Interracial unions and sleep duration among heterosexual American adults

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A B S T R A C T

For Americans in romantic unions, sleep occurs in the context of couple relationships. Romantic partners influence one another's circadian rhythms, share beds, buffer or cause stress, and share resources that can be used to improve sleep. Moreover, sleep among individuals in interracial relationships may be negatively impacted by the social construction of race/ethnicity that drive health disparities and that point to the importance of factors such as racism, stress and social adversity that represent the unique lived reality of interracial couples in the U.S. Using non-dyadic data from the 2004–2018 National Health Interview Survey (n = 243,552) we fit a series of multinomial regression models predicting self-reported sleep duration of six or fewer (short), seven to eight (normal), and nine or more (long) hours. After adjusting for demographics, household socioeconomic characteristics, and health characteristics/behaviors, we find that individuals in interracial unions report significantly higher odds of short sleep compared to normal sleep. Race/ethnic stratified models indicated that all respondents in interracial relationships had higher odds of reporting short sleep, but that the association was particularly pronounced among non-Hispanic White adults and Hispanic adults. Generally, we find few differences in these associations between men and women or between those in marital versus those in cohabiting relationships. Future research should continue to investigate how social inequality conditions sleep for Americans in romantic relationships.

1. Introduction

Mounting evidence demonstrates that sleep is essential for the well-being of humans (Grandner and Fernandez 2021). Short sleep duration (sleeping six or fewer hours per 24-hour period) is associated with a litany of chronic conditions such as obesity (Buxton & Marcelli, 2010), diabetes (Cappuccio et al., 2010a), memory problems (Beydoun et al., 2021), depression (Ji et al., 2019), and is also tied to an increased risk of mortality (Cappuccio et al., 2010b). Long sleep duration (sleeping nine or more hours per 24-hour period) is also linked to worse physical and mental health (Patel et al., 2006) and substantially increases the risk of mortality (Youngstedt & Jean-Louis, 2011). Healthy sleep durations (sleeping 7–8 hours) are inequitably distributed across the U.S. population in a manner that reflects social inequalities and given the physiological importance of sleep duration for health, this has serious implications for the creation and maintenance of health disparities. For instance, research has documented that non-Hispanic White adults (hereafter White adults) have lower levels of short and long sleep durations (i.e., unhealthy durations) and better quality sleep compared to

non-Hispanic Black adults (hereafter Black adults) as well as Hispanic adults (Grandner et al., 2013). These racial/ethnic disparities in sleep stem from exposure to factors linked to systemic racism, including increased discrimination and exposure to institutional racism, which is largely manifested in fewer socioeconomic resources or reduced benefits from socioeconomic resources, more precarious work, and other stressors (including interpersonal racism), all of which can affect sleep (Goosby et al., 2017).

Researchers increasingly understand sleep for those in romantic relationships, to be a process influenced by romantic partners. For example, partners share beds, synchronize circadian rhythms, and pool resources that affect sleep (Troxel, 2010). However, it remains less clear whether there is stratification in sleep duration based on one's own race/ethnicity and one's romantic partner's race/ethnicity, even as research consistently documents that those in interracial/ethnic (hereafter, "interracial") unions endure unique stressors produced by systemic racism and report worse mental (Kroeger & Williams, 2011; Wong & Penner, 2018) and physical health (Yu & Zhang, 2017) than those in same-race relationships. Therefore, this study examines the extent to

which being in an interracial union influences sleep duration among a nationally representative sample of co-residential couples and whether this varies by race/ethnicity and the racial/ethnic composition of the couple. In addition, we ask whether the strength of these associations varies by the gender of the respondent and whether the link between partner race/ethnicity and sleep is stronger among married versus cohabiting couples.

1.1. Interracial unions, health, and sleep

In the United States, interracial unions are rapidly increasing. In 2019, nearly one in five of all newlyweds had a partner with a different racial/ethnic background than their own, up from roughly one in twenty in 1980 (Parker & Barroso, 2021). As the U.S. population becomes more racially and ethnically diverse, the share of interracial relationships will continue to increase, and thus understanding sleep and well-being within these unions is critical. Although public opinion shows nearly universal support of interracial couples (Mccarthy, 2021), the share of interracial unions remains a minority of romantic relationships in the United States (Kao, Joyner, and Balistreri 2019), which likely has consequences for the health of those in interracial relationships compared to those in same-race/ethnic (i.e., same-race) unions.

Indeed, the "homogamy hypothesis" suggests that individuals in relationships not matched on race/ethnicity, education, or other social statuses may experience higher rates of psychological distress (Wong & Penner, 2018) than those not matched on race/ethnicity, education, or other social statuses. Among coresidential couples, researchers have found a greater prevalence of depressive symptoms among those in interracial versus those in same-race relationships (Kroeger & Williams, 2011; Wong & Penner, 2018). Conversely, having a same-race/ethnic partner may buffer external stress and help one cope with potential racial/ethnic discrimination.

While evidence continues to mount that institutional and interpersonal racism in the U.S. exacerbates the mental and physical health of individuals in interracial relationships, we are unaware of any research examining how interracial unions and partner race/ethnicity matter specifically for *sleep* in general and sleep duration in particular. This is an important oversight, as the potential stressors, discrimination, and lack of support faced by interracial couples likely shapes their sleep outcomes. For instance, prior research documents how those in interracial unions report more emotionally distant relationships with family members (Henderson & Brantley, 2019; Yahirun and Kroeger 2019. As parents, interracial couples report less (grand)parent support of their children (Bratter & Whitehead, 2018). In general, a lack of familial and social support (e.g., emotional support or temporal support) and broader societal stigma faced by interracial couples could also lead to poor relationship quality and increased temporal strain (e.g., more time caretaking, less help with errands, more time needed to work) among interracial couples, which could have a negative impact on sleep (Hohmann-Marriott & Paul, 2008).

1.2. Variations by respondent and partner race/ethnicity

Possible stressors, including a lack of social support and potential discrimination that interracial couples encounter, may also vary by the racial composition of the couple (Parker & Barroso, 2021). In particular, White individuals in interracial unions may face a greater lack of familial support and stronger discrimination from other White adults because interracial unions remain much less common among White compared to non-White adults (Livingston & Brown, 2017), and this discrimination may negatively influence their sleep. In addition, interviews with White adults married to Hispanic adults suggest that White partners have enhanced understanding of race/ethnicity and racism (Vasquez, 2014), potentially leading to "spillover stress." White adults married to Black spouses and "non-Hispanic Other" spouses also report lower self-rated health than White adults in same-race unions (Yu

& Zhang, 2017), indicating that White adults in interracial relationships may be exposed to the negative consequences of living with systemic racism. Research has also indicated that Hispanic adults in particular are pushed towards homogamy through familial and social pressures, and that deviation from homogamy is explicitly sanctioned (Vasquez, 2015), potentially leading to unique stress and fewer resources (including time) to devote to sleep.

1.3. Gender

Further, the gender and racial/ethnic composition of the interracial couple also shapes health outcomes. Among those in interracial unions, women's well-being appears to be more sensitive to their partner's race/ethnicity than men. White women married to non-White men report a greater increase in depressive symptoms than do White men married to non-White women (Wong & Penner, 2018). In addition, White women in relationships with non-White partners also experience worse self-rated health than their peers who are partnered with White men (Lykke & Rendall, 2017). Women's dating and mating behaviors are more subject to public and familial scrutiny than men's, which likely account for these findings (Osuji, 2019; Shenhav, Campos, and Goldberg 2017). Notably, however, other research has found no gender differences in the influence of interracial relationships on physical health (Miller & Lennox Kail, 2016).

1.4. Union status

Although nearly 20 percent of all newlyweds have a different race/ethnicity-partner, the odds of entering into an interracial *nonmarital cohabiting* relationship (hereafter *cohabiting*) remain much higher than the likelihood of entering into an interracial *marriage* (Parker & Barroso, 2021; Yahirun & Kroeger, 2019). One reason for this may be that the definitions and behavioral norms surrounding marriage are more institutionalized compared to cohabitation (Qian & Lichter, 2007; Sassler & Lichter, 2020). Thus, the social barriers to interracial marriage may be more formidable than interracial cohabitation and therefore the type of union that interracial couples enter into may also influence their sleep outcomes (Herman & Campbell, 2012).

1.5. Confounders of sleep for interracial couples

Beyond racial composition, romantic partners influence one another's sleep in multiple ways (Troxel, 2010). For example, a partner's financial resources and associated health behaviors likely shape sleep outcomes. More educated couples report the most favorable sleep durations, in part because they have higher incomes (Sheehan & Iida, 2021). Because Black individuals and Hispanic individuals have faced systematic barriers to achieving higher levels of income and education (Phelan and Bruce 2015), they possess fewer socioeconomic resources to improve sleep (Grandner et al., 2010). Given this, our analyses include measures of respondent, household, and partner socioeconomic status.

Partners also subtly or explicitly influence or "correct" each other's (health) behaviors (Umberson et al., 2010), including behaviors that directly influence sleep (e.g., smoking, alcohol use, and BMI; (Danisi et al., 2019; Phillips & Danner, 1995). Because the prevalence of health behaviors, like smoking, vary across racial/ethnic groups, we expect that partner' race/ethnicity might also influence individual health behaviors. For instance, recent work has documented how White adults partnered with Hispanic adults smoke less, mirroring the better health behaviors of their Hispanic partners (Bratter et al., 2020). Our analysis therefore accounts for health behaviors and measures of mental and physical health of individuals.

1.6. Research questions and anticipated findings

Our overall objective is to utilize a nationally representative data

source, the National Health Interview Survey, to systematically document the relationship between romantic partner race/ethnicity and self-reported sleep duration while focusing on three major research questions. First, we ask whether being in an interracial union—married or cohabiting—is associated with sleep duration after adjusting for demographic, socioeconomic, health, and behavioral health covariates. We anticipate that individuals in interracial relationships will report worse sleep - both shorter and longer sleep durations compared to normal sleep - than those in same-race relationships. Second, we ask how the specific racial/ethnic composition of the couple is tied to sleep duration. Although we expect that all respondents in interracial unions will report short sleep duration, we anticipate that the association will be particularly pronounced among White adults and Hispanic adults. Specifically, White adults in relationships with non-White partners may be especially susceptible to a lack of social support given that interracial unions are far less common among White compared to non-White adults, and previous research has documented important familial and community consequences for Hispanic adults not in an homogamous relationship (Vasquez, 2015). Finally, we analyze whether these associations vary by the respondent's gender (woman versus man) and the couple's union status (cohabiting versus married). Given the findings of past research on gender, interracial unions, and health, we anticipate that women's sleep will be more impacted by being in an interracial union than men's sleep and also that individuals in marital unions may be more sensitive to the race/ethnicity of their partner than those in cohabiting unions.

2. Data and methods

2.1. Data

We used data from the National Health Interview Survey (NHIS), a large annually conducted nationally representative survey that collects detailed information on the health and social characteristics of noninstitutionalized American adults. Major strengths of the NHIS include interviews of the household roster, reports of self-reported sleep duration, large sample sizes, and nationally representative design, all of which are essential for analyzing sleep in interracial unions. In particular, this study used the Integrated Public Use Microdata Series version of the 2004–2018 NHIS, a prepared and validated version of the data (Blewett et al., 2018).

We selected 2004–2018 because the measure of sleep duration was consistently administered yearly during that period and 2018 was the most recently available year of analysis. The analytical sample consisted of 243,522 heterosexual adults between 25 and 84 years of age who reported valid measures of sleep duration and were living with a romantic partner either in a marital or cohabiting union. Notably 4,804 eligible respondents were missing sleep duration and therefore excluded. To report their measure of sleep duration, respondents must have been identified as the sample adult—either the head of the household or the partner. To maximize our analytical sample size, we included sample adults regardless of whether they were the head of the household or not, as past researchers have employed similar sampling strategies (Brown et al., 2014). We used age 25 as a threshold as it signifies the end of emerging adulthood, and the beginning of a period marked by more stability in occupational paths and romantic relationships (Arnett, 2000). In addition, we used a cutoff at age 84 because the NHIS grouped respondents ages 85 and older into a noncontinuous age category, thereby making it impossible to know their exact age. We also excluded same-sex couples because there were too few to support a detailed analysis of interracial unions, especially when stratified by race/ethnic composition, gender, and union status.

2.2. Measures

To measure sleep duration, we used the interview question "On average, how many hours of sleep do you get in a 24-hour period?" The interviewers would round the respondent's answer to the nearest hour. Paralleling existing research (Hale et al., 2019; Sheehan et al., 2018), we coded sleep duration into the following categories: six or fewer hours of sleep as short sleep, 7–8 hours of sleep as normal sleep (reference), and 9 hours or more as long sleep.

To capture race and ethnicity, we used a respondent-reported measure. In cases where individuals selected more than one category, the interviewers were instructed to ask, "Which of those groups would you say BEST describes [person's] racial background?" For both respondents and partners, we coded race/ethnicity into the following categories: Non-Hispanic White (White, reference), Non-Hispanic Black (Black), Hispanic, and Non-Hispanic Other (Other). We also used a second measure of partner race/ethnicity: a dichotomous variable where "1" = the respondent differed from the partner in race/ethnicity (i.e., interracial union) and "0" = the two were of the same race/ethnicity. To assess whether the relationship between partner racial/ethnic identity and duration of sleep varied by gender and union status, we used dummy variables: 0 = female and 1 = male, and 0 = married and 1 = cohabiting, respectively.

2.3. Covariates

In the multivariable models, we adjusted for various demographic characteristics, household socioeconomic measures, and perceived health status and behavioral factors. Among demographic characteristics, we used a categorical specification of age: 25–44 (ref), 45–64, and 65–84. However, continuous and non-linear specifications provided similar results. We also used a continuous measure for the number of co-residing offspring, ranging from 0 to 9+. We included a categorical variable to account for the respondent's region of residence in the United States given substantial geographic variation in the prevalence of interracial unions, which may contribute to differences in experiences of discrimination/stigma (Taylor et al., 2010): 1 = Northeast (reference), 2 = North Central/Midwest, 3 = South, and 4 = West. We also added a dichotomous nativity variable: 0 = born in the United States, and 1 = not born in the United States.

Studies suggest that household socioeconomic resources may affect sleep duration, thus we included a categorical variable to account for household income: 0 = $0–$34,999 (reference), 1 = $35,000–$74,999, and 2 = $75,000+. Household income was top-coded at $75,000+ in the NHIS data. We also accounted for the respondent's educational attainment and the educational attainment of the respondent's partner to adjust for the association between educational attainment and sleep duration (Sheehan & Iida, 2021). We coded educational attainment for respondents and their partners identically into the following categories: 0 = less than high school, 1 = high school, 2 = some college, and 3 = *four-year* college or more. Given the important association between sleep duration and time spent working, we also included a categorical variable measuring the number of hours respondents work per week: 0 = 0 hours, 1 = 0–39 hours, 2 = 40 hours, and 3 = 40+ hours. We also added a dummy variable for homeownership: 0 = not owned, 1 = owned.

Various health behaviors and self-perceived health are linked to sleep, and this association may vary by the individual and their partner's race. We included a categorical measure of smoking frequency: 0 = never a smoker (reference), 1 = former smoker, 2 = current some days smoker, and 3 = current everyday smoker. We also accounted for the respondent's alcohol drinking status: 0 = never a drinker (reference), 1 = former drinker, and 2 = current drinker. We incorporated three dimensions of well-being: Body Mass Index, self-rated health, and perceived mental distress. Respondent's BMI was categorized in accord with the specifications of Danisi et al. (2019), as 0 = normal (18.5-<30; reference), 1 = underweight (less than 18.5), or 2 = obese+ (30+). We coded self-rated health as a dummy variable: 0 = Excellent/Very Good/Good and 1 = Fair/Poor. We also included the Kessler six scale, a validated scale of mental distress, to account for respondent's perceived

mental health (Kessler et al., 2010). Finally, we included a dichotomous variable to account for health insurance, with no insurance as the referent.

2.4. Analytic plan

First, we calculated the survey weighted descriptive statistics for all covariates (Table 1). We also documented the racial/ethnic distribution of all relationships (Supplemental Table 1). Next, we present a series of survey weighted multinomial regression models (Hoffmann, 2004) to analyze the association between being in an interracial union (the dichotomous specification) and sleep duration (Table 2). The co-efficients from the multinomial regression models are presented in the form of Relative Risk Ratios (RRRs). We fit models to analyze the three different sleep categories: short, normal (base category), and long sleep. Model 1 included the main effect of being in an interracial relationship, demographic characteristics, household socioeconomic factors, and health and health behaviors. In Model 2 we included an interaction between respondent race/ethnicity and being in an interracial union (the dichotomous specification), adjusting for all covariates.

To further examine the potentially divergent influence of partner race/ethnicity on sleep by partner race, we fit multinomial regression models with all covariates stratified by the respondent's race/ethnic affiliation (Table 3). We fit two models that included all covariates. In the first model we used the dichotomous specification (same race/ethnic partner or not). In the second model we predicted sleep duration with the reference category for partner race/ethnicity in each regression matched to the respondent race/ethnicity for that stratified model (i.e., non- Black partners were the reference group for the model focusing on Black adults). These results are presented in Table 3. Similarly, Fig. 1 presents the calculated marginal predicted probabilities of reporting short sleep duration from an interaction model (own race/ethnicity X partner race/ethnicity) with all covariates held at their mean value (Williams, 2012). We also fit models stratified by gender (Supplemental Table 2) and union status (Supplemental Table 3) and present and discuss these results in the supplemental materials. All analyses were conducted with Stata 15.1. To contend with missing data, we used Stata's multiple imputation command, mi impute, to create ten imputed datasets. To conduct the analysis with the imputed datasets, we used Rubin's rule and mi estimate. Listwise deletion provided similar overall results.

3. Results

Table 1 presents the weighted descriptive statistics from the sample. Most of the respondents reported a normal sleep duration (62.5%), fewer than a third reported a short sleep duration (30.8%), and 6.8% reported long sleep. One in five respondents—or 20%—reported being in a union with someone of a different racial/ethnic background than their own. These estimates are nearly identical to other researchers documenting interracial relationships (Livingston & Brown, 2017). For partner race/ethnicity, 70.3% had White partners, 9.8% had Black partners, 13.8% had Hispanic partners, and 6.1% had Other partners. These percentages mirrored the distribution of the respondent's race.

Table 2 presents the coefficients from multinomial models predicting categories of sleep duration, with normal sleep duration as the base category. Model 1 included interracial union status, demographic and socioeconomic characteristics, and physical and behavioral health characteristics of the respondent and their partner. In this model, re-spondents who were in an interracial union had significantly higher RRRs of reporting short sleep compared to normal sleep (RRR: 1.23, $p < .001$) than respondents in a same race/ethnic union. These results were non-trivial and suggested that respondents in interracial unions had 23% higher risk of reporting short sleep than normal, even after adjusting for all the covariates. Model 2 included an interaction between respondents' self-reported race/ethnicity and union status and the results were quite

Table 1

Descriptive Statistics, Sample Adults living with Romantic Partner, aged 25–84 Years in the National Health Interview Survey, 2004–2018.

	Percentage or Mean	
Sleep Duration		
Short (six or fewer hours)	30.8%	
Normal (seven to eight hours)	62.5%	
Long (nine or more hours)	6.8%	
Partner and Own Race/Ethnicity		
Romantic Partner not same Race/Ethnicity (Ref = Same Race/Ethnicity)		20.0%
Partner Race/Ethnicity		
White (Ref)	70.3%	
Non-Hispanic Black	9.8%	
Hispanic	13.8%	
Non-Hispanic Other	6.1%	
Own Race/Ethnicity		
Non-Hispanic White (Ref)	69.9%	
Non-Hispanic Black	9.9%	
Hispanic	14.1%	
Non-Hispanic Other	6.1%	
Demographic Characteristics		
Age Group		
25-44	42.7%	
45-64	41.0%	
65-84	16.3%	
Male (Female = Ref)	47.8%	
Number of Offspring in House	1.04	
Cohabit (Married = Ref)	8.7%	
Region		
Northeast (Ref)	17.7%	
Midwest	23.1%	
South	36.5%	
West	22.6%	
Foreign Born	18.5%	
Socioeconomic Characteristics		
Household Income		
$0-$34,999 (Ref)	23.7%	
$35,000-$74,999	32.9%	
75,000+	43.4%	
Educational Attainment		
Less than High School (Ref)	10.6%	
High School	27.5%	
Some College	28.7%	
College +	33.2%	
Spouses' Educational Attainment		
Less than High School (Ref)	10.9%	
High School	29.0%	
Some College	27.2%	
College +	32.8%	
Hours Per Week Worked		
0 (Ref)	33.7%	
1 to 39	16.6%	
40.00	29.3%	
41+	20.5%	
Owns Home	75.0%	
Health and Behavioral Health		
Smoking Status		
Never Smoker (Ref)	58.6%	
Former Smoker	24.4%	
Current Someday Smoker	3.4%	
Current Everyday Smoker	13.5%	
Alcohol Consumption		
Never Drinker (Ref)	17.9%	
Former Drinker	14.9%	
Current Drinker	67.2%	
Self-Reported Body Mass Index		
Normal Weight ($\geq$18.5 to < 30, Ref)	68.7%	
Under Weight (<18.5)	1.2%	
Obese and more ($\geq$30)	30.1%	
Self-Reported Health		
Fair/Poor rated health (Ref = Good health)	12.0%	
Kessler-6 Scale	1.8	
Insurance		
Has insurance (Ref = No Insurance)	87.5%	
N = 243,552		

Source: National Health Interview Survey, 2004–2018.

Table 2

Relative Risk Ratios from Multinomial Logistic Regression Models Predicting Sleep Duration, Sample Adults living with Romantic Partner aged 25–84 Years in the National Health Interview Survey, 2004–2018.

	Short Sleep (vs. Normal)				Long Sleep (vs. Normal)			
	Model 1		Model 2		Model 1		Model 2	
	RRR		RRR		RRR		RRR	
Partner Race/Ethnicity								
Romantic Partner not same Race/Ethnicity (Ref = Same Race/Ethnicity)	1.23	***	1.27	***	0.97		0.93	*
Demographic Characteristics								
Own Race/Ethnicity								
Non-Hispanic White (Ref)								
Non-Hispanic Black	1.47	***	1.61	***	1.35	***	1.32	***
Hispanic	0.99		0.96		1.00		0.99	
Non-Hispanic Other	1.41	***	1.49	***	0.99		0.94	
Own/Race/Ethnicity X Romantic Partner not same Race/Ethnicity (Ref = Same Race/Ethnicity)								
Non-Hispanic White (Ref)								
Non-Hispanic Black X Romantic Partner not same Race/Ethnicity			0.82	***			1.08	
Hispanic X Romantic Partner not same Race/Ethnicity			1.06	*			1.03	
Non-Hispanic Other X Romantic Partner not same Race/Ethnicity			0.86	***			1.15	
Age Group								
25-44								
45-64	1.10	***	1.10	***	0.88	***	0.88	***
65-84	1.00		0.99		1.31	***	1.31	***
Male (Female = Ref)	1.01		1.01		0.96	*	0.97	
Number of Offspring in House	1.13	***	1.13	***	0.92	***	0.92	***
Cohabit (Married = Ref)	1.07	***	1.06	***	1.10	**	1.10	**
Region								
Northeast (Ref)								
Midwest	0.86	***	0.86	***	1.11	***	1.11	***
South	0.90	***	0.89	***	1.15	***	1.15	***
West	0.83	***	0.83	***	1.13	***	1.13	***
Foreign Born	0.88	***	0.88	***	0.84	***	0.84	***
Socioeconomic Characteristics								
Household Income								
$0-$34,999 (Ref)								
$35,000-$74,999	1.02		1.02		0.94	**	0.94	**
75,000+	0.97		0.97		0.86	***	0.86	***
Educational Attainment								
Less than High School (Ref)								
High School	1.11	***	1.10	***	0.90	***	0.90	***
Some College	1.24	***	1.24	***	0.83	***	0.83	***
College +	0.99		0.99		0.71	***	0.71	***
Spouses' Educational Attainment								
Less than High School (Ref)								
High School	1.04		1.04		1.01		1.00	
Some College	1.02		1.02		1.05		1.05	
College +	0.92		0.91	***	0.95		0.95	

Table 2 (*continued*)

	Short Sleep (vs. Normal)				Long Sleep (vs. Normal)			
	Model 1		Model 2		Model 1		Model 2	
	RRR		RRR		RRR		RRR	
Hours Per Week Worked								
0 (Ref)								
1 to 39	1.10	***	1.10	***	0.65	***	0.65	***
40	1.11	***	1.11	***	0.42	***	0.42	***
41+	1.66	***	1.66	***	0.39	***	0.39	***
Owns Home	0.93	***	0.93	***	0.94	**	0.94	**
Health and Behavioral Health								
Smoking Status								
Never Smoker (Ref)								
Former Smoker	1.06	***	1.06	***	1.16	***	1.16	***
Current Someday Smoker	1.16	***	1.16	***	1.36	***	1.36	***
Current Everyday Smoker	1.33	***	1.32	***	1.24	***	1.24	***
Alcohol Consumption								
Never Drinker (Ref)								
Former Drinker	1.16	***	1.16	***	1.15	***	1.15	***
Current Drinker	1.06	***	1.06	***	0.98		0.98	
Self-Reported Body Mass Index								
Normal Weight (≥18.5 & < 30, Ref)								
Under Weight (<18.5)	1.00		1.00		1.31	***	1.31	***
Obese and more (≥30)	1.23	***	1.23	***	1.12	***	1.12	***
Self-Reported Health								
Fair/Poor rated health (Ref = Good health)	1.47	***	1.47	***	1.62	***	1.62	***
Kessler-6 Scale	1.11	***	1.11	***	1.06	***	1.06	***
Insurance								
Has insurance (Ref = No Insurance)	1.10	***	1.10	***	1.08	**	1.08	**
Constant	0.19	***	0.19	***	0.15	***	0.15	***
N = 243,552								

Notes: RRR = Relative Risk Ratio. Each Model additionally adjusts for Survey year.

Source: National Health Interview Survey, 2004–2018. *p < .05 **p < .01 ***p < .001.

similar. Broadly, the interaction results indicated that interracial unions were less harmful for Black adults and Other adults' short sleep duration (compared to normal sleep duration) than White adults and more harmful for Hispanic adults than White adults. We explore these issues further below with an assessment of partner race/ethnicity. Concerning long sleep, the results in Model 1 indicated that respondents in interracial unions did not have significantly higher RRRs of reporting long sleep compared to normal sleep than respondents in same-race unions. Additionally, there were no significant interaction terms for long sleep in Model 2.

Table 3 presents abbreviated results from multinomial models stratified by the respondent's race/ethnicity. The short sleep results indicated that after adjusting for demographic, socioeconomic, and health and behavioral health characteristics, White adults (RRR: 1.21, *p* < .001), Black adults (RRR: 1.12, *p* < .001), Hispanic adults (RRR: 1.23, *p* < .001), and Other adults (RRR: 1.13, *p* < .01) in interracial unions had statistically higher RRRs of reporting short sleep compared to respondents of their same racial/ethnic group not in interracial unions. Model 2 examined the influence of specific racial/ethnic pairings. The results indicate that White respondents whose partner identified as Other (RRR: 1.16, p < .01) had statistically higher RRRs of reporting

Table 3

Relative Risk Ratios from Multinomial Logistic Regression Models Predicting Sleep Duration stratified by Respondent Race/Ethnicity, Sample Adults living with Romantic Partner, aged 25–84 Years in the National Health Interview Survey, 2004–2018.

	Short Sleep (vs. Normal)								Long Sleep (vs. Normal)							
	Own/Race/Ethnicity								Own/Race/Ethnicity							
	NH White		NH Black		Hispanic		NH Other		NH White		NH Black		Hispanic		NH Other	
	RRR		RRR		RRR		RRR		RRR		RRR		RRR		RRR	
Model 1																
Romantic Partner not same Race/Ethnicity (Ref = Partner Same Race/Ethnicity)	1.21	***	1.12	***	1.23	***	1.13	**	0.96		1.01		0.94		1.12	
Model 2																
Partner Race/Ethnicity																
Non-Hispanic White	Ref		1.08		1.05		0.97		Ref		1.06		1.00		1.17	
Non-Hispanic Black	1.01		Ref		1.40	**	1.37		0.98		Ref		0.93		1.20	
Hispanic	1.07		0.99		Ref		1.18		0.89		1.02		Ref		1.20	
Non-Hispanic Other	1.16	**	1.01		1.21		Ref		1.09		0.83		0.99		Ref	
Constant	0.33	***	0.27	***	0.21	***	0.24	***	0.14	***	0.16	***	0.19	***	0.16	***
N = 243,552	155,667		29,085		42,814		15,986		155,667		29,085		42,814		15,986	

Notes: RRR = Relative Risk Ratio. For each model, the reference group of the partner is the group studied (e.g., the reference group for partner race/ethnicity for the Non-Hispanic White model is non-Hispanic White partners). All models account for age group, gender, number of offspring in the home, cohabitation status, region of residence, nativity status, household income, respondent educational attainment, partner educational attainment, hours worked per week, home ownership status, smoking status, alcohol consumption, self-reported health, kessler-6 scale, health insurance status and survey year.

Source: National Health Interview Survey, 2004–2018. *$p < .05$ **$p < .01$ ***$p < .001$.
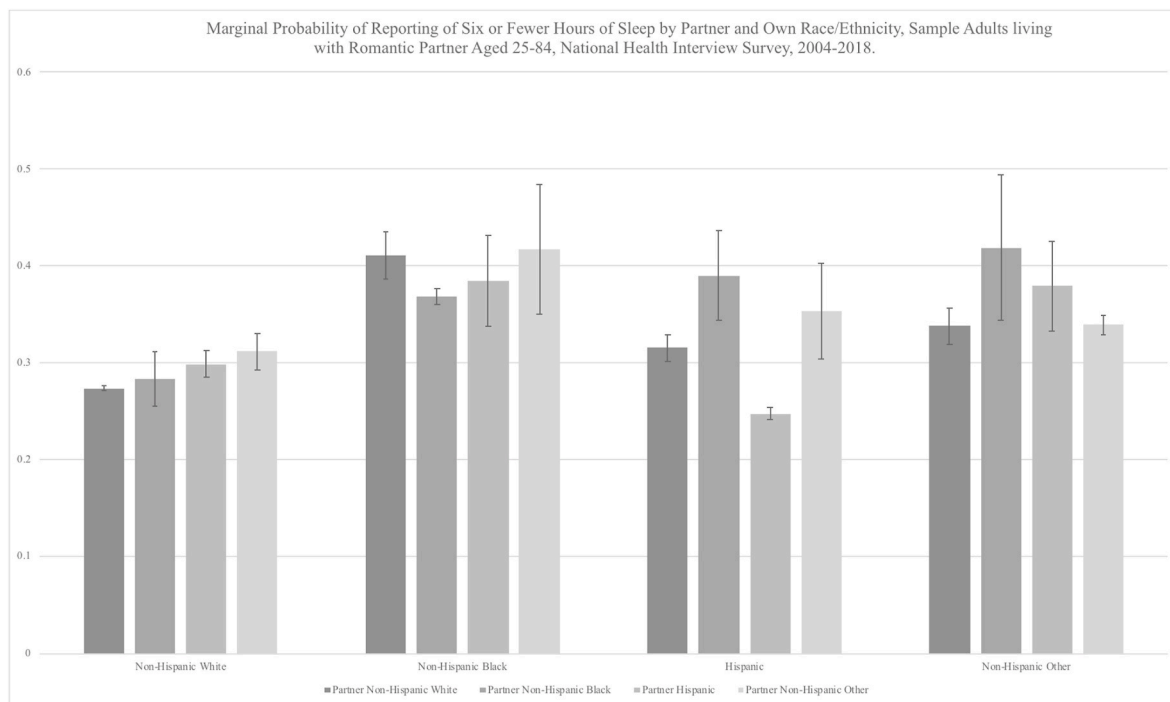

Fig. 1. Marginal Probability of Reporting of Six or Fewer Hours of Sleep by Partner and Own Race/Ethnicity, Sample Adults living with Romantic Partner Aged 25–84, National Health Interview Survey, 2004–2018.

short sleep compared to normal sleep than White respondents in a same race/ethnic relationship. In addition, Hispanic respondents whose partner identified as Black (RRR: 1.40, $p < .01$) had statistically higher RRRs of reporting short sleep compared to normal sleep than Hispanic respondents in a same-race relationship. Being in an interracial union and the partner race/ethnic coefficients were generally not significantly associated with long sleep.

To ease interpretation, we plotted the results from a separate interaction model between respondent's race/ethnicity and their partner's race/ethnicity and calculated the marginal predicted probability of reporting short sleep in Fig. 1. None of the long sleep interactions were significant (results not shown here, available upon request). Not

surprisingly, the confidence intervals are the smallest when the respondent's and partner's race are the same, as this is the most likely combination (see Supplemental Table 1). Overall, Fig. 1 draws attention to several important results. First, the figure suggests that regardless of partner race, White respondents were least likely to report short sleep, with the one exception of Hispanic respondents with Hispanic partners who had the lowest levels of short sleep. Second, within racial groups, we see variation by partner race/ethnicity. White respondents with Hispanic partners or Other race/ethnic partners were more likely to report six or fewer hours of sleep than Whites respondents with White partners. Among Black respondents, those with White partners experienced a higher probability of shorter sleep than those with Black

partners. Hispanic respondents with non-Hispanic partners all reported shorter sleep than those with Hispanic partners.

We also fit models testing the differences across gender and union status (results are available in Supplemental Tables 2 and 3). With respect to gender, the only significant finding was that Hispanic men in particular benefited from having a Hispanic partner. Finally, we found that the association between being in an interracial union and sleep health varied little by union status.

4. Discussion

As researchers view sleep as a process shaped by romantic partners (Troxel, 2010) and Americans' romantic relationships are becoming more diverse, understanding the influence of a partner's social characteristics, including race/ethnicity, for sleep is critical. Even as interracial relationships have increased over time (Parker & Barroso, 2021), recent research has documented that those in interracial unions report less favorable mental (Bratter & Eschbach, 2006; Kroeger & Williams, 2011; Wong & Penner, 2018) and physical health (Lykke & Rendall, 2017; Yu & Zhang, 2017) than those in same-race unions, likely reflecting the negative health consequences of living under systemic racism. In this study, we examined whether interracial relationships and the racial/ethnic composition of those relationships were associated with sleep duration and asked whether these associations varied by gender and union type.

Broadly, we found that Americans in interracial relationships were significantly more likely to report short sleep than were those in same-race unions, even after we accounted for demographic characteristics, socioeconomic status, and measures of health behaviors and well-being. This was true of all racial/ethnic groups we analyzed but was especially pronounced among White adults and Hispanic adults. Somewhat similarly, in ancillary analyses we found that individuals in interracial relationships had significantly greater propensities to report long sleep until measures of health and health behaviors were accounted for in the models. This was intuitive given that physical and mental health conditions (especially depression) and employment status are so strongly predictive of long sleep (Patel et al., 2006).

Although our data do not necessarily allow us to test for precise "downstream" mechanisms, we offer a few potential explanations for our findings. For one, those in interracial unions may have weaker social support networks to begin with, as prior research has shown that weak parent-child ties select individuals into interracial unions and this too may influence sleep (Yahirun & Kroeger, 2019). Less social, familial, and community support can increase temporal burdens allowing less time for sleep. A second explanation is the levels of social stigma that those in interracial unions face that those in same-race unions do not (Kalmijn, 1998). Negative interactions with family members, one's broader social network, or even people randomly encountered in public could influence appraisals of sleep duration as it does with discrimination (Goosby et al., 2017). This may be especially true of White adults in interracial relationships. Indeed, previous work has documented the negative association between being in an interracial union for White adults in part because interracial unions are far less common among White adults compared to non-White adults (Yu & Zhang, 2017). White adults in interracial unions are also more likely to be exposed to institutional or interpersonal racism given their intimate ties to partners, children, and extended family members compared to those in same-race unions. Being more aware of the consequences of racial aggressions and discrimination could take a unique toll on the health of White adults with different-race partners (a process known as "race cognizance;" Vasquez, 2014) who may otherwise be shielded or unaware of explicit racism. We also found that Hispanic adults in same-race unions had the lowest levels of short sleep but that Hispanic adults with different-race partners reported significantly worse sleep than Hispanic adults in homogamous unions and worse sleep health than White adults in interracial unions. Again, we could not explain this but previous research has noted strong

endogamous pressures among Hispanics in particular (Vasquez, 2015). It is also possible that through the health selection of Hispanic adults (documented through behaviors like smoking, for example), those in same-race unions may reinforce positive sleep habits. In qualitative work, second generation immigrants from Latin America and Asia underscored parental sanctions against relationships with Black partners, reflecting racist hierarchies that are deeply ingrained in the United States (Kasinitz et al., 2009). More work is needed to understand how individuals select partners with positive or negative health behaviors and whether this varies across the racial composition of the couple (Maralani & Portier, 2021).

We also conducted ancillary analyses investigating the importance of specific socioeconomic measures on the influence of interracial partners on short sleep. Overwhelmingly there was very little difference in the importance of each socioeconomic measure for short sleep in terms of RRR reduction relative to a full model without the socioeconomic covariate. However, we found that for White adults, we found that income was most important in explaining the differences, providing tentative evidence that White adults in interracial relationships may earn lower levels of household income, influencing their ability to use flexible resources to improve their sleep duration. In contrast, for Black adults and Hispanic adults we found that the worker status/hours worked was most important, suggesting that Black adults and Hispanic adults in interracial relationships may have less temporal flexibility to dedicate to sleep.

In addition, we found little evidence of gender differences, with the notable exception that Hispanic men in particular seemed to benefit from being in relationships with Hispanic women for short sleep risk. These results parallel similar studies that found no difference between men versus women in interracial unions with respect to physical health outcomes (Miller & Lennox Kail, 2016), or find that men's sleep benefits more from their partner's educational attainment (Sheehan & Iida, 2021). However, the results depart from prior work suggesting that women in interracial unions may be susceptible to worse health outcomes than men (Lykke & Rendall, 2017; Wong & Penner, 2018). Still, other work has also pointed to the importance of race and gender, underscoring how gender effects may only be applicable for White (as opposed to non-White) women (Kroeger & Williams, 2011). Similarly, interaction terms (and three-way interactions) indicated no differences in the probability of reporting short sleep for cohabiting versus married couples: those in interracial relationships were equally disadvantaged in terms of short and long sleep in both unions. This suggests that the same factors that undermine sleep among cohabiting couples may be similar among marital couples. Future research using panel data with information on how sleep behaviors select couples into different union types may help shed light on some of these null findings (Maralani & Portier, 2021).

There are important limitations that should be considered. First, we used self-reported sleep duration, which is inaccurate compared to "objective" measures such as actigraphy. However, we have no reason to anticipate that this bias would vary systematically by romantic partners' race/ethnicity. In addition, we analyzed only heterosexual couples. Similar work should be conducted on same-sex couples, who face additional sources of stress and discrimination, potentially exacerbated among those in interracial relationships. Furthermore, we did not have an exhaustive list of variables that could be used to examine mechanisms. The NHIS contains limited measures of household income and wealth, for example, where household income is top-coded at $75,000 and only homeownership is included as a measure of wealth. In addition, future research should examine whether measures such as relationship quality or duration, family or social support, discrimination, and other more detailed measures of socioeconomic status can mediate the relationship between partners' race/ethnicity and their sleep. Although the data controlled for the respondent's nativity status, the NHIS did not provide a measure for partner's nativity status. Regarding the race/ethnicity variables in the data, it is unclear whether Others partnered with Others are in same-race relationships, given the opaqueness of the

category itself. The need for larger sample sizes to disentangle the specific racial and ethnic composition of couples is underscored by the growth of the Asian and multiracial/ethnic populations in the United States, who are not adequately captured in our analysis. Finally, although our data hint at the potential pathways through which being in an interracial union affects an individual's sleep, dyadic data on sleep patterns are needed to unpack the potential spillover effects of health and sleep between partners.

As the American population becomes more racially and ethnically heterogenous, interracial unions will constitute a growing share of romantic relationships. Sleep scientists are well aware that sleep is a process that is influenced by romantic partners; now is the time to understand the mechanisms, through which social factors and inequities, including systemic racism, can enter the bedroom. Future data should be collected explicitly focusing on how the dyadic nature of sleep is influenced by broader social processes such as systematic racism. Investigating those processes will allow clinicians and policy makers to promote successful sleep strategies across the broad array of Americans who sleep with partners.

Ethical Statement

Interracial unions and sleep duration among heterosexual American adults, Ethical Statement.

CRediT statement

Angelica Lopez: Conceptualization, Methodology, Software, Validation, Investigation, Data Curation, Writing Original/Editing, Visualization. **Connor Sheeehan:** Methodology, Software, Validation, Formal Analysis, Writing- Review, Visualization, Supervision. **Jenjira Yahirun:** Conceptualization, Writing - Original/Editing, Supervision, Project Administration.

Declaration of competing interest

None.

Data availability

Data will be made available on request.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssmph.2022.101188.

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