

Differences in Dimensions of Sleep Among LGBTQ College Students

by

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Honors Thesis

Appalachian State University

Submitted to the Department of Psychology  
and The Honors College  
in partial fulfillment of the requirements for the degree of  
Bachelor of Science  
August 2019

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### Abstract

Even as acceptance of LGBTQ individuals grows, limited research has been performed on this population. Therefore, we have little understanding of specific problems that may affect LGBTQ people. As such, it is our duty to conduct research to identify health risks among LGBTQ individuals. This study aims to help fill this gap by looking at the relationship between sexual orientation and sleep in heterosexual and LGBTQ American college students. We predicted that LGBTQ students would have poorer sleep quality and quantity, as well as greater stress, than heterosexual students. We also predicted that stress would partially explain the difference in sleep between the two populations. We collected sleep data using the Pittsburgh Sleep Scale (PSQI), a self-report questionnaire, and a wrist-worn accelerometer that tracks sleep. We assessed stress using the Perceived Stress Scale (PSS), which looks at an overall sense of control and feelings of being overwhelmed. Using t-tests and an ANCOVA, we found that LGBTQ students reported poorer sleep quality on self-report measures but found no differences in the sleep watch or diary data. We also found that LGBTQ students reported higher perceived stress than heterosexual students. The statistical main effect of sexual orientation for sleep quality was not significant when stress was used as a covariant, indicating that the difference in sleep by sexual orientation is likely a result of differences in stress or the perception of stress.

### Differences in Dimensions of Sleep Among LGBTQ College Students

One thing that connects almost every living organism is a need for sleep. Some animals sleep while standing up, some while lying down, and others while swimming, but at some point, they all take the time to rest. For years researchers have tried to understand the benefits humans get from sleeping and what happens to people if they do not get enough sleep. Researchers have also tried to determine if there are populations of people who are at greater risk of not getting enough sleep. This study examines if sexual minorities are at-risk for poorer sleep quality and/or quantity using a combination of surveys and sleep monitoring equipment.

#### *Sleep and Human Health*

Research has repeatedly shown that poor sleep quality and shorter sleep durations are associated with poor mental health and also negatively impacts physical health. Strine and Chapman (2005) found that those reporting frequent sleep restriction were more likely to report mental distress, depressive symptoms, and anxiety. Another study found that when participants were put on a sleep-restricted schedule, they showed a reduction in prosocial behavior (Dickinson & McElroy, 2017). Further, those with poor sleep quality recalled more negative events and used more negative words when describing these past memories (Lukowski, Valentovich, Bohanek, & Slonecker, 2017).

In terms of physical health effects, those reporting frequent sleep insufficiency were more likely to engage in poor health habits, such as smoking, physical inactivity, obesity, and, in the case of men, heavy drinking (Strine & Chapman, 2005). Another study showed that after only 12 days of restricted sleep, participants reported significant increases in generalized body pain, back pain, and stomach pain (Haack and Mullington, 2005). Both short (below 7 hours per night) and long (above 8 hours per night) sleep duration have been associated with a greater risk of

death (Cappuccio, D'Elia, Strazzullo, & Miller, 2010). Among children, chronic sleep restriction from infancy to school age was associated with higher BMI scores, body fat, waist and hip circumference, and higher rates of obesity (Taverars, Gillman, Peña, Redline, & Rifas-Shiman, 2014).

### *Sleep and Academic Performance*

While this study was conducted on college students in the United States, research from other countries indicates that sleep is a vital part of academic performance no matter where in the world the student resides. Sarraf and Dubey (2016) found that students pursuing advanced degrees in India who had longer sleep durations scored higher in adaptability, general ability, guilt-proneness, maturity, mental health, and self-control when compared to short sleepers. Similarly, in a study of Norwegian college students, researchers found that difficulties initiating and maintaining sleep were associated with a higher likelihood of poor academic performance. Negative outcomes include delayed study progress (falling behind the expected progression of the course), failing multiple exams, and low self-efficacy (Hayley, Divertsen, Hysing, Vedaa, & Øverland, 2017).

In a comprehensive study of college student's sleep habits, Ranasinghe, Gayathri, and Priya (2018) analyzed when students went to bed, what delayed their bedtimes, and reasons why they might be sleep deprived. The majority of participants (57%) reported bedtimes between 10 pm and 12 pm. When asked about what caused them to lose sleep the top answers were the internet (38%), stress (21%), studying (18%), and socializing with friends (18%).

### *Sexual Minorities, Health Risks, and Sleep*

An important aspect of psychology and public health is to determine if certain populations have specific health risks. These demographic factors or identities can include

gender or sex, race, social class, and sexual orientation, or a combination of these identities. The following studies have examined health risks as they pertain to sexual minority identities.

Several studies have found that LGBTQ individuals consume alcohol at higher rates than heterosexual individuals. Ward, Dahlhamer, Galinsky, and Joestl (2014) found that LGBTQ people engaged in greater alcohol consumption when compared to heterosexual people.

Similarly, another study found that gay, lesbian and female bisexual students were more likely to report drinking during the semester than heterosexual students (Coulter, Marzell, Saltz, Stall, & Mair, 2016).

In terms of overall health risks, Ward, Dahlhamer, Galinsky, and Joestl (2014) found that LGBTQ individuals had a higher likelihood of being cigarette smokers and of experiencing serious psychological distress than their heterosexual counterparts. Lesbian, gay, and bisexual students were more likely to report engaging in violent behaviors, attempt death by suicide, and substance use, while being less likely to engage in physical activity than their heterosexual peers (Jiang, Reilly-Chammat, Copper, & Viner-Brown, 2018). Sexual minority and questioning students consistently reported more health-related risk behaviors and higher rates of being bullied, depression, suicide attempts, substance use, sexual behavior, and health condition. Other researchers found that LGBTQ youth in rural Appalachia had an overall higher likelihood of reporting suicide risk, bullying victimization, school violence, drug use, and risky sexual behaviors (Ballard, Jameson, & Martz, 2017). Sexual minority students were also more likely to report inadequate support from their community and at school. They found staff less supportive and there was little evidence of institutional support for LGB students, such as active Gay-Straight Alliances or other supportive clubs. Roberts, Austin, Corliss, Vander Morris, and Koenen (2010) found that sexual minority adults had greater risk of childhood maltreatment and

interpersonal violence than heterosexual adults. They also found that there was a higher risk of PTSD onset among LGB adults than in heterosexual adults. This difference was largely due to greater exposure to violence, more potentially traumatic events, and earlier trauma exposure.

We could find only been a handful of studies that have examined the relationship between sleep and sexual orientation. Rahman and Silber (2000) examined the sleep-wake cycle using self-reported data and its relationship to sexual orientation. They found that gay and lesbian participants went to bed later than their heterosexual counterparts, however, this difference only reached significance for men. They also found that gay and lesbian participants woke up earlier on average. Gay men had a mean of just over 6.5 hours of sleep and lesbians had a mean of approximately 7.5 hours. Heterosexual men had a mean of about 8.75 hours of sleep, while women had a mean of about 8.5 hours.

In a study of Chinese adolescents, researchers (Li et al., 2017) found that sexual minority students had significantly shorter mean sleep duration (6.9 hours a day) than heterosexual students (7.2 hours a day). They also found that fewer sexual minority students (27%) slept 8 hours or more compared to heterosexual students (36%). The number of students reporting poor sleep quality was significantly higher among sexual minority students than heterosexual students (33% vs. 22%). They found that bullying victimization mediated the relationship between sexual orientation and sleep quality, suggesting that bullying could be a reason that differences were found between the two groups.

Using data from the U.S. National Survey, researchers compared sexual orientation and sleep using questions about sleep duration and sleep disturbances (Chen & Shiu, 2017). They found that sexual minority adults had a higher risk of sleep disturbances than heterosexual adults, but there was no association between sexual orientation and an increased risk of short or long

sleep duration. This finding is consistent with the research of Galinsky, Ward, Joestl, and Dahlhamer (2018) examined the relationship between sleep and sexual minority status. They found no difference in the likelihood of meeting the recommendations of the National Sleep Foundation for sleep duration on the basis of sexual orientation. They did find that gay men were more likely to report having trouble falling asleep, using medication to help stay/fall asleep, and waking up not feeling well rested when compared to heterosexual and bisexual men. Lesbians were more likely to have trouble staying asleep and to use medication to help stay/fall asleep compared to heterosexual women. Bisexual women were more likely to have trouble falling and staying asleep compared to heterosexual women.

Each of these studies found a relationship between sleep and sexual orientation but the findings were not consistent across studies. Some reported significant differences in duration (Li et al., 2017), while others reported higher rates of sleep disturbances in LGBTQ individuals (Chen & Shiu, 2017). However, each of the cited studies relied on self-report sleep survey data. None used physiological measures of sleep in real time. This may be a limitation in the research and why some studies found differences where others did not.

There are three factors that might contribute to a relationship between sleep and sexual orientation. As noted above, stress can be a factor in reduced sleep quality and quantity. So, minority stress, a type of stress specifically felt by members of marginalized groups that can be caused by a multitude of factors such as poor social support and discrimination (Meyer, 2003), could explain why there is a difference in these factors for members of the LGBTQ community. The second factor to consider is bullying (Li et al., 2017). Bullying victimization is common among LGBTQ individuals and can lead to poor health outcomes, increased risk, and poor sleep (Jiang, Reilly-Chammat, Copper, & Viner-Brown, 2018; Ballard, Jameson, & Martz, 2017; and

Li et. al 2017). Finally, conflictual family relationships could impact sleep among LGBT individuals. Parents are often an important source of support throughout a person's life and "coming out" can potentially damage these relationships. Having a poor relationship with one's family can be a burden and can affect many aspects of a person's life, including sleep (Patterson, Tate, Sumontha, & Xu, 2018). However, the current study does not examine bullying or family conflict specifically. We chose to focus on overall stress using a stress questionnaire with questions pertaining to coping with stressful situations, feeling in control, and an overall feeling on being "on top of things."

The current study examined the sleep quality and quantity of LGBTQ and heterosexual identifying students overall and over the course of three days. Participants filled out a survey examining their sleep habits and perceived stress over the past month. They also completed a daily sleep diary and wore a wrist accelerometer that tracked their sleep for each day of the study. We hypothesized that LGBTQ participants would score higher on the perceived stress scale and poorer on measures of sleep quality and quantity. Stress was expected to significantly impact sleep.

## **Method**

### **Participants**

This study was approved by the University's Institutional Review Board on March 14, 2019. Participants were recruited from a mid-sized public university in the eastern United States. There were 60 participants, of these 37 identified as straight and 23 identified as LGBQ (2 gay, 4 lesbian, 12 bisexual, 1 queer, 1 asexual, and 3 identified as other). Most participants identified as female ( $n = 47$ ), 9 identified as male, 1 as transgender, and 3 as other. Participants race/ethnicity was primarily white/Caucasian (37), 2 were African American/black, 6 were Hispanic/Latinx,

and 7 were biracial or mixed. Students were recruited using the Psychology Department's online recruitment system and flyers posted in the campus LGBT center. Participants recruited through the online recruitment system were given course credit for a psychology class; there were reasonable options to earn the credit. Participants recruited through flyers were compensated with \$10 upon completion of the study. Participants began data collection either on a Monday or Tuesday and ended four days later on either a Thursday or Friday. This was done to avoid the irregular sleep patterns that were likely to occur on the weekends when participants did not have class.

### **Measures**

**The Pittsburgh Sleep Quality Index (PSQI).** The PSQI (Buysse, Reynolds III, Monk, Berman, & Kupfer, 1989) is an 11 question self-report assessment of sleep quality and sleep disturbances over a one-month period. See Appendix A for items. The PSQI measures sleep quality, latency, duration, and disturbances, as well as habitual sleep efficiency, the use of sleep medication and daytime dysfunction. It has a test-retest reliability of 0.85 (Buysse et al. 1989). Scores range from 0 to 21 and scores less than or equal to 5 are associated with good quality sleep whereas scores greater than 5 are associated with poor quality sleep.

**Sleep Diary.** The 11-item sleep diary was modeled after the diary developed by the National Heart, Lung, and Blood Institute. See Appendix B for items. Participants recorded when they went to bed, when they woke up, what time they thought they fell asleep, how many times they woke up during the night, how long they were asleep during the night, and how refreshed they feel upon waking up on a scale of 1 to 7 with 1 being not at all refreshed and 7 being very refreshed. Participants filled this out each night and morning of data collection to assess self-reported sleep in real time.

**The Perceived Stress Scale (PSS).** The PSS is a 14 question self-report assessment of the degree to which people perceive their lives to be stressful based on feelings over the past month. See Appendix C for items. The PSS has a reliability alpha of .78 (Cohen, Kamarck, & Mermelstein, 1983). Scores can range from 0 to 56 with higher scores indicating higher perceived stress.

**Wrist-worn Accelerometer.** This device records movement and white, blue, red, and green light. The light data can be used to differentiate when a person is inactive but still awake by showing what kind of light is on, such as the blue light from a cell phone. The sleep accelerometer was used to assess sleep quality, quantity, time in bed, and wake time. Studies have found that actigraph data is correlated with self-report data for sleep onset time (time they go to sleep); ( $r = .88$ ) and sleep offset time (time they wake up); ( $r = .92$ ) indicating that sleep watches and diaries play a complementary role (Sadeh, 2011).

## **Procedure**

Participants came into the lab and were given a consent form to read and sign. They completed the PSQI, the PSS, and a brief demographic questionnaire on a computer in the lab. The participants were given a sleep diary to fill out over the course of the study. They were instructed to fill out the diary each morning when they woke up and each evening just before going to bed. The participants were also asked to press the event marker on the sleep watch as soon as they woke up and just as they were about to go to sleep. An email was sent by the researcher each morning and evening to remind all participants to complete their sleep diary for the day. On the fourth day the participants returned to the lab to return their sleep diary and watch and were then given their ELC credits or the cash payment.

## **Results**

Table 1 presents the means and standard deviations for average sleep efficiency, average sleep duration, average sleep refresh scores, PSS total, and the PSQI global score for LGBTQ and heterosexual students. Using independent samples *t*-tests we found that sleep efficiency [ $t(57) = -1.328, p = .652$ ], duration [ $t(57) = -.629, p = .379$ ], and refresh scores [ $t(48) = -.773, p = .702$ ] were not significantly different between the two groups. However, the Perceived Stress Scale totals were significantly different with LGBTQ students reporting higher stress [ $t(57) = -2.48, p = .016$ ]. We also found that PSQI global scores were significantly different with LGBTQ students reporting higher scores indicating poorer sleep [ $t(56) = -2.57, p = .013$ ].

Because both the Perceived Stress Scale and PSQI differed for heterosexual and LGBTQ student, we conducted an ANCOVA to see if the difference in PSQI scores could be explained by differences in stress. There was no main effect of sexual orientation for PSQI scores [ $F(1, 54) = 1.63, p = .21$ ], but Perceived Stress scores were a significant covariate [ $F(1, 54) = 10.44, p = .002$ ]. This suggests that differences in sleep between heterosexual and LGBTQ students are largely a function of differences in perceived stress.

### **Discussion**

We predicted that LGBTQ college students would have poorer sleep quality and quantity than heterosexual students. We also predicted that LGBTQ students would have higher perceived stress and this would at least partially explain the relationship between sleep and sexual orientation. Our results showed that there is a significant relationship between sleep and sexual orientation when using self-report sleep data. This is consistent with results from Li et al. (2017). However, we found no significant differences in the sleep watch data. In our sample, LGBTQ students had significantly higher PSQI scores than heterosexual students, indicating poorer sleep quality among the LGBTQ students. This may be due to the fact that the PSQI asks about sleep

over the course of an entire month whereas the watch data was only gathered across three days. If the watch data was collected over the period of a month, we may have seen similar results to the PSQI. LGBTQ students also had significantly higher scores on the Perceived Stress Scale than heterosexual students. This result is consistent with the findings of Ward, Dahlhamer, Galinsky, and Joestl (2014). Follow-up analyses indicated that while stress was a significant covariate of PSQI scores, there was no main effect for sexual orientation. This indicates that the higher stress experienced by LGBTQ students, not sexual orientation per se, is possibly tied to poorer sleep quality and quantity. Another possible explanation for the differences in the self-report data is that individuals with higher perceived stress also perceive their sleep to be poorer when looking back over the month.

We believe that by exploring this topic we can provide knowledge that can translate into better care for the LGBTQ population. By calling attention to a health risk to which LGBTQ people may be more susceptible, we can create better services to address this problem. Future studies into the relationship between sleep and sexual orientation should consider using objective sleep data, such as sleep watches, or other non-self-report measures. Even though we did not find significant differences in the data from the watches, this could have been a result of our small data collection window. As mentioned previously, if the participants had worn the watches for a month we may have obtained results more similar to the PSQI. Future research should also look at the relationship between sleep and sexual orientation and/or gender with a more diverse population as our sample was compromised of college students whose schedules likely affected their typical sleep routine. We also think future research should look into the relationship between sleep, sexual orientation, and bullying or other victimization. Adding some or all of

these into studies could help us better understand the health risks facing LGBTQ individuals when it comes to sleep.

## References

- Ballard, M. E., Jameson, J. P., & Martz, D. M. (2017). Sexual identity and risk behaviors among adolescents in rural Appalachia. *Journal of Rural Mental Health, 41*, 17-29.
- Buysse, D. J., Reynolds III, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh sleep quality index: A new instrument for psychiatric practice and research. *Psychiatry Research, 28*, 193-213.
- Cappuccio, F. P., D'Elia, L., Strazzullo, P., & Miller, M. A. (2010). Sleep duration and all-cause mortality: A systematic review and meta-analysis of prospective studies. *Sleep, 33*, 585-592.
- Chen, J. & Shiu, C. (2017). Sexual orientation and sleep in the U.S.: A national profile. *American Journal of Preventive Medicine, 52*, 433-442.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*, 385-396.
- Coulter, R. W. S., Marzell, M., Saltz, R., Stall, R., & Mair, C. (2016). Sexual-orientation differences in drinking patterns and use of drinking contexts among college students. *Drug Alcohol Depend., 160*, 197-204.
- Dickinson, D. L. & McElroy, T. (2017). Sleep restriction and circadian effects on social decisions. *European Economic Review, 97*, 57-71.
- Galinsky, A. M., Ward, B. W., Joestl, S. S., & Dahlhamer, J. M. (2018). Sleep duration, sleep quality, and sexual orientation: Findings from the 2013-2015 national health interview survey. *Sleep Health, 4*, 56-62.
- Haack, M. & Mullington, J. M. (2005). Sustained sleep restriction reduces emotional and physical well-being. *Pain, 119*, 56-64.

- Hayley, A. C., Sivertsen, B., Hysing, M., Vedaa, Ø., & Øverland, S. (2017). Sleep difficulties and academic performance in Norwegian higher education students. *British Journal of Educational Psychology, 87*, 722-737.
- Jiang, Y., Reilly-Chammat, R., Cooper, T., & Viner-Brown, S. (2018). Disparities in health risk behaviors and health conditions among Rhode Island sexual minority and unsure high school students. *Journal of School Health, 88*, 803-812.
- Li, P., Huang, Y., Guo, L., Wang, W., Xi, C., Lei, Y., ... Lu, C. (2017). Is sexual minority status associated with poor sleep quality among adolescents? Analysis of a national cross-sectional survey in Chinese adolescents. *BMJ Open, 7*, 1-9.
- Lukowski, A. F., Valentovich, V., Bohanek, J. G., & Slonecker, E. M. (2017). Sleep quality and the subjective experience of autobiographical memory: Differential associations by memory valence and temporality. *Applied Cognitive Psychology, 31*, 604-614.
- Meyer, I. H. (2003). Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: Conceptual issues and research evidence. *Psychol Bull., 129*, 674-697.
- Patterson, C. J., Tate, D. P., Sumontha, J., & Xu, R. (2018). Sleep difficulties among sexual minority adults: Associations with family relationship problems. *Psychology of Sexual Orientation and Gender Diversity, 5*, 109-116.
- Rahman, Q. & Silber, K. (2000). Sexual orientation and the sleep-wake cycle: A preliminary investigation. *Archives of Sexual Behavior, 29*, 127-134.
- Ranasinghe, A. N., Gayathri, R., & Priya, V. V. (2018). Awareness of effects of sleep deprivation among college students. *Drug Intervention Today, 10(9)*, 1806-1809.

- Roberts, A. L., Auston, S. B., Corliss, H. L., Vandermorris, A. K., & Koenen, K. C. (2010). Pervasive trauma exposure among US sexual orientation minority adults and risk of posttraumatic stress disorder. *American Journal of Public Health, 100*, 2433-2441.
- Sadeh, A. (2011). The role and validity of actigraphy in sleep medicine: An update. *Sleep Medicine Reviews, 15*, 259-267.
- Sarraf, S. R. & Dubey, S. N. (2016). Effect of duration of sleep on personality and stress in professional students. *Indian Journal of Health and Wellbeing, 7*, 780-782.
- Strine, T. W. & Chapman, D. P. (2005). Associations of frequent sleep insufficiency with health-related quality of life and health behaviors. *Sleep Medicine, 6*, 23-27.
- Taveras, E. M., Gillman, M. W., Peña, M., Redline, S., & Rifas-Shiman, S. L. (2014). Chronic sleep curtailment and adiposity. *Pediatrics, 133*, 1013-1022.
- Ward, B. W., Dahlhamer, J. M., Galinsky, A. M., & Joestl, S. S. (2014). Sexual orientation and health among U.S. adults: National health interview survey, 2013. *National Health Statistics, 77*, 1-10.

## Appendix A

## Pittsburgh Sleep Quality Index

Subject Code \_\_\_\_\_

**INSTRUCTIONS:**

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.

1. During the past month, what time have you usually gone to bed at night?

BED TIME \_\_\_\_\_

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

NUMBER OF MINUTES \_\_\_\_\_

3. During the past month, what time have you usually gotten up in the morning?

GETTING UP TIME \_\_\_\_\_

4. 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 spent in bed.)

HOURS OF SLEEP PER NIGHT \_\_\_\_\_

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

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

- a) Cannot get to sleep within 30 minutes

Not during the past month \_\_\_\_\_ Less than one a week \_\_\_\_\_

Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

b) Wake up in the middle of the night or early morning

Not during the past month \_\_\_\_\_ Less than one a week \_\_\_\_\_

Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

c) Have to get up to use the bathroom

Not during the past month \_\_\_\_\_ Less than one a week \_\_\_\_\_

Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

d) Cannot breathe comfortably

Not during the past month \_\_\_\_\_ Less than one a week \_\_\_\_\_

Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

e) Cough or snore loudly

Not during the past month \_\_\_\_\_ Less than one a week \_\_\_\_\_

Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

f) Feel too cold

Not during the past month \_\_\_\_\_ Less than one a week \_\_\_\_\_

Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

g) Feel too hot

Not during the past month \_\_\_\_\_ Less than one a week \_\_\_\_\_

Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

h) Had bad dreams

Not during the past month \_\_\_\_\_ Less than one a week \_\_\_\_\_

Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

i) Have pain

Not during the past month \_\_\_\_\_ Less than one a week \_\_\_\_\_

Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

j) Other reason(s), please describe \_\_\_\_\_

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How often during the past month have you had trouble sleeping because of this?

Not during the past month \_\_\_\_\_ Less than one a week \_\_\_\_\_

Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

6. During the past month, how would you rate your sleep quality overall? Very good

Very good \_\_\_\_\_ Fairly good \_\_\_\_\_

Fairly bad \_\_\_\_\_ Very bad \_\_\_\_\_

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

Not during the past month \_\_\_\_\_ Less than one a week \_\_\_\_\_

Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

8. 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 one a week \_\_\_\_\_

Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

9. 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 \_\_\_\_\_

10. Do you have a bed partner or roommate?

No bed partner or roommate \_\_\_\_\_ Partner/roommate in other room \_\_\_\_\_

Partner in same room, but not same bed \_\_\_\_\_ Partner in same bed \_\_\_\_\_

11. If you have a roommate or bed partner, ask him/her how often in the past month you have had . . .

a) Loud snoring

Not during the past month \_\_\_\_\_ Less than one a week \_\_\_\_\_

Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

b) Long pauses between breaths while asleep

Not during the past month \_\_\_\_\_ Less than one a week \_\_\_\_\_

Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

c) Legs twitching or jerking while you sleep

Not during the past month \_\_\_\_\_ Less than one a week \_\_\_\_\_

Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

d) Episodes of disorientation or confusion during sleep

Not during the past month \_\_\_\_\_ Less than one a week \_\_\_\_\_

Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

e) Other restlessness while you sleep; please describe \_\_\_\_\_

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Not during the past month \_\_\_\_\_ Less than one a week \_\_\_\_\_

Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

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*Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ: Psychiatry Research, 28:193-213, 1989.*

Appendix B

Sleep Diary

Subject Code \_\_\_\_\_

Night Time	Date:	Date:	Date:
Did you take any naps today? If yes, start and end time.			
Did you take the watch off? If yes, record start and end time and explain why.			
What time are you first attempting to go to sleep?			
Morning Time	Date:	Date:	Date:
What time did you wake up this morning?			
What time do you think you fell asleep last night?			
How long do you think it took you to fall asleep? (in minutes)			
How many times did you wake up during the night? If you woke up, explain why.			
How many total minutes were you awake during the night?			
Calculate how long you were asleep (in hours and minutes) <b>remember to consider how long it took to fall asleep and if you were awake during the night</b>			
How refreshed do you feel on a scale of 1-7? (1=not at all refreshed, 7=completely refreshed)			
Was this a typical night of sleep for you? If no, explain why.			

## Appendix C

## Perceived Stress Scale

## INSTRUCTIONS:

The questions in this scale ask you about your feelings and thoughts during THE LAST MONTH. In each case, you will be asked to indicate your response by placing an “X” over the circle representing HOW OFTEN you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don’t try to count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate.

	Never 0	Almost Never 1	Sometimes 2	Fairly Often 3	Very Often 4
1. In the last month, how often have you been upset because of something that happened unexpectedly?	<input type="radio"/>				
2. In the last month, how often have you felt that you were unable to control the important things in your life?	<input type="radio"/>				
3. In the last month, how often have you felt nervous and “stressed”?	<input type="radio"/>				
4. In the last month, how often have you dealt successfully with day to day problems and annoyances?	<input type="radio"/>				
5. In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life?	<input type="radio"/>				

6. In the last month, how often have you felt confident about your ability to handle your personal problems?
7. In the last month, how often have you felt that things were going your way?
8. In the last month, how often have you found that you could not cope with all the things that you had to do?
9. In the last month, how often have you been able to control irritations in your life?
10. In the last month, how often have you felt that you were on top of things?
11. In the last month, how often have you been angered because of things that happened that were outside of your control?
12. In the last month, how often have you found yourself thinking about things that you have to accomplish?
13. In the last month, how often have you been able to control the way you spend your time?
14. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Table 1

*Means, Standard Deviations, and Ranges by Sexual Orientation*

Measures	Heterosexual		LGBTQ	
	<i>M (SD)</i>	Range	<i>M (SD)</i>	Range
Sleep Efficiency	83.08 (6.41)	68.30 - 93.43	85.35 (6.37)	68.02 – 93.66
Sleep Duration	423.64 (93.82)	252.00 – 703.83	438.25 (74.95)	222.00 – 545.00
Sleep Refresh	4.46 (1.04)	2.67 – 6.33	4.68 (0.96)	3.00 – 6.33
PSQI Global*	3.05 (0.51)	7.00 – 18.00	3.41 (0.71)	10.00 – 22.00
PSS Total*	40.03 (8.02)	19 - 58	45.04 (6.82)	36 - 58

*Note:* Sleep duration is calculated as average minutes of sleep per night according to actiwatch data. PSQI scores of 5 or below are associated with good sleep quality and scores higher than 5 are associated with poorer sleep quality.

\*  $p < .05$