

SOCIAL SUPPORT, DISCRIMINATION,
AND SLEEP QUALITY IN
AFRICAN AMERICAN
ADULTS

by

ANDREA NICOLE DECKER

MATTHEW R. CRIBBET, COMMITTEE CHAIR
HEATHER GUNN
CASEY TOTENHAGEN

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ABSTRACT

Past literature demonstrates that poor sleep quality has adverse effects on mental and physical health, particularly for African Americans. Additionally, while stressors, such as discrimination, have been shown to negatively impact sleep, support from romantic partners or other in one's network may have an important stress-buffering effect. To test the hypotheses that 1) more experiences of discrimination predict poorer sleep quality and 2) spousal support acts as a buffer against the effects of discrimination on sleep quality above and beyond other sources of support, 73 African American couples completed an online survey, which assessed recent sleep habits, sources of support, and experiences of discrimination within the past week. Using multilevel modeling to account for the nesting of data within couples, we found that individuals who report more experiences of discrimination are more likely to experience poorer sleep quality. Additionally, we found that higher levels of partner support, but not other support, predicted improved sleep quality. Finally, no buffering effect of either source of support was detected. However, follow-up analyses revealed that support from either source can buffer the effect of discrimination on sleep duration. The buffering effect of partner support was such that the inverse association between discrimination and sleep duration was only present for individuals who reported that their partners were ambivalent, and not for those who reported supportive partners. The buffering effect of other support was such that the inverse association of discrimination and sleep duration was stronger for those who reported being less satisfied with the support they receive from their networks than for those who report being more satisfied. These findings are critical for developing our understanding of risk factors for poor sleep and the

related adverse health. By improving our understanding of these relationships, we can inform future interventions that can mitigate risk of poor sleep quality and adverse health outcomes in African Americans.

LIST OF ABBREVIATIONS AND SYMBOLS

<i>a</i>	Cronbach's index of internal consistency
<i>b</i>	Unstandardized regression coefficient
<i>F</i>	Fisher's F ratio: A ration of two variances
<i>p</i>	Probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value
<i>r</i>	Pearson product-moment correlation
<i>t</i>	Computed value of t test
<	Less than
=	Equal to
\$	Dollar amount
%..	Percent
SE.	Standard error

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INTRODUCTION

The National Sleep Foundation's 2012 Bedroom Poll reports that 63% of adults sleep with a significant other (National Sleep Foundation, 2012). As such, it is important to consider the dyadic nature of sleep, and how relationship functioning may impact sleep quality (Troxel, 2010; Troxel, Robles, Hall, & Buysse, 2007). Poor sleep quality is associated with many physical and mental health outcomes such as cardiovascular disease risk (Hoevenaar-Blom, Spijkerman, Kromhout, van den Berg, & Verschuren, 2011), incidence of depression, and anxiety (João, Jesus, Carmo, & Pinto, 2018; McCrae et al., 2008), and perceived physical and mental health (Furihata et al., 2012). Research shows that between 15 -35% of adults report poor sleep quality (Bixler, Kales, Soldatos, Kales, & Healey, 1979; Furihata et al., 2012; Karacan et al., 1976; Mellinger, Balter, & Uhlenhuth, 1985), and African Americans have increased risk for poorer sleep quality and the related poor health outcomes (Mezick et al., 2008; Patel, Grandner, Xie, Branas, & Gooneratne, 2010), such as obesity (Bidulescu et al., 2010) type 2 diabetes (Knutson, Ryden, Mander, & Van Cauter, 2006), and higher levels of inflammation and preterm birth (Blair, Porter, Leblebicioglu, & Christian, 2015). There is a substantial need for improvements in our understanding of the disparities that affect sleep in African Americans. Using a biopsychosocial model of sleep (Troxel et al., 2007), the proposed study will investigate the impact of experiences of perceived discrimination on sleep quality in African Americans and how social support may buffer this relationship.

Marriage and Sleep Quality

Examining the impact of relationship functioning on sleep is critical for understanding sleep processes in adults in romantic relationships. A review from Troxel, Robles, Hall, & Buysse (2007) provides a conceptual model of biopsychosocial pathways to address the relationship between relationship functioning and sleep. The model proposes that a partner is often a powerful stress-buffer in healthy relationships by down-regulating physiological and psychological stress responses, encouraging positive health behaviors, and discouraging negative health behaviors that may negatively affect sleep. Conversely, the model suggests that distressed relationships may serve as a main source of stress and strain, contributing to increased physiological and emotional arousal, negative health behaviors, and increased risk for sleep disturbance and sleep disorders. Moreover, this model highlights that the association between sleep and relationship quality is likely bidirectional.

As the central relationship for most adults, marriage provides a context for examining associations between sleep and relationship quality. Indeed, a study of 927 women found that greater marital satisfaction predicted decreased sleep problems (Prigerson, Maciejewski, & Rosenheck, 1999), and a longitudinal study in older adults found that as marital quality improved, sleep quality improved as well (Lee, Chopik, & Schiamberg, 2017). Additionally, a multiethnic study of marital happiness and sleep in women found fewer sleep disturbances in women who reported greater marital satisfaction. This association was stronger in Caucasian women than in African American women, but it was significant for both (Troxel, Buysse, Hall, & Matthews 2009). This suggests that there may be racial differences in the relationship between marital satisfaction and sleep.

Discrimination and Sleep Quality

Sleep quality is a subjective assessment, though it may correlate with slow wave sleep (Riedel & Lichstein, 1998). It consists of sleep continuity and feeling refreshed upon waking (Harvey, Stinson, Whitaker, Moskovitz, & Virk, 2008; Libman et al., 2016; Ohayon et al., 2017). The model of biopsychosocial pathways highlights stressful life events as a potential vulnerability factor that can affect the bidirectional relationship between relationship functioning and sleep (Troxel et al., 2007). In fact, a volume of cross-sectional and longitudinal studies suggest that stress diminishes sleep quality (Almojali, Almalki, Alothman, Masuadi, & Alaqeel, 2017; Burgard & Ailshire, 2009; Crain et al., 2014; Knudsen, Ducharme, & Roman, 2007), though much of this literature has focused on work related stress. Higher daily stress may lead to diminished sleep quality through heightened pre-sleep arousal (Fernandez-Mendoza et al., 2010; Winzeler et al., 2014). The relationship between sleep quality and stress may be particularly important in African Americans, as one study found that psychosocial stress moderated the relationship between sleep quality and obesity in women in an African American sample (Bidulescu et al., 2010), while another study found that higher levels of perceived stress predicted poorer sleep quality and incidence of insomnia in Black college women (McLaurin-Jones, Anderson, Marshall, Lashley, & Carter-Nolan, 2020).

In fact, African Americans may be differentially exposed to psychosocial stressors compared to Caucasians, especially when considering discrimination as a class of psychosocial stressors (Kessler, 1997). Discrimination, which can be defined as different or unjust treatment based on group membership (i.e. race, gender, age, sexual orientation; Williams, Lavizzo-Mourey, & Warren, 1994) affects African Americans above and beyond any other racial/ethnic group (Everson-Rose et al., 2015; Kessler, Mickelson, & Williams, 1999; Lewis et al., 2013).

Experiences of discrimination can negatively impact emotional and physical well-being (Kessler et al., 1999; Lewis, Cogburn, & Williams, 2015; Mouzon, Taylor, Keith, Nicklett, & Chatters, 2017; Pascoe & Richman, 2009; Schmitt, Postmes, Branscombe, & Garcia, 2014). In particular, experiences of discrimination have been positively associated with obesity and visceral fat (Cozier et al., 2014; Lewis, Kravitz, Janssen, & Powell, 2011), nighttime blood pressure non-dipping (Beatty & Matthews, 2009; Brondolo et al., 2008; Tomfohr, Cooper, Mills, Nelesen, & Dimsdale, 2010), and inflammation (Lewis, Aiello, Leurgans, Kelly, & Barnes, 2010). Finally, experiences of discrimination have been prospectively linked to hypertension (Dolezsar, McGrath, Herzig, & Miller, 2014) and all-cause mortality (Barnes et al., 2008).

Poor sleep may be a mechanism through which discrimination impacts health. A review from Slopen, Lewis, & Williams (2016) identified seventeen studies to evaluate the relationship between discrimination (which included any form of unfair treatment) and self-reported and objectively assessed sleep outcomes (duration, difficulties, and sleep architecture). All of these studies highlighted at least one association between discrimination and a measure of poorer sleep. Most of these studies addressed interpersonal discrimination and self-reported sleep outcomes. Another study measured every day experiences of discrimination and sleep quality and found that individuals who reported more experiences of discrimination also experienced poorer sleep quality compared to those who reported fewer experiences of discrimination (Vaghela & Sutin, 2016). Additionally, increased experiences of racial discrimination in particular has been shown to predict poorer sleep quality in African Americans (Hoggard & Hill, 2016). Overall, there is a clear connection between experiences of discrimination and poor sleep outcomes.

The Stress Buffering Effects of Social Support

Research suggests that greater interpersonal distress may lead to increased pre-sleep arousal (Gunn, Troxel, Hall, & Buysse, 2014). Conversely, a meta-analysis found that greater social support is associated with better sleep outcomes, regardless of type of social support provided (Kent de Grey, Uchino, Trettevik, Cronan, & Hogan, 2018).

Social support can be broken down into two major components: structure (the existence of relationships or network size) and function (a network's ability to provide resources to the individual). An overall beneficial effect of social support is found when the social support measure assesses the individual's level of integration in a social support network. However, a stress-buffering effect can be found when the social support measure assesses the perceived availability of support in the face of stressors, assuming that the support addresses the demands of the stressor. The stress-buffering model of social support proposes that social support might mitigate the negative health outcomes associated with stress through cognitive appraisal processes, such as through the individual's interpretation of the stressor and their coping resources (Cohen & Wills, 1985).

Functional support can be actual or perceived, and can be further broken down into 4 categories: emotional support (i.e. expressions of caring from others), informational support (i.e. information that might be used to deal with one's stress), belonging (i.e. the availability of others with whom the individual can engage in social activities), and tangible support (i.e. instrumental aid; Karen Glanz, Barbara K Rimer, & K. Viswanath, 2015). When these domains of functional support are measured, a stress buffering effect can be found on cardiovascular function (Steptoe, 2000; Uchino, Cacioppo, & Kiecolt-Glaser, 1996) and sense of wellbeing (Terry, Nielsen, & Perchard, 1993). The support providers in these studies included spouses and other key figures,

but familial support may be particularly important (Uchino et al., 1996). Additionally, a study on Black and White families suggests that Black individuals focus more on offerings of instrumental support to family members, whereas White individuals focus more on offerings of emotion or financial support (Sarkisian & Gerstel, 2016).

While one study did not find support for the stress buffering model on the effects of perceived racial discrimination on psychological adjustment (Prelow, Mosher, & Bowman, 2006), other studies did find a stress-buffering effect of social support on systolic blood pressure (Clark, 2006) and emotional well-being (Steers et al., 2019). Notably, the first study did find that perceived racial discrimination was associated with lower perceptions of social support, greater symptoms of depression, and lower levels of life satisfaction. Perhaps social support acts differentially on the adverse mental and physical health effects of discrimination.

Finally, in a study that compared church based and secular support in older Black and White adults, church-based emotional support reduced the impact of financial strain on self-rated health, while support from secular network members did not. This was only true for Black older adults (Krause, 2006). When evaluating the stress-buffering model in African Americans, church-based support may be an important consideration.

PRESENT STUDY

Despite the large volume of literature that demonstrates the adverse effects of poor sleep quality and that marital quality, social support, and stressors, such as discrimination, are important predictors of sleep, more research is needed for these domains in African Americans. This is especially true given that past research has highlighted that African Americans disproportionately experience poorer sleep quality (Mezick et al., 2008; Patel et al., 2010). Therefore, the antecedents underlying this disparity are important to understand. Discrimination may be a vulnerability factors that puts African Americans at risk of poorer sleep quality (Slopen et al., 2016), but much of the literature that highlights the relationships between daily stress and sleep quality focuses on work-related stress in Caucasians (Burgard & Ailshire, 2009; Crain et al., 2014; Knudsen et al., 2007). Additional research is needed to evaluate this relationship when discrimination is the stressor. Additionally, the literature shows that spousal support can offer distinctive protections against stressors, but much of this research has been done in Caucasian samples. It is important to understand how these relationships replicate in different populations and if the type of support measured (i.e. spousal vs. other) matters.

The proposed study recruited a sample of African American couples who currently live together and are at least 18 years old. The first aim is to replicate past findings that show an inverse relationship between levels of perceived discrimination and sleep quality. The next aim is to test the hypothesis that spousal support acts as a buffer against the effects of discrimination on sleep quality above and beyond other sources of support.

We hypothesize that daily discrimination will be inversely correlated with sleep quality as past research has demonstrated. Next, we hypothesized that spousal support will buffer the relationship between discrimination and sleep quality above and beyond the role of other sources of support when both are added to the model. Each type of support is expected to moderate the relationship between discrimination and sleep quality, such that the association between discrimination and sleep quality is weaker for an individual who rates higher support compared to those who rate lower support.

METHOD

Participants

From December 2021 to February 2022, African American couples were recruited through Facebook advertising to complete an online survey that asked about experiences of discrimination, perceived social support and sleep. 887 individuals completed a brief online screener. Participants were required to be in a heterosexual relationship and share a bed at least four nights per week with their partner. Both partners were required to complete the survey independently. Individuals were excluded if they reported a diagnosis of obstructive sleep apnea or restless leg syndrome, had a history of major health problems (e.g., cardiovascular diseases, immunological diseases, or cancer), were currently pregnant, or took medications for the purpose of initiating or maintaining sleep (e.g., Ambien, Lunesta, Doxepin). After screening, 370 individuals were eligible, and 189 participants completed the full survey at the time of this study.¹ Participants were compensated \$20 for participating in this study. Data from 6 participants were deleted because they completed the survey multiple times, and 4 participants reported that they were in a marital like relationship and therefore were not included in analyses. Another 11 participants did not provide sleep quality data. Finally, the partners of 22 participants have not yet completed the survey, so their data was also excluded from analysis, thus leaving 146 participants (mean age = 30.54; 50.0% female) in the final dataset.

¹ We continued to accrue participants at the time of these analyses.

All participants reported that they were married and lived with their partner. Most participants had children (76.7%). On average, participants had been married for 6.40 years. Of the 63 participants who completed the Stop Bang Questionnaire, majority reported low risk of sleep apnea (61.9% = low risk, 31.7% = moderate risk, and 6.3% = high risk). Of the 146 participants who completed the ISI and ESS, majority reported no clinically significant insomnia (31.5%) or subthreshold insomnia (35.6%). Additionally, majority of the sample (91.1%) reported high daytime sleepiness. On average, participants slept 6.64 hours (SE = 0.18) and took 23.58 minutes (SE = 2.15) to fall asleep. A majority of participants rated their sleep quality as good (30.1%) or fairly good (47.3%). Finally, majority of the sample (69.4%) rated their partners as ambivalent, while the rest of the sample (30.6%) rated their partners as supportive. No participants rated their partners as indifferent or aversive.

Procedure

Interested participants responded to an ad on Facebook that called for African American couples who were willing to participate in online research. Participants were emailed a link to a brief online screening form, where they provided their race, age, sex, the number of years they've spent with their partner, whether they live together, how many nights per week they share a bed, self-reported diagnosed sleep disorder and disease history, whether they were currently pregnant, and any medications they take for sleep.

Once a participant was eligible, a researcher sent them a link to a larger online survey administered using Qualtrics survey software (Provo, UT). Participants and their partners completed an online survey, where they provided demographic data and responded to questions about their sleep over the past month, perceived experiences of discrimination over the past

week, the social support that they receive from their partner, other family members, and close friends. Participants also reported on their exercise habits and substance use.

Measures

Sleep Quality

Participants completed the Pittsburgh Sleep Quality Index (PSQI; Buysse, Reynolds, Monk, Berman, & Kupfer, 1988). The PSQI is a well validated measure of general sleep habits. It is a 19-item self-report measure that assessed participants' average sleep quality over the past month. Participant responses yielded seven component scores —sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, sleep medication, and daytime dysfunction. Each component score had a range of 0-3, with lower scores indicating better sleep outcomes. An overall global score was computed by summing the seven composite scores. Global scores had a range of 0-21, with lower scores indicating overall better sleep. Additionally, wake after sleep onset was calculated from questions about average times in and out of bed, sleep onset latency, and sleep duration. The sleep quality component score was included in data analyses as a continuous variable. Sleep duration, sleep onset latency, wake after sleep onset, and sleep efficiency were later included in additional analyses to further understand which components of sleep quality may be affected by experiences of discrimination. In this sample, the PSQI global score has a Cronbach's α of .94.

Discrimination

The Past Week Discrimination Scale (PWDS) of the Perceived Ethnic Discrimination Questionnaire-Community Version (PEDQ_CV; Brondolo et al., 2005) was administered to assess self-reported exposure to discrimination in the past week. The PEDQ-CV is typically a 70-item questionnaire consisting of five scales, but only the 10-item past week scale was

administered in this study. Participants were asked about the frequency with which instances of social exclusion, stigmatization, and threat/harassment occurred to them during the past week. Items were rated on a 4-point scale from 0 (not at all), 1 (once per week), 2 (twice per week) to 3 (3 or more times per week). A total score was created by summing the items and included in the analyses as a continuous variable. In this sample, the Cronbach's α is .93.

Support

Spousal Support. The Social Relationships Inventory (SRI; Campo et al., 2009) was used to categorize the type of relationship that a participant had with their partner in terms of how much support they receive. Participants rated their partner based on how much the partner helps them when they need advice, understanding, or a favor using a scale of 1 (not at all) to 6 (very much). Relationship positivity will be calculated from these three items. A threshold approach was used to categorize relationships as indifferent (i.e., "1" on both positivity and negativity), supportive (i.e., "2" or greater on positivity and only a "1" on negativity), aversive (i.e., only a "1" on positivity and "2" or greater on negativity), or ambivalent (i.e., "2" or greater on both positivity and negativity). In order to compare ambivalent relationships to supportive relationships, partner support was dummy coded (i.e. supportive = 1; ambivalent = 0). In this sample, the SRI has a Cronbach's α of .77 for positive measures and .88 for negative measures.

Other Support. Participants completed the 6-item Social Support Questionnaire (SSQ: Sarason, Sarason, Shearin, & Pierce, 1987) to assess their satisfaction with the amount of social support they receive from their support network in different domains (e.g., helping them feel more relaxed when they are under pressure or tense; helping them feel accepted; feeling cared for). Participants were asked to rate their satisfaction for each item, ranging from 1 (very

dissatisfied) to 6 (very satisfied). A total support score was calculated by averaging these 6 ratings and included in the analyses. In this sample, the SSQ has a Cronbach's α of .91.

Health Behaviors

Exercise. The Leisure Time Exercise Questionnaire (LTEQ) (Godin & Shephard, 1985) is a 4-item scale that assessed participants' usual leisure-time exercise habits. The first question prompted participants to enter the number of times per week they typically engage in strenuous, moderate, and light exercise. These frequencies are multiplied by nine, five, and three respectively and then summed. Scores 0-13 indicate a sedentary lifestyle, 14-23 indicate a moderately active lifestyle, and 24+ indicate an active lifestyle. Exercise was dummy coded (i.e., sedentary = 0; moderately active = 1; active = 2) and included in the analyses. In this sample, the LTEQ has a Cronbach's α of .71. This variable was included as a covariate in statistical analyses.

Alcohol Use.

Participants were asked to report how many alcoholics drinks they typically consume each day of the week. The number of drinks was summed across each day of the week to generate an average weekly alcohol consumption score. This score was included in analyses as a covariate.

Sleep Disorders

The following measures were used to provide further confirmation of reported diagnoses of sleep disorders.

Obstructive Sleep Apnea.

In order to assess participants' risk for obstructive sleep apnea, they completed the Stop-Bang Questionnaire (Chung, Abdullah, & Liao, 2016). Participants answered yes or no to five

questions that can predict increased risk of sleep apnea (e.g., do you snore loudly?). They also provided their height (inches) and weight (pounds) so that BMI could be calculated. For each item endorsed by the participant, one point was added to their score. Additionally, a point each was added if the participant was older than 50, male, or had a $BMI > 35$. 0-2 points indicated low risk for obstructive sleep apnea, 3-4 points indicated moderate risk, and 5-7 points indicated high risk. The sensitivity of this measure to detect obstructive sleep apnea ranges from 66.2-96% (Nagappa et al., 2015; Tan et al., 2016)

Insomnia.

In order to assess participants' insomnia severity, they completed the Insomnia Severity Index (ISI; Morin, 1993). The ISI is a seven-items questionnaire that assesses severity of sleep-onset, maintenance, early morning awakenings, other sleep problems, satisfaction with current sleep pattern, interference with daily functioning, impairment attributed to the sleep problem, and level of distress caused by the sleep problem in the past 2 weeks (e.g., how worried are you about your current sleep problem?). Items are rated on a five-point Likert scale ('0'= not at all, '4'= extremely). Total scores range from 0 to 28, with high scores indicating greater insomnia severity. Scores of 0-7 indicated no clinically significant insomnia, 8-14 indicated subthreshold insomnia, 15-21 indicated moderate clinical insomnia, and 22-28 indicated severe clinical insomnia. In this sample, the ISI has a Cronbach's α of .90.

Daytime Sleepiness.

Participant's daytime sleepiness was estimated using the Epworth Sleepiness Scale (ESS; Johns, 1991). The ESS is an 8-item measure that asks participants to rate the likelihood that they would doze off from 0 (would never doze) to 4 (high chance of dozing) in various scenarios (e.g., sitting and reading). The scores are summed to yield a total score, which range from 0-24.

Total scores above 16 indicate high daytime sleepiness. In this sample, the ESS has a Cronbach's α of .85.

Overview of Analyses

Bivariate correlations were conducted to examine the relationships between discrimination, sleep quality, partner support, and other support. Multilevel analyses were performed using PROC MIXED (SAS Institute) to account for nested data when testing associations among discrimination, sleep quality and social support. PROC MIXED uses a random regression model to derive parameter estimates both between and within individuals while also permitting specification of covariance structures for repeated measures assessments. In the present study, we modeled the covariance structure for one repeated factor of dyad (i.e. husband and wife). We modeled the covariance matrix for dyad using the heterogeneous compound symmetry covariance structure. The Satterthwaite approximation was used to determine the appropriate degrees of freedom (Campbell & Kashy, 2002). Each partner's own age, alcohol consumption, physical activity, discrimination and social support values were mean centered (Raudenbush & Bryk, 2002). Preliminary analyses revealed some minor departures from normality (e.g., positive skew for alcohol use and exercise and negative skew for partner support, other support, and past week discrimination). Because analyses of transformed outcomes produced the same pattern of significant and non-significant effects and similar effect sizes, we proceeded with untransformed variables for ease of interpretation. Regression coefficients are reported as unstandardized betas.

To test the hypothesis that daily discrimination is negatively associated with global sleep quality, we ran a multilevel model where each partner's own discrimination scores were

regressed on to sleep quality. Main effects of age alcohol consumption and physical activity were included at Level 2. Next, to test the hypothesis that support from a partner can buffer the relationship between discrimination and sleep quality above and beyond the role of support from others, a hierarchical multilevel analysis was conducted. In step 1, each partner's partner support score and mean-centered other support score were added to the model. In step 2, the partner support x discrimination and other support x discrimination interaction terms were added to the model.

In the case that significant predictors of sleep quality were identified, follow-up analyses were conducted to test which aspects of global sleep quality were associated with these predictors. To do so, sleep duration, sleep onset latency, sleep disturbances, and sleep efficiency were each substituted as the outcome variable. Multilevel analyses that included both the spousal support X discrimination and other support X discrimination interaction terms were added to separate models that included each of the 4 sleep outcomes mentioned above. In the case of significant statistical interactions, regression equations will be restructured as appropriate based on the support variable included as the moderator and the significance of simple slopes will be tested (Aiken & West, 1991).

RESULTS

Sample Characteristics

Table 1 displays the zero-order correlations, means, and standard deviations of variables included in the analyses. Global sleep quality was significantly negatively associated with experiences of discrimination and positively associated with both support from the partner and support from others. Experiences of discrimination was also negatively associated with both sources of support and the two sources of support were positively associated with one another.

Testing the Effect of Discrimination on Sleep Quality

A multiple level analysis tested the hypothesis that more experiences of discrimination would predict poorer sleep quality while accounting for the nesting of data within couples. This analysis revealed that experiences of discrimination was associated with global sleep quality ($b = 0.21$, $t=4.09$, $p<.001$) after controlling for age, alcohol use, and exercise, such that higher levels of experienced discrimination predict poorer global sleep quality. Unstandardized regression coefficients, t values, and Cohen's f are presented in Table 2.

Testing the Buffering Effects of Partner Support and Other Support on the Relationship between Discrimination and Sleep Quality

Hierarchical multilevel analyses tested the hypothesis that support from a partner would buffer the effects of discrimination on sleep quality above and beyond support from another person in one's network. Experiences of discrimination were not associated with global sleep quality after partner support and other support were added to the model ($b=0.09$, $t=1.74$, $p=.08$).

Additionally, partner support ($b = -4.05$, $t = -4.20$, $p < .001$), but not other support ($b = -0.73$, $t = -1.70$, $p = .09$), was significantly associated with global sleep quality. These results suggest that partner support is associated with better sleep quality above and beyond the effect of other sources of support.

However, when the spousal support X discrimination and other support X discrimination interaction terms were added to the model, neither interaction term was statistically significant ($b = 0.26$, $t = 1.62$, $p = 0.11$; $b = 0.00$, $t = -0.04$, $p = 0.97$). These results suggest that the association between discrimination and sleep quality is not buffered by either spousal support or other sources of social support. Unstandardized regression coefficients and t values are presented in Table 3.

Additional Analyses

When wake after sleep onset and sleep onset latency were the outcome variables, a multilevel model that regressed discrimination, partner support, other support, age, sex, alcohol consumption, exercise, and the discrimination X partner support and discrimination X other support interaction terms revealed no significant predictors. When sleep efficiency was the outcome variable, only partner support successfully predicted the sleep variable. However, neither partner support or other support significantly moderated the relationship between discrimination and sleep efficiency. When sleep duration was the outcome variable, other support, but not discrimination nor support from a partner, significantly predicted the sleep outcome. Unstandardized regression coefficients and t values for each model are presented in table 4.

Although there were no significant predictors of sleep onset latency, there was a significant spousal support x discrimination interaction ($b = 0.11$, $t = 3.33$, $p = .001$). There was a

significant negative association between discrimination and sleep onset latency in individuals with ambivalent partners ($b=-0.03$, $t= -3.10$, $p=.001$) and a significant positive association between discrimination and sleep onset latency in individuals with supportive partners ($b=0.07$, $t= 2.53$, $p=.01$). This interaction is displayed in Figure 1. There was also a significant spousal support x discrimination interaction on sleep duration ($b= 0.09$, $t= 2.14$, $p=.05$). Specifically, spousal support moderated the relationship between discrimination and sleep duration, such that there was non-significant positive association between discrimination and sleep duration among individuals who rated their partner as supportive ($b= 0.05$ $t=1.00$, $p=.32$), but a significant negative association between discrimination and sleep duration among individuals who rated their partner as ambivalent ($b= -0.04$, $t= -2.48$, $p= .02$). These relationships are depicted in Figure 2. Finally, there was also a significant other support x discrimination interaction on sleep duration ($b= -0.03$, $t= -2.52$, $p=.01$). Support from others moderated the relationship between discrimination and sleep duration, such that there was a significant negative relationship between discrimination and sleep duration for those who reported lower support ($b=-0.06$, $t= -3.06$, $p=.003$) and a nonsignificant negative relationship between discrimination and sleep duration for those who reported higher support ($b=-.01$, $t= -0.92$, $p=.36$). These relationships are depicted in Figure 3.

DISCUSSION

According to the biopsychosocial model of sleep, aspects of relationship functioning, (e.g., security, closeness, positive emotions, vigilance, hyperarousal, avoidance, conflict) may impact sleep quality in individuals with particular vulnerability factors, such as psychopathology, lower socioeconomic status, or increased levels of life stress.(Troxel, Robles, Hall, & Buysse, 2007). Discrimination, a psychosocial stressor that disproportionately affects African Americans (Everson-Rose et al., 2015; Kessler et al., 1999; Lewis et al., 2013) and predicts poorer sleep outcomes (Slopen, Lewis, & Williams, 2016), may be one such vulnerability factor. As such, the aims of this study were to 1). replicate previous findings that experiences of discrimination are negatively associated with sleep quality and 2). assess the buffering effect of partner support on the relationship between discrimination and sleep quality above and beyond the role of support from others in an African American sample.

In the current study, individuals who endorsed more experiences of discrimination in the past week also rated their sleep quality as poorer compared to those who endorsed fewer experiences of discrimination. This relationship remained after controlling for age, alcohol consumption, and exercise. These findings are supported by other studies that find that psychosocial stressors (Morin, Rodrigue, & Ivers, 2003), particularly experiences of discrimination, have detrimental effects on sleep quality (McLaurin-Jones et al., 2020; Slopen et al., 2016). Additionally, individuals who indicated higher levels of support from a partner reported better sleep quality compared to individuals who indicated lower levels of partner

support. These findings support the biopsychosocial model of sleep (Troxel et al., 2009, 2007), which suggests that improved relationship functioning predicts better sleep outcomes. These findings also support past research that has demonstrated a relationship between improved marital satisfaction and better sleep quality (Lee et al., 2017; Prigerson et al., 1999). Importantly, support from others in one's network was not a significant predictor of sleep quality.

Neither spousal or other sources of support buffered the relationship between discrimination and sleep quality in this sample. It is possible that there are specific pathways through which each type of support and experiences of discrimination influence sleep. These pathways may be obscured when sleep is operationalized as global sleep quality, because perceptions of sleep quality are characterized by several factors. For example, sleep continuity is an important component of sleep quality (Harvey et al., 2008; Libman et al., 2016; Ohayon et al., 2017). Therefore, we further probed the relationships of interest using sleep onset latency, efficiency, wake after sleep onset, and duration as outcome variables. Replicating the original multilevel model using these four measures of sleep as outcome variables demonstrated that experiences of discrimination may play an important role in predicting sleep duration, which supports previous findings (Huynh & Gillen-O'Neel, 2013; Slopen & Williams, 2014).

Past research suggests that individuals who experience more discrimination report shorter sleep duration (Huynh & Gillen-O'Neel, 2013; Slopen & Williams, 2014), but the current study suggests that this is only true for those who report ambivalent partners. In this sample, more frequent experiences of discrimination predicted shorter sleep duration in individuals who find their partners to be ambivalent, but not in those who find their partners supportive. Similarly, the findings from this study suggest that individuals who receive ample support from others in their support network may be more protected from the effects of discrimination on sleep duration than

those who receive less support from their network. These findings demonstrate that experiencing higher amounts of discrimination is particularly a vulnerability factor for individuals who feel less supported by their partner or their network.

While this study is unique in that it examines an entirely African American sample, this study relies on self-reported data, and there are limitations to collecting research online, such as limited control over participants' environment and attention to the survey. For example, some participants may have been hesitant to answer questions honestly due to concerns about privacy related to online data collection. Furthermore, these finding may not generalize to other ethnic groups. For example, past research suggests that there may be race-based differences in the strength of the relationship between sleep outcomes and relationship functioning (Troxel et al., 2009) and the types of support that are most likely to be offered in the family environment (Sarkisian & Gerstel, 2016). To date, few studies have tested the relationships between relationship quality and sleep quality in same-sex couples (Brooks Holliday & Troxel, 2017), thus, these results also may not generalize to same-sex relationships.

These cross-sectional data could also be built upon by conducting daily diary studies to understand the nuanced associations among these variables. Furthermore, 93% of this sample reported excessive levels of daytime sleepiness, which is significantly more than expected (Pahwa et al., 2012), and may make these results more difficult to generalize. Finally, the average marriage length in this sample was 6.5 years ($SD=2.8$). It will be important to replicate these analyses in samples of partners who have been married longer to improve external validity.

However, this study makes an important contribution to our understanding of the biopsychosocial model of sleep by testing a potential vulnerability factor for poor sleep outcomes in a national sample. First, by highlighting the relationship between discrimination and

global sleep quality, this study adds to the growing literature that evaluates discrimination as a psychosocial stressor that can predict poor sleep outcomes in African Americans. Additionally, this study builds on existing literature by demonstrating that higher levels of partner support predict better sleep outcomes above and beyond the role of support from one's network. Importantly, this study reflects the dyadic nature of sleep by examining these relationships in couples and accounting for the nesting of data within dyads. Finally, this study makes a meaningful contribution to our understanding of the relationship between discrimination and sleep by identifying a subset of individuals (i.e., low partner support, low network support) who are at higher risk for experiencing the negative effects of discrimination on sleep duration. These findings are critical for developing interventions that can mitigate risk of poor sleep quality and adverse health outcomes in African Americans.

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TABLES

Table 1

Bivariate Correlations and Sample Descriptive

	1	2	3	4	5	6	7	8
1. Sleep quality	-							
2. Discrimination	0.48**	-						
3. Partner support	-0.49**	-0.58**	-					
4. Other support	-0.35**	-0.30**	0.23**	-				
5. Age	-0.07	-0.35**	0.25**	-0.13	-			
6. Sex (female)	-0.01	-0.004	-0.06	0.01	-0.33**	-		
7. Alcohol Use	0.24**	0.37**	-0.39**	0.06	-0.09	-0.14	-	
8. Exercise	0.12	0.29**	-0.30	0.04	0.27**	-0.04	0.42**	-
Mean	8.72	9.39	0.31	5.44	30.54	0.50	11.49	1.76
Standard Deviation	5.21	8.65	0.46	0.95	4.32	0.50	9.43	0.66

* p<.05, **p<.001

Note. n = 146

Table 2

The Effect of Discrimination on Sleep Quality

	F	b	t
Discrimination	16.69	0.21**	4.09
Age	0.02	-0.01	-0.14
Alcohol Use	0.27	0.02	0.52
Exercise	1.9	-0.81	-1.38

* p<.05, **p<.001

Table 3

Social Support on the Relationship Between Discrimination and Sleep Quality

	F	b	t
Step 1			
Discrimination	3.02	0.09	1.74
Partner Support	17.61	-4.05**	-4.20
Other Support	2.89	-0.73	-1.7
Age	0.03	0.01	0.17
Alcohol Use	0.41	0.03	0.64
Exercise	2.27	-0.81	-1.51
Step 2			
Discrimination	1.14	0.06	1.07
Partner Support	2.60	-2.31	-1.61
Other Support	3.23	-0.81	-1.80
Age	0.07	0.02	0.27
Alcohol Use	0.56	0.03	0.75
Exercise	1.57	-0.68	-1.25
Partner Support x Discrimination	2.63	0.28	1.62
Other Support x Discrimination	0.00	-0.05	-0.04

* p<.05, **p<.001

Table 4
Discrimination and Support on Other Sleep Outcomes

<i>Sleep Onset Latency</i>	F	b	t
Discrimination	0.90	-0.01	-0.95
Partner Support	3.21	0.51	1.79
Other Support	0.13	-0.03	-0.36
Age	0.00	0.00	-0.02
Alcohol Use	1.34	-0.01	-1.16
Exercise	1.71	0.16	1.31
Partner Support x Discrimination	11.12	0.11**	3.43
Other Support x Discrimination	0.57	0.01	0.76
<i>Sleep Efficiency</i>			
Discrimination	3.73	0.03	1.93
Partner Support	3.99	-0.78*	-2.00
Other Support	0.35	-0.07	-0.59
Age	0.02	0.00	0.14
Alcohol Use	0.61	0.01	0.78
Exercise	0.81	-0.14	-0.90
Partner Support x Discrimination	0.37	-0.03	-0.61
Other Support x Discrimination	0.03	0.00	0.17
<i>Wake After Sleep Onset</i>			
Discrimination	3.17	0.06	1.78
Partner Support	2.74	-1.33	-1.66
Other Support	0.15	0.10	0.38
Age	0.61	0.04	0.78
Alcohol Use	0.31	0.01	0.55
Exercise	0.27	-0.16	-0.52
Partner Support x Discrimination	0.79	-0.08	-0.89
Other Support x Discrimination	0.21	0.01	0.45
<i>Sleep Duration</i>			
Discrimination	5.08	-0.04*	-2.41
Partner Support	0.00	0.00	-0.09
Other Support	4.02	-0.24	-2.01
Age	0.00	0.00	-0.03
Alcohol Use	1.77	0.01	1.33
Exercise	1.07	-0.15	-1.04
Partner Support x Discrimination	4.58	0.09*	2.14
Other Support x Discrimination	6.33	-0.03*	-2.52

* p<.05

FIGURES

Figure 1

The Moderating Effect of Partner Support on the Relationship between Discrimination and Sleep Onset Latency

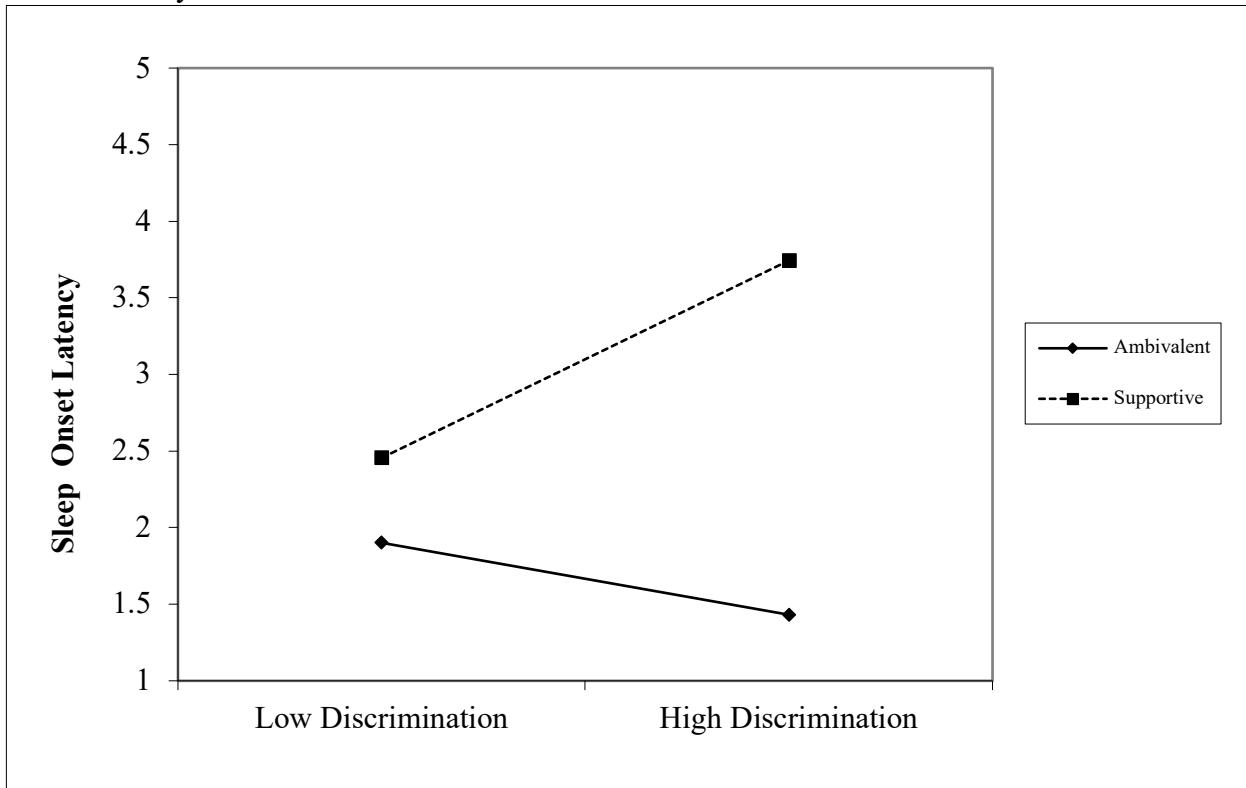


Figure 2

The Moderating Effect of Partner Support on the Relationship between Discrimination and Sleep Duration

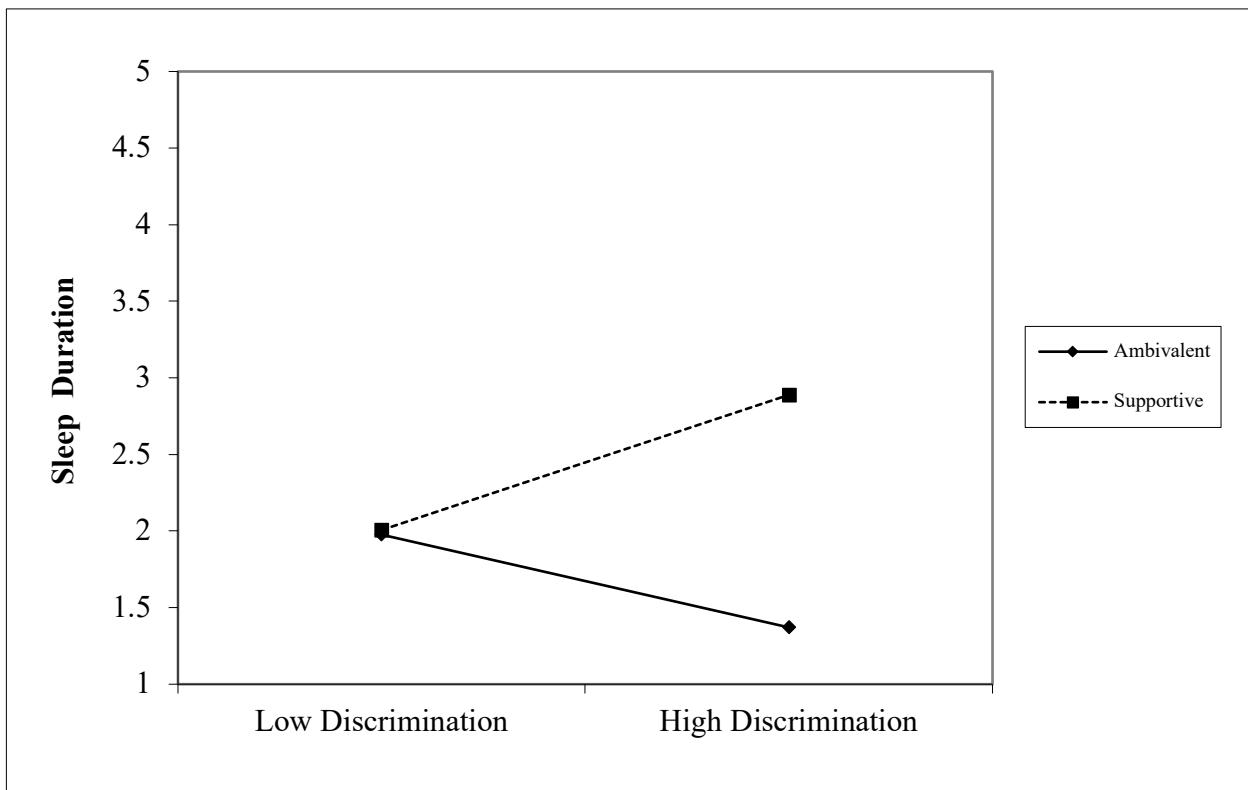
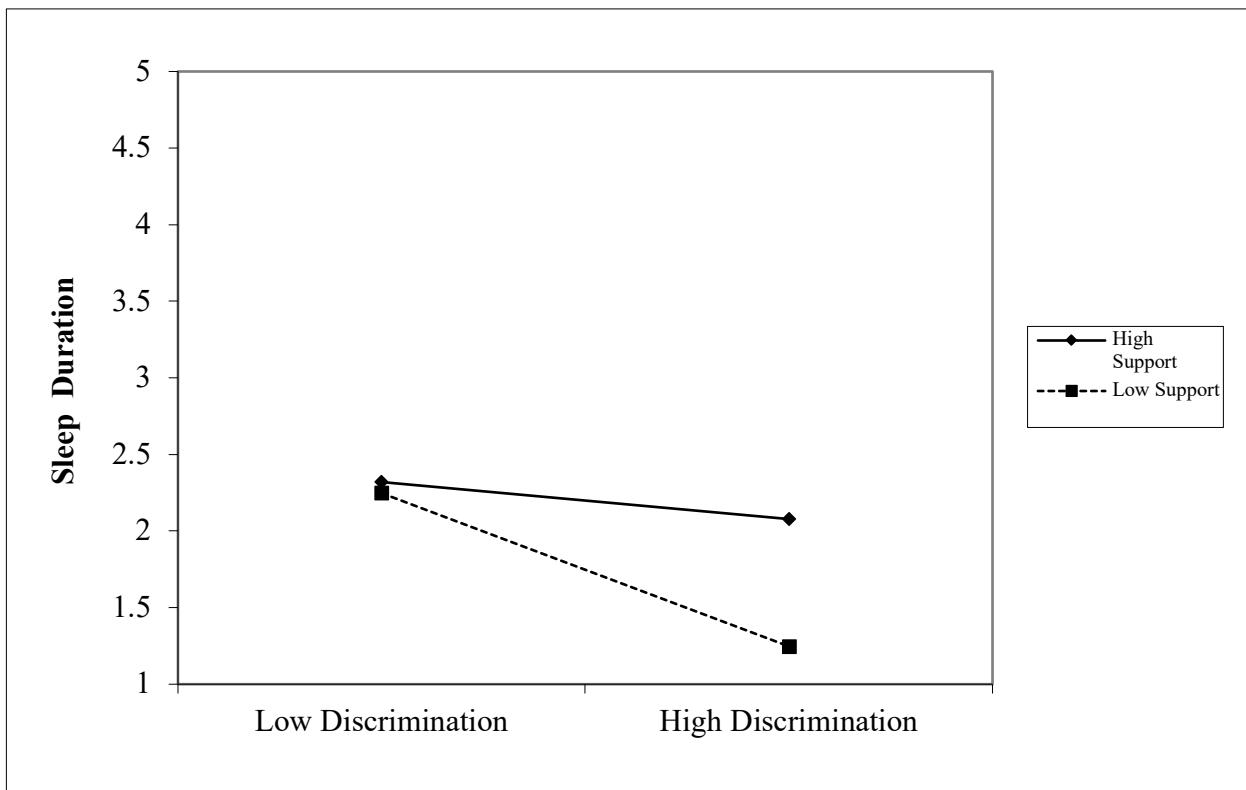


Figure 3

The Moderating Effect of Other Support on the Relationship between Discrimination and Sleep Duration



APPENDIX A:
DEMOGRAPHIC QUESTIONNAIRE

Age (years):

Sex:

Male

Female

Other

If you selected "other", please explain.

Your race/ethnicity is (mark all that apply):

Native Hawaiian or Pacific Islander

Asian/Asian American

Black/African American

Hispanic/Latino/a

Native American/American Indian

White/Caucasian

Biracial/Multiracial

Other

You indicated you identify as Asian/Asian American. Please specify in the box below:

You indicated you identify as Native American/American Indian. Please specify in the box below:

You indicated you identify as Biracial/Multiracial. Please specify in the box below:

You indicated you identify as Other. Please specify in the box below:

You indicated you identify as Hispanic/Latino/a. Please specify below (mark all that apply).

Mexican

Guatemalan

Dominican

Cuban

Salvadoran

Puerto Rican

Other

You indicated you identify as Other. Please specify in the box below:

Please indicate the type of family unit you were raised in for the majority of your childhood: (For example, if you grew up with a single parent, you would indicate 'Guardian #1: Parent' & 'Guardian #2: Not Applicable').

Guardian #1 _____

Guardian #2 _____

How would your parent(s) / guardian(s) describe their gender identities?

Parent/Guardian #1 _____

Parent/Guardian #2 _____

Please choose the option that best describes the educational status of your parent(s) / guardian(s).

Parent / Guardian #1:

Partial high school

Graduated from high school

Partial college

Associate's Degree

Graduated from college (Bachelor's)

Graduate Degree (Ex. Master's, PhD, JD, MD)

Parent / Guardian #2

Partial high school

Graduated from high school

Partial college

Associate's Degree

Graduated from college (Bachelor's)

Graduate Degree (Ex. Master's, PhD, JD, MD)

How much do your parent(s) / guardian(s) make in a month (both, or one if you are supported by only one parent / guardian)?

Less than \$500

\$500 - \$999

\$1,000- \$4,999

\$5,000 - \$8,999

\$9,000 - \$12,999

\$13,000 - \$16,999

\$17,000 - \$20,999

\$30,000 - \$33,999

\$34,000 - \$37,999

\$38,000 - \$41,999

Greater than \$42,000

Prefer not to answer

How many people altogether live on this income (that is, provides at least half of their income)?

Do you and your partner live together?

Yes

No

Please check the box that best describes your current relationship status

Legally married

Currently living in a marriage-like relationship

Dating only

How long have you been married?

Years _____

Months _____

How long have you been living in this relationship?

Years _____

Months _____

Do you have a joint lease, deed, or mortgage agreement with your partner?

Yes

No

Is your partner the primary beneficiary on your will?

Yes

No

Do you and your partner have mutual legal responsibility for the care of a child?

Yes

No

Is your partner your primary beneficiary on a life insurance or retirement contract?

Yes

No

Do you and your partner have joint ownership of a vehicle, a joint checking, or a joint credit account?

Yes

No

On average, how many nights per week do you and your partner share a bed?

How many times have you been married? (if you are currently married, include current marriage)

Do you think your marital status will change in the next 3-4 months?

Yes

No

How much do you (and your spouse/partner if applicable) make in a month?

Less than \$500 (1)

\$500 - \$999 (4)

\$1,000- \$4,999

\$5,000 - \$8,999

\$9,000 - \$12,999

\$13,000 - \$16,999

\$17,000 - \$20,999

\$30,000 - \$33,999

\$34,000 - \$37,999

\$38,000 - \$41,999

Greater than \$42,000

Prefer not to answer

How many people altogether live on this income (that is, provides at least half of their income)?

Please choose the option that best describes your educational status.

Partial high school

Graduated from high school

Partial college

Associate's Degree

Graduated from college (Bachelor's)

Graduate Degree (Ex. Master's, PhD, JD, MD)

What is your current occupational status? (please check ALL that apply)

Full-time Student

Part-time Student

Unemployed

Employed

Do you have any children?

Yes

No

Please answer the following questions for each of your children.

Do they live with you?

Yes

No

Are you the child's biological parent?

Yes

No

Is your current partner the child's biological parent?

Yes

No

How old is this child?

Are there any children living in your home that you have not already identified?

Yes

No

Please answer the following questions for each child living in your home, other than those you identified above. Once you have completed a row for each child, you can leave the remaining rows blank.

Is your current partner the child's biological parent?

Yes

No

How old is this child?

In addition to you and your partner, are there any other adults living in your home?

Yes

No

Please answer the following questions for each adult living in your home, other than you and your partner. Once you have completed a row for each adult, you can leave the remaining rows blank.

What is this individual's relationship to you?

How would you rate your health in general?

Excellent

Very Good

Good

Fair

Poor

Please rate your current health on the following scale.

If the slider is already in the correct spot, please click on it to ensure your response is registered.

Worst imaginable ----- Best imaginable

health state

10 20 30 40 50 60 70 80 90 100

health state

Q181 Please rate your current pain level on the following scale. If the slider is already in the correct spot, please click on it to ensure your response is registered.

A horizontal scale representing pain intensity, ranging from 0 to 100. The scale is labeled "No Discomfort" at the left end (0) and "Severe Pain" at the right end (100). Numerical labels are present at 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100.

APPENDIX B:
INSOMNIA SEVERITY QUESTIONNAIRE

Please rate the current (I.e., last 2 weeks) SEVERITY of your insomnia problem(s)

Difficulty falling asleep

None

Mild

Moderate

Severe

Very

Difficulty staying asleep

None

Mild

Moderate

Severe

Very

Problem waking up too early

None

Mild

Moderate

Severe

Very

How SATISFIED/dissatisfied are you with your current sleep pattern?

Very satisfied (0)

1

2

3

4

Very Dissatisfied (5)

To what extent do you consider your sleep problem to INTERFERE with your daily functioning (e.g., daytime fatigue, ability to function at work/daily chores, concentration, memory, mood, etc).

Not at all interfering

A little

Somewhat

Much

Very much interfering

How noticeable to others do you think your sleeping problem is in terms of impairing the quality of your life?

Not at all noticeable

Barely

Somewhat

Much

Very noticeable

How WORRIED/distressed are you about your current sleep problem?

Not at all

A little

Somewhat

Much

Very much

APPENDIX C:
EPWORTH SLEEPINESS SCALE

Please rate how likely you are to doze or fall asleep in the following situations by selecting the response that best applies. If you have not done some of these activities recently, select what would most likely happen if you were in that situation.

Sitting and reading

Would never doze

Slight Chance of dozing

Moderate chance of dozing

High chance of dozing

Watching television

Would never doze

Slight Chance of dozing

Moderate chance of dozing

High chance of dozing

Sitting inactive in a public place (eg, a theater or a meeting)

Would never doze

Slight Chance of dozing

Moderate chance of dozing

High chance of dozing

As a passenger in a car for an hour without a break

Would never doze

Slight Chance of dozing

Moderate chance of dozing

High chance of dozing

Lying down to rest in the afternoon when circumstances permit

Would never doze

Slight Chance of dozing

Moderate chance of dozing

High chance of dozing

Sitting and talking to someone

Would never doze

Slight Chance of dozing

Moderate chance of dozing

High chance of dozing

Sitting quietly after a lunch without alcohol

Would never doze

Slight Chance of dozing

Moderate chance of dozing

High chance of dozing

In a car, while stopped for a few minutes in traffic

Would never doze

Slight Chance of dozing

Moderate chance of dozing

High chance of dozing

APPENDIX D:
STOP BANG QUESTIONNAIRE

Do you snore loudly?

(Louder than talking or loud enough to be heard through closed doors)

Yes

No

Do you often feel tired, fatigued, or sleepy during the daytime?

Yes

No

Has anyone observed you stop breathing during sleep?

Yes

No

Do you have (or are you being treated for) high blood pressure?

Yes

No

In pounds, approximately how much do you weigh?

Is your shirt collar 16 inches or larger?

Yes

No

APPENDIX E:
PITTSBURGH SLEEP QUALITY INDEX

The following questions relate to your usual sleep habits during the past month ONLY.
Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

During the past month, when have you usually gone to bed at night? (Please indicate the time in hh:mm AM/PM format)

During the past month, how long (in minutes) has it usually taken you to fall asleep each night?

During the past month, when have you usually gotten up in the morning? (Please indicate the time in hh:mm AM/PM format)

During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spend in bed.)

For each of the remaining questions, check the one best response. Please answer all questions.

During the past month, how often have you had trouble sleeping because you...

Cannot get to sleep within 30 minutes

Not during the past month

Less than once a week

Once or twice a week

Three or more times a week

Wake up in the middle of the night or early morning

Not during the past month

Less than once a week

Once or twice a week

Three or more times a week

Have to get up to use the bathroom

Not during the past month

Less than once a week

Once or twice a week

Three or more times a week

Cannot breathe comfortably

Not during the past month

Less than once a week

Once or twice a week

Three or more times a week

Cough or snore loudly

Not during the past month

Less than once a week

Once or twice a week

Three or more times a week

Feel too cold

Not during the past month

Less than once a week

Once or twice a week

Three or more times a week

Feel too hot

Not during the past month

Less than once a week

Once or twice a week

Three or more times a week

Had Bad Dreams

Not during the past month

Less than once a week

Once or twice a week

Three or more times a week

Have Pain

Not during the past month

Less than once a week

Once or twice a week

Three or more times a week

Other reasons

Not during the past month

Less than once a week

Once or twice a week

Three or more times a week

If you listed "Other reason(s)", please describe:

During the past month, how would you rate your sleep quality overall?

Very good

Fairly good

Fairly bad

Very bad

During the past month, how often have you taken medicine (prescribed or "over the counter") to help you sleep?

Not during the past month

Less than once a week

Once or twice a week

Three or more times a week

During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

Not during the past month

Less than once a week

Once or twice a week

Three or more times a week

During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

No problem at all

Only a very slight problem

Somewhat of a problem

A very big problem

Do you have a bed partner or roommate?

No bed partner/roommate

Partner/roommate in other room

Partner in same room, but not same bed

Partner in same bed

Measuring the Quality of your Sleep (please choose the correct response)

How satisfied/dissatisfied are you with the quality of your sleep LAST NIGHT?

Very Satisfied

Satisfied

Neutral

Dissatisfied

Very Dissatisfied

How worried/distressed are you about the quality of you sleep LAST NIGHT?

Very Satisfied

Satisfied

Neutral

Dissatisfied

Very Dissatisfied

How rested or refreshed did you feel this morning?

Very Satisfied

Satisfied

Neutral

Dissatisfied

Very Dissatisfied

When you woke up this morning, to what extent did you...

Notice feelings of tiredness or heaviness in your body?

Not at All

A Little

Somewhat

A Lot

Extremely

Notice heaviness, soreness, or itchiness in your eyes?

Not at All

A Little

Somewhat

A Lot

Extremely

Notice your arms and/or legs feeling tired or heavy?

Not at All

A Little

Somewhat

A Lot

Extremely

Notice that you feel fatigued?

Not at All

A Little

Somewhat

A Lot

Extremely

APPENDIX F:
SOCIAL RELATIONSHIPS INDEX

Our relationships with other people may or may not have both positive and upsetting aspects. For the following questionnaire, please answer them in regards to your thoughts and feelings about your spouse. Remember that your responses are confidential and that there are no right or wrong answers.

When were you married?

Month

Year

How important is your spouse to you?

Not at all important

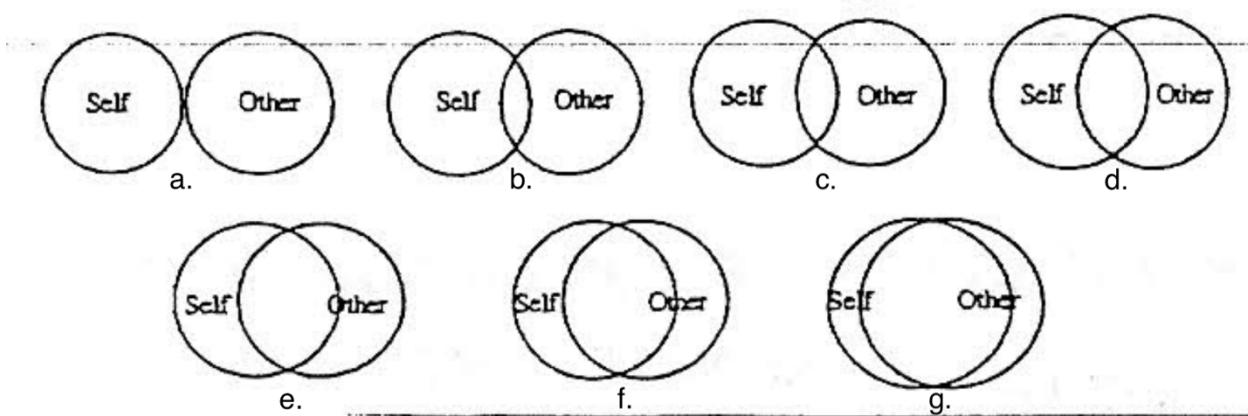
A little important

Somewhat important

Moderately important

Very important

Extremely important



Which of the above pictures best describes how close you feel towards your spouse?

- a.
- b.
- c.
- d.
- e.
- f.
- g.

For the next section, when asked to rate the extent YOUR SPOUSE is HELPFUL or POSITIVE, you should ignore any upsetting aspects of the relationship. When asked to rate the extent your spouse is UPSETTING, you should ignore any helpful or positive aspects of your relationship. Please circle the ONE best answer.

When you are really excited, happy, or proud of something...

How positive is your spouse?

Not at all

A little

Somewhat

Moderately

Very

Extremely

How upsetting is your spouse?

Not at all

A little

Somewhat

Moderately

Very

Extremely

How mixed or conflicted are your thoughts and feelings towards your spouse?

Not at all

A little

Somewhat

Moderately

Very

Extremely

How unpredictable is your spouse?

Not at all

A little

Somewhat

Moderately

Very

Extremely

During routine daily interactions, conversations, or activities...

How positive is your spouse?

Not at all

A little

Somewhat

Moderately

Very

Extremely

How upsetting is your spouse?

Not at all

A little

Somewhat

Moderately

Very

Extremely

How mixed or conflicted are your thoughts and feelings towards your spouse?

Not at all

A little

Somewhat

Moderately

Very

Extremely

How unpredictable is your spouse?

Not at all

A little

Somewhat

Moderately

Very

Extremely

When you need support, such as advice, understanding, or a favor...

How positive is your spouse?

Not at all

A little

Somewhat

Moderately

Very

Extremely

How upsetting is your spouse?

Not at all

A little

Somewhat

Moderately

Very

Extremely

How mixed or conflicted are your thoughts and feelings towards your spouse?

Not at all

A little

Somewhat

Moderately

Very

Extremely

How unpredictable is your spouse?

Not at all

A little

Somewhat

Moderately

Very

Extremely

For this section, please rate HOW YOU ARE on the following questions. Please remember when asked to rate the extent you are HELPFUL or POSITIVE, you should ignore any upsetting aspects. When asked to rate the extent you are UPSETTING, you should ignore any helpful or positive aspects. Please circle the ONE best answer.

When your spouse is really excited, happy, or proud of something...

How positive are you?

Not at all

A little

Somewhat

Moderately

Very

Extremely

How upsetting are you?

Not at all

A little

Somewhat

Moderately

Very

Extremely

How mixed or conflicted are your thoughts and feelings?

Not at all

A little

Somewhat

Moderately

Very

Extremely

How unpredictable are you?

Not at all

A little

Somewhat

Moderately

Very

Extremely

During routine daily interactions, conversations, or activities...

How positive are you?

Not at all

A little

Somewhat

Moderately

Very

Extremely

How upsetting are you?

Not at all

A little

Somewhat

Moderately

Very

Extremely

How mixed or conflicted are your thoughts and feelings?

Not at all

A little

Somewhat

Moderately

Very

Extremely

How unpredictable are you?

Not at all

A little

Somewhat

Moderately

Very

Extremely

When your spouse need support, such as advice, understanding, or a favor...

How positive are you?

Not at all

A little

Somewhat

Moderately

Very

Extremely

How upsetting are you?

Not at all

A little

Somewhat

Moderately

Very

Extremely

How mixed or conflicted are your thoughts and feelings?

Not at all

A little

Somewhat

Moderately

Very

Extremely

How unpredictable are you?

Not at all

A little

Somewhat

Moderately

Very

Extremely

APPENDIX G:
SOCIAL SUPPORT QUESTIONNAIRE

The following questions ask about people in your life whom provide you with help or support. Each question has two parts. For the first part, I will ask you to tell me all the people you know, except for yourself, whom you can count on for help or support in the manner described. Give the person's initials (first name/last name), relationship to you and their birth year if you know it. Once you have entered each person who provides you with help or support in the manner described, you can leave the remaining rows blank. Do not list more than 9 people. For the second part, tell me how satisfied you are with the overall support you have. If you have had no support for a question, you will still be prompted to rate your level of satisfaction.

Do you have anyone whom you can count on when you need help?

Yes

No

Who can you count on when you need this type of support?

Initials Relationship;Year born

1 _____ ; _____

2 _____ ; _____

3 _____ ; _____

4 _____ ; _____

5 _____ ; _____

6 _____; _____

7 _____; _____

8 _____; _____

9 _____; _____

How satisfied are you with this type of support?

Very satisfied

Fairly satisfied

A little satisfied

A little dissatisfied

Fairly dissatisfied

Very dissatisfied

Do you have anyone whom you can really count on to help you feel more relaxed when you are under pressure or tense?

Yes

No

Who can you count on when you need this type of support?

Initials Relationship;Year born

1 _____; _____

2 _____; _____

3 _____; _____

4 _____; _____

5 _____; _____

6 _____; _____

7 _____; _____

8 _____; _____

9 _____; _____

How satisfied are you with this type of support?

Very satisfied

Fairly satisfied

A little satisfied

A little dissatisfied

Fairly dissatisfied

Very dissatisfied

Do you have anyone who accepts you totally, including both your worst and your best points?

Yes

No

Who can you count on when you need this type of support?

Initials Relationship;Year born

1 _____; _____

2 _____; _____

3 _____; _____

4 _____; _____

5 _____; _____

6 _____; _____

7 _____; _____

8 _____; _____

9 _____; _____

How satisfied are you with this type of support?

Very satisfied

Fairly satisfied

A little satisfied

A little dissatisfied

Fairly dissatisfied

Very dissatisfied

Do you have anyone who you can really count on to care about you, regardless of what is happening to you?

Yes

No

Who can you count on when you need this type of support?

Initials Relationship; Year born

1 _____; _____

2 _____; _____

3 _____; _____

4 _____; _____

5 _____; _____

6 _____; _____

7 _____; _____

8 _____; _____

9 _____;

How satisfied are you with this type of support?

Very satisfied

Fairly satisfied

A little satisfied

A little dissatisfied

Fairly dissatisfied

Very dissatisfied

Do you have anyone whom you can really count on to help you feel better when you are feeling generally down in the dumps?

Yes

No

Who can you count on when you need this type of support?

Initials Relationship;Year born

1 _____;

2 _____;

3 _____;

4 _____;

5 _____;

6 _____;

7 _____;

8 _____;

9 _____;

How satisfied are you with this type of support?

Very satisfied

Fairly satisfied

A little satisfied

A little dissatisfied

Fairly dissatisfied

Very dissatisfied

Do you have anyone whom you can count on to console you when you are very upset?

Yes

No

Who can you count on when you need this type of support?

Initials Relationship;Year born

1 _____ ; _____

2 _____ ; _____

3 _____ ; _____

4 _____ ; _____

5 _____ ; _____

6 _____ ; _____

7 _____ ; _____

8 _____ ; _____

9 _____ ; _____

How satisfied are you with this type of support?

Very satisfied

Fairly satisfied

A little satisfied

A little dissatisfied

Fairly dissatisfied

Very dissatisfied

**APPENDIX H:
PAST WEEK DISCRIMINATION SCALE**

Place rate the frequency with which you have experienced the following events in the past week.

Being looked at in a mean way because of your ethnicity.

Never in the past week

Once

Twice

Three or more times in the past week

Being ignored because of your ethnicity.

Never in the past week

Once

Twice

Having something mean said to you because of your ethnicity.

Never in the past week

Once

Twice

Three or more times in the past week

Being treated in an unfair manner because of your ethnicity.

Never in the past week

Once

Twice

Three or more times in the past week

Having someone avoid talking to you because of your ethnicity.

Never in the past week

Once

Twice

Three or more times in the past week

Having someone act as if you could not be taken seriously or handle responsibility because of your ethnicity.

Never in the past week

Once

Twice

Three or more times in the past week

Having someone act as if you could not be trusted because of your ethnicity.

Never in the past week

Once

Twice

Three or more times in the past week

Having someone act as if you were lazy because of your ethnicity.

Never in the past week

Once

Twice

Three or more times in the past week

Being left out of an activity or event because of your ethnicity.

Never in the past week

Once

Twice

Three or more times in the past week

Having someone say or do something threatening because of your ethnicity.

Never in the past week

Once

Twice

Three or more times in the past week

APPENDIX I:
LIFESTYLE EXERCISE QUESTIONNAIRE

Considering a 7-Day period (a week), how many times on the average do you do the following kinds of exercise for more than 15 minutes during your free time (write on each line the appropriate number).

Strenuous Exercise (Heart beats rapidly) (I.e. running, jogging, hockey, football, soccer, squash, basketball, cross country, skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)

Moderate Exercise (Not exhausting) (I.e. fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)

Mild Exercise (Minimal effort) (I.e. yoga, archery, fishing from river bank, bowling, horseshoes, golf, snow-mobiling, easy walking)

Considering a 7-Day period (a week), during your leisure-time, how often do you engage in any regular activity long enough to work up a sweat (heart beats rapidly?)

Often

Sometimes

Never/rarely

APPENDIX J: INSTITUTIONAL REVIEW BOARD (IRB) APPROVAL



October 8, 2021

Andrea Decker
Department of Psychology
College of Arts & Sciences
Box 870348

Re: IRB # 21-05-4639: "Sleep Health and Discrimination with Everyday Support"

Dear Ms. Decker,

The University of Alabama Institutional Review Board has granted approval for your proposed research. Your application has been given exempt approval according to 45 CFR part 46. Approval has been given under exempt review category 2 as outlined below:

(2) Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met:

(i) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects.

The approval for your application will lapse on October 7, 2022. If your research will continue beyond this date, please submit the annual report to the IRB as required by University policy before the lapse. Please note, any modifications made in research design, methodology, or procedures must be submitted to and approved by the IRB before implementation. Please submit a final report form when the study is complete.

Sincerely,

[Redacted]
Carpanhato T. Myles, MSM, CIM, CIP
Director & Research Compliance Officer

Jessup Building | Box 870127 | Tuscaloosa, AL 35487-0127 | 205-348-8461
Fax 205-348-7189 | Toll Free 1-877-820-3066 | rscompliance@research.ua.edu