increasingly enmeshed in the work-family nexus of responsibilities. That is, from our original sample of partnered Europeans, we limited the sample to those who were employed (n = 5,180 women; n = 6,305 men), and then limited it again to employed respondents whose partners also work for pay (n = 4,986 women; n = 4,712 men). In both of these sub-samples, we re-ran model 2 of Table 3, and found that the basic pattern of our results was confirmed: i.e., family covariates, especially having a child under 6 years old for women, increased women's reports of restless sleep, whereas satisfaction with the family's living standard was associated with decreased reports of men's restless sleep. Most important, the effect of societal gender inequality on the restless sleep of the average women was strongly and significantly negative among employed women and among women in dual-employed unions. For men, the negative effect of GEM on restless sleep was strongly and negatively related to restless sleep among employed men, but weakened slightly and became non-significant in the subsample of employed men with employed partners (i.e., men in dual-earner households). Nevertheless, when we reproduced the plots in Figure 1 in the subsamples of the employed and dual-employed partnered Europeans, it was still the case that for men and women alike the likelihood of sleeping restlessly declined with societal gender equality. This suggests that the results shown in Table 3 and Figure 1 for partnered Europeans are robust in smaller samples of employed- and dual-employed partnered Europeans.

Second, our main finding is that gender equality across 23 European countries reduces the likelihood of sleeping restlessly for men and women alike. But, Bryan and Jenkins (2105) caution that when the number of countries is smaller than 25, the estimates of country effects
may be unreliable; more important, the standard errors of the country effects are potentially biased downward, leading to inferences of significant country effects when none actually exist. Alternatively, Bryan & Jenkins (2015:4) suggest a two-step regression approach in which the first step is to estimate gender-specific equations for restless sleep with the controls shown in Table 2, and with the addition of a dummy variable for each country of residence (less a reference country). We estimated such an equation and then added the slope for each country binary to the constant, yielding an estimate of the log odds of sleeping restlessly for the average man and woman in each country. In the second step these n=23 country averages for each gender were regressed onto the GEM index score. This two-step approach yielded the same results as those obtained from the hierarchical linear model shown in Table 3; i.e., for the average man and woman restless sleep declined with gender equality.

Third, and on a related point, the country equations shown in model 2 of Table 3 include both the GEM index and log GDP/capita as predictors of the log odds of restless sleep for the average man and woman. This could present problems because of the small-N distortion (discussed above) when estimating country effects with an additional control for national wealth. Relatedly, there is potential collinearity in the country equations, as the correlation between GEM and log GDP is .87 (result not shown). One solution to both of these issues would be to initially regress the GEM index onto (log) GDP/capita and compute the difference between the observed and predicted GEM index scores. The residual gender empowerment index is now independent of national wealth, and has a score of 0 when women's equality is at the level one would expect given the country's level of development, and positive/negative residuals indicate that women's equality is greater than/less than expected given the level of development. When we substituted the residual gender empowerment index score for the original GEM and log
GDP/capital into the country equations in model 2 of Table 3, the results were the same. That is, the average man and woman reports a lower likelihood of sleeping restlessly with greater residual gender equality.

Finally, as noted above the GEM index has been criticized because a central component of the index is the female-male ratio of absolute incomes. But, because richer countries have higher absolute incomes they score higher on the GEM and poorer countries score lower on the GEM, irrespective of the actual shares of national income that women actually earn (Klasen 2006). Others have criticized the GEM index as being too narrowly measured, missing other and better measures of women's status in society such as reproductive rights and health, educational attainment, and labor force participation. To account for these criticisms, some scholars have revised the GEM index to better measure the shares of income earned by men and women independent of national wealth (Klasen and Schüler 2011), and in 2010 the UN introduced a new measure, the Gender Inequality Index (GII) to address the limitations of the GEM. We chose to measure societal gender equality with the GEM index because it has been used extensively in prior research, but our results in Table 3 and Figure 1 may be sensitive to this choice.

Alternatively, Klasen and Schüler (2011) revised the GEM index to better capture the extent of gender inequality in a country independent of its wealth; their alternative measure is for the year 2004 and has the effect of increasing the GEM score for poorer countries score and reducing it for wealthier countries. The UN's GII is for 2005 and is scaled from 0 to 1 but in the opposite direction as GEM; i.e., higher values indicate greater gender inequality. In separate analyses by gender, we substituted these alternative measures (deviated from their grand means) into the country equations in model 2 of Table 3 and obtained substantively similar results. Further, we plotted the probability of reporting restless sleep for the average man and woman against the
revised GEM index (figure 2b) and the GII (figure 2b), the results of which can be compared with Figure 1 which has the original GEM index on the x-axis. As figures 2a and 2b show, the results are similar in showing that for the average woman the incidence of restless sleep decreases with gender equality. And, similar to what figure 1 shows, men in figures 2a and 2b are less likely to report restless sleep than are women, but their trend line parallels that of women; i.e., men, too, are less likely to report sleeping restlessly at higher levels of gender equality. These results suggest that our findings above are consistent irrespective of which of the UN-sponsored measures of gender equality are used as a measure of societal gender equality.

**DISCUSSION**

This article situated poor sleep in the work-family nexus. The models were run separately by gender to provide insight into the gendered process by which work and family stressors affect reports of sleeping restlessly. Other studies have similarly shown that work experiences and family dynamics affect sleep, but in samples drawn from a single country (Arber et al. 2009; Burgard & Ailshire 2009; Hislop & Arber 2003; Maume et al. 2009; Sekine et al. 2006). We examined gendered sleep antecedents in cross national context. In previous research significant relationships have been found between macro-level gender inequality and time in housework, work-family conflict, and well-being (Dahlin & Härkönen 2013; Fuwa 2004; Ruppanner 2011; van der Lippe et al. 2006). Ours is the first study to examine gender differences in sleeping restlessly across national contexts.

At the individual level, we hypothesized that gendered role obligations during waking hours affected sleep at night. Because women are primarily family caregivers, women's sleep was troubled when they had a young child in the home. Among men, the presence of children had no effect on their reports of restless sleep. Yet, men remain accountable to cultural
expectations that they be economic providers, and they slept restlessly when they depended on their partners to support the family, or when they were otherwise concerned about the family's standard of living. Women, too, slept significantly more restlessly when they were the sole provider in the family, or when both they and their partners were not employed.

Our main finding was focused at the national level: both the average woman and man sleep better when living in gender equal societies. It is understandable why women's sleep might be more troubled when they live in patriarchal societies. But, we suggest that patriarchy harms men too, in that in gender unequal societies men are expected to conform to a hegemonic masculinity, the behavioral markers for which are abusing or neglecting their health. Gender equality challenges hegemonic masculinity, giving men more freedoms to care for themselves, and this may extend to getting better sleep. In advancing this interpretation of our main finding, we draw on a body of research linking gender equality to lowered stress and greater happiness in individuals (Dahlin & Härkönen 2013; Hopcroft and Bradley 2007; Mencarini & Sironi 2013; Van de Velde et al. 2013). This study extends this line of research to another health outcome, showing that gender equality is associated with sounder sleep for men and women alike.

Our study shows that gender inequality is associated with restless sleep, but limitations in our study suggest the need for further research. First, at the individual level we were unable to control for taking medications, smoking, drinking, and obesity, factors which in other research have shown to be related to sleep disruption (Maume et al. 2009). Other studies also show that it is not just how much people work, but when they work that affects sleep; specifically those who work at night often have shorter and more fragmented sleep during the day (Garey 1995; Maume et al. 2009). Additionally, we lacked a measure of control for women's share of the couple's income, a factor which is strongly related to bargaining power over who does the housework /
childcare, and may likewise affect bargaining over rights to a restful sleep. Finally, time in care work interferes with sleep (Burgard and Ailshire 2013) yet the ESS 2006 lacked measures of time in housework and child care. Because we control for a range of measures tapping household demographics, job quality, family dynamics, and economic standing we may be capturing some of this omitted variable bias, but that is an empirical question that should be addressed in future research. Second, respondents in our study reported only on their own sleep patterns, and we lacked information on partner's sleep habits. Qualitative research has established that partners affect each other's sleep, and future quantitative studies of couples' sleep can further establish how couples' work-family obligations affect bargaining of who gets rights to a restful sleep at the time of their choosing.

Despite these limitations, our study is the first to establish that sleep is influenced not only by gendered work and family stressors at the individual level, but also by the strength of a nation's commitment to gender equality, the benefits of which extend to both women and men. Given the time pressure and strains associated with contemporary work and family life across most developed nations, our findings suggest that there is a place for government policy to alleviate this pressure which will have positive flow on effects for individual’s sleep and ultimately their health and wellbeing.
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