



# Dimensions of sexual orientation and sleep disturbance among young adults

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## ABSTRACT

We examined associations among 3 dimensions of sexual orientation (identity, attraction, and behavior) and sleep disturbance among young adults in the United States. Using Wave IV of the National Longitudinal Study of Adolescent Health (respondents aged 24–32,  $N = 14,334$ ), we ran multivariate logistic regressions to estimate the probability of reporting trouble falling asleep, trouble staying asleep, and short sleep duration, based on specific sexual orientation categories.

Results after controlling for mental health indicate that these categories are more likely to have trouble falling asleep: women who identify as “bisexual” ( $OR = 1.85$ ,  $CI: 1.21, 2.82$ ), women attracted to “both sexes” ( $OR = 1.31$ ,  $CI: 1.00, 1.72$ ), women who have had “mostly opposite sex” partners ( $OR = 1.40$ ,  $CI: 1.10, 1.77$ ), and men who have had “mostly same sex” partners ( $OR = 2.28$ ,  $CI: 1.21, 4.31$ ). For trouble staying asleep: women who identify as “bisexual” ( $OR = 1.48$ ,  $CI: 1.01, 2.18$ ), men and women attracted to “both sexes” ( $OR = 1.81$ ,  $CI: 1.12, 2.91$ ;  $OR = 1.27$ ,  $CI: 1.00, 1.60$ ), and women who have had “mostly opposite sex partners” ( $OR = 1.38$ ,  $CI: 1.13, 1.69$ ). For short sleep duration: women who identify as “mostly straight” or “mostly gay” ( $OR = 1.27$ ,  $CI: 1.01, 1.60$ ;  $OR = 2.64$ ,  $CI: 1.36, 5.14$ ), men who identify as “bisexual” ( $OR = 2.56$ ,  $CI: 1.26, 5.18$ ), women attracted only to “same sex” ( $OR = 2.42$ ,  $CI: 1.48, 3.96$ ), men attracted to “both sexes” ( $OR = 1.88$ ,  $CI: 1.21, 2.93$ ), and women who have had “mostly same sex” partners ( $OR = 4.90$ ,  $CI: 2.10, 11.46$ ). Given the variation in findings, it is necessary to analyze each sexual orientation dimension and the categories within each dimension to adequately understand sleep disturbances among sexual minority populations.

## 1. Introduction

Conceptually, sexual orientation has three major dimensions (Badgett and Goldberg, 2009): sexual identity, sexual attraction, and sexual behavior; however, past work linking sexual orientation to health has often failed to recognize this multidimensionality. Notably, this may stem from lack of available data, as few large-scale surveys include questions regarding each dimension. Of this past work, most have found sexual minority status to be disadvantageous to both mental and physical health (Meyer and Northridge, 2007), which is commonly explained by the minority stress model (Meyer, 2003). Reliance upon a single dimension of sexual orientation misses important variations in health behaviors (McCabe, Hughes, Bostwick, West, and Boyd, 2009), and leaves us with a deficient understanding of disparities not only between sexual minority and majority populations, but also within sexual minority populations themselves (Lindley, Walsemann, and Carter, 2012). The way in which sexual orientation is defined and measured has important implications for health research and practice (McCabe, Hughes, Bostwick, and Boyd, 2005).

Findings from studies that have analyzed all three dimensions of sexual orientation have been consistent with the aforementioned literature documenting poorer health outcomes for sexual minority populations as compared to heterosexuals (Meyer and Northridge, 2007), but they have also shown considerable variability across dimensions and genders in relation to health-risks (McCabe et al., 2009; Lindley et al., 2012; McCabe et al., 2005; McCabe, West, Hughes, and Boyd, 2013; Talley, Aranda, Hughes, Everett, and Johnson, 2015; Lhomond, Saurel-Cubizolles, and Michaels, 2014; Brewster and Tillman, 2012; Bostwick, Boyd, Hughes, and McCabe, 2010). For example, Lindley et al. (Lindley et al., 2012) utilized the National Longitudinal Study of Adolescent Health ‘Add Health’ to assess the dimensions of sexual orientation and associations with common health-risks experienced by sexual minorities. Notably, the Add Health dataset allows for an analysis of intermediate sexual orientation categories (e.g. “mostly straight,” “mostly opposite-sex partners”), which, as the authors mention, are preferred, because they better reflect personal experiences (Lindley et al., 2012). The results showed that among women aged 24–32 years, being attracted to both sexes, identifying as “mostly

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straight” or “bisexual,” and having “mostly opposite-sex sexual partners” was associated with greater risk of depressive symptoms, perceived stress, smoking, binge drinking, and victimization. While among men of the same age, identifying as “mostly straight” was associated with a greater risk for depressive symptoms, perceived stress, and smoking. Such variation across dimensions calls for the analysis of all three whenever possible (McCabe et al., 2005).

Potential differences regarding sleep behavior, a key indicator of long-term health (Åkerstedt, 2006) and a growing public health concern (Colten, Altevogt, and Colten, 2006), have yet to be studied across dimensions of sexual orientation. A recently published article by Chen and Shiu (Chen and Cheng-Shi, 2016) examined the association between sexual orientation and sleep disturbance among adults aged 20 and older in the U.S. using the 2013–2014 National Health Interview Survey. The authors found that sexual minority adults had higher risks of sleep disturbances (trouble falling asleep, trouble staying asleep, not feeling rested) and short sleep duration than heterosexual adults, which was partly explained by differences in socioeconomic status and physical and mental health conditions. Specifically, sexual minority women had greater odds of waking up at night than sexual minority men, but sexual orientation was not associated with an increased risk of short or long sleep duration. However, the authors only incorporated sexual identity as an indicator of sexual orientation, distinguishing between heterosexual, homosexual, bisexual, and “other” minority individuals. Because the authors are unable to include the other dimensions of sexual orientation, the study is not sufficient to understand possible differential effects of sexual orientation on sleep behavior.

Previous work has also demonstrated that inconsistency among dimensions is fairly common (Badgett and Goldberg, 2009; Lindley et al., 2012), which may further contribute to health-risks for individuals that express diverse and fluid sexual identities, attraction, and behavior (Talley et al., 2015; Lourie and Needham, 2016). Discordance regarding sexual orientation is more pertinent among young adults (Strutz, Herring, and Halpern, 2015), as sexual orientation in youth is not fixed (Diamond, 2000; Rosario, Schrimshaw, Hunter, and Braun, 2006), especially among females (Ott, Corliss, Wypij, Rosario, and Austin, 2011), with variation in the timing and sequence of orientation indicator affirmation through young adulthood (Rosario, Schrimshaw, and Hunter, 2008). Further, early adulthood is often accompanied by greater anxiety and uncertainty because of transitions and role formations (Mirowsky and Ross, 1992). Therefore, a comprehensive examination of sexual orientation in regards to young adult health-risks is of particular necessity.

Thus, this work utilizes Wave IV of the Add Health dataset, a nationally representative sample of young adults, to examine the three dimensions of sexual orientation and their associations with sleep disturbance. We also test whether the associations change after controlling for mental health, as sexual minorities report worse mental health outcomes than the majority (Meyer and Northridge, 2007), and poor mental health is strongly related to impaired sleep (Åkerstedt, 2006; Gillin et al., 1984; Chapman et al., 2013; Spoomaker and Van Den Bout, 2005).

## 2. Methods

For this research, we used Wave IV [restricted use] of Add Health. Add Health is a longitudinal study of a nationally representative sample of adolescents in grades 7–12 in the United States during the 1994–1995 school year. The Add Health cohort has been followed into young adulthood with four in-home interviews, the most recent in 2008, when the sample was aged 24–32.

We began with 15,701 individuals, and then restricted the analyses to respondents that were assigned a probability weight (14,800) at Wave IV to ensure that the sample was representative of specific age groups. Further, we excluded 466 individuals who did not have information on the variables included. Our final sample consisted of 7646

women and 6688 men (14,334).

### 2.1. Included variables

We used three dependent variables in this analysis regarding sleep disturbance, measured at Wave IV: trouble falling asleep, trouble staying asleep, and short sleep duration (< 6 h per night) on a typical work day. Trouble falling asleep and trouble staying asleep are categorical variables based on the questions, “Over the past four weeks, how often did you have trouble falling asleep?” and “Over the past four weeks, how often did you have trouble staying asleep throughout the night?” Categories for both questions include “never,” “less than once a week,” “1 or 2 times a week,” “3 or 4 times a week,” and “5 or more times a week.” Since we are interested in chronic sleep problems, we recoded both trouble falling and staying asleep into dichotomous variables: “had trouble falling (or staying) asleep 3 or 4 times a week or more in the past four weeks” (Badgett and Goldberg, 2009) and “had trouble falling (or staying) asleep 1 or 2 times a week or less in the past four weeks” (0). We computed short sleep duration by combining the variables of usual time falling asleep and usual time waking up during the week on a typical work day (respondents reported clock-time indicating AM/PM), and then recoded it into a dichotomous variable: “sleep less than 6 hours on a typical work day” (Badgett and Goldberg, 2009) and “sleep 6 or more hours on a typical work day” (0).

In order to take into account all the three dimensions of sexual orientation – identity, attraction, and behavior –, we used three different independent variables in our analysis, also measured at Wave IV. The first is *sexual identity*, a categorical variable based on the question, “Please choose the description that best fits how you think about yourself.” The categories given are “straight,” “mostly straight,” “bisexual,” “mostly gay,” “gay,” and “none.” The second is *sexual attraction*, a categorical variable that we constructed based on the gender of the respondent and their reported romantic attraction(s). Each respondent is asked if he or she is “romantically attracted to females,” and if he or she is “romantically attracted to males.” Using the answers to these two questions and the gender of the respondent, we constructed a variable with the following categories: “attracted only to opposite sex,” “attracted to both sexes,” “attracted only to same sex,” and “not attracted to any sex.” The last is *sexual behavior*, a categorical variable we built based on the number of male and female partners the respondent reported ever having sex with. The categories we created are “only opposite sex partners,” “mostly opposite sex partners” (if the proportion of opposite-sex partners is > 70% and < 100%), “both sex partners” (if the proportion of opposite-sex partners is between 30% and 70%), “mostly same-sex partners” (if the proportion of opposite-sex partners is < 30%), “only same-sex partners,” and “no sex” if the respondent has never had sex before.

To test if the relationships between sexual orientation and sleep are influenced by mental health, we included three different mental health variables: stress, depression, and anxiety. They are pre-constructed variables based on the Cohen Perceived Stress Scale (Cohen, 1994), Center for Epidemiologic Studies Depression Scale (Radloff, 1977), and Anxious Personality Scale, respectively. The scales range from 0 to 12 (stress), 0–15 (depression),<sup>1</sup> and 4–20 (anxiety); the higher the score, the higher the level of reported stress, depression, or anxiety.

As controls, we included age (continuous: takes into account both year and month of birth), race/ethnicity (categorical: non-Hispanic White, non-Hispanic Black, Asian/Pacific Islander, Hispanic-any race, or other), education level (categorical: less than high school, high school, some college/vocational training, or college degree or more), in-school (dichotomous: equal to 1 if enrolled in school, 0 otherwise),

<sup>1</sup> Questions used for CESD Scale: In the past 7 days, how often were you “bothered by things,” “unable to shake off the blues,” “had trouble concentrating,” “felt depressed,” and “felt sad”; questions were scored 0–3 and summed for a total score

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