



ELSEVIER

Contents lists available at ScienceDirect

# Sleep Health

Journal of the National Sleep Foundation

journal homepage: [sleephealthjournal.org](http://sleephealthjournal.org)

## Sleep quality among college students: exploring the role of a divine locus of sleep control



Reed T. DeAngelis, MS<sup>a,b,\*</sup>, Irene Escobar, BA<sup>c</sup>, Andrea L. Ruiz, PhD<sup>d</sup>, Gabriel A. Acevedo, PhD<sup>e</sup>

<sup>a</sup> Department of Sociology, University of North Carolina at Chapel Hill, 155 Hamilton Hall CB #3210, Chapel Hill, NC 27599

<sup>b</sup> Carolina Population Center, University of North Carolina at Chapel Hill, 123 W Franklin St., Chapel Hill, NC 27516

<sup>c</sup> Department of Psychology, University of North Texas, 1155 Union Circle #311280, Denton, TX 76203

<sup>d</sup> Department of Sociology, University of Texas at San Antonio, 10 Cocke Dr, San Antonio, TX 78249

<sup>e</sup> School of Humanities and Social Sciences, St Mary's University, One Camino Santa Maria, San Antonio, TX 78228

### ARTICLE INFO

#### Article history:

Received 29 May 2019

Received in revised form 13 August 2019

Accepted 14 August 2019

#### Keywords:

Sleep quality

Religion

Religion and sleep

Locus of control

Divine control

Psychological distress

### ABSTRACT

**Objectives:** To explore (a) how perceptions of personal and divine control over one's sleep schedule combine in distinct ways to predict sleep quality among college students and (b) whether health behaviors and psychological distress mediate the associations between perceptions of sleep control and sleep quality.

**Methods:** We surveyed 1251 students attending a public university in South Texas. All measures were derived from self-reports. Binary logistic regression techniques were used to predict the odds of reporting high-quality sleep in the past month. Mediation analyses were used to decompose the estimated effects of perceptions of sleep control on sleep quality via smoking, drinking, and psychological distress.

**Results:** Compared to participants who reported both low personal control and low divine control over their sleep schedules, students who reported both high personal control and high divine control exhibited 148% greater odds of reporting high-quality sleep (odds ratio = 2.48; 95% confidence interval = 1.434–4.294). These same participants also showed the highest predicted probabilities of reporting high-quality sleep (22%) compared to students with other sleep control orientations. Mediation analyses indicated that reduced psychological distress partially accounted for these differences, whereas smoking and drinking behaviors did not.

**Conclusion:** College students who felt they and God both shared full control over their sleep schedules reported the highest quality sleep, which was partially explained by their lower average levels of psychological distress.

© 2019 National Sleep Foundation. Published by Elsevier Inc. All rights reserved.

### Introduction

*I lie down and sleep; I wake again, because the Lord sustains me.*  
Psalm 3:5

A recent review and conceptual model developed by Hill and colleagues contend that religious involvement could be an important but neglected social determinant of sleep.<sup>1</sup> According to these authors, dimensions of religious involvement may contribute to healthier sleep by (a) reducing symptoms of psychological distress, (b) promoting healthy lifestyles, (c) limiting exposures to acute and

chronic stressors, and (d) mitigating physiological arousal or allostatic load. The authors urge scholars to test this conceptual model with more refined measures of religious involvement.

The current study offers several important contributions to the nascent literature on religion and sleep. First, we explore how perceptions of personal vs divine control over one's sleep schedule combine in distinct ways to predict sleep quality. Feelings of control and efficacy are vital psychosocial resources with widespread implications for personal well-being. Numerous studies have found that people who feel they lack control over their own lives are less capable of coping with life stressors and therefore tend to experience worse mental and physical health outcomes compared to their peers with robust feelings of control.<sup>2,3</sup>

The degree to which people feel they control their own sleep schedules should be particularly important for sleep health. People who believe forces outside of their control—for example, demands from

\* Corresponding author at: Department of Sociology, University of North Carolina at Chapel Hill, 155 Hamilton Hall CB #3210, Chapel Hill, NC 27599.

E-mail addresses: [reedd@live.unc.edu](mailto:reedd@live.unc.edu) (R.T. DeAngelis), [irene.escobar@unt.edu](mailto:irene.escobar@unt.edu) (I. Escobar), [andrea.ruiz@utsa.edu](mailto:andrea.ruiz@utsa.edu) (A.L. Ruiz), [gacevedo3@stmarytx.edu](mailto:gacevedo3@stmarytx.edu) (G.A. Acevedo).

work, children, or spouse—dictate something so fundamental to their lives as when and how they sleep may eventually develop feelings of helplessness, which could trigger heightened distress and further erode sleep quality.<sup>4</sup>

The discussion thus far seems to suggest that people who believe God controls their sleep schedules will also experience worse sleep given that God is an external force beyond individual control. The story is more complicated than this, however. Perceptions of divine control can serve for many believers as a source of “proxy agency” whereby one enhances feelings of personal control by sharing in the perceived omnipotence of God.<sup>5–7</sup> Thus, believers who sense that they and God are working together in life as collaborators have been found to enjoy improved well-being, whereas believers who defer and relinquish control entirely to God tend to suffer greater distress and poor health.<sup>8–11</sup>

Within the domain of sleep, studies have shown that people who report a secure relationship with God or who believe God is collaborating with them to help them achieve important life goals tend to report better sleep outcomes than nonbelievers.<sup>12,13</sup> Conversely, parallel studies have found that people who report an insecure relationship with God or who feel God has more control over their lives than they do tend to report worse mental health and sleep.<sup>14–17</sup> Taken together, extant literature on perceived divine control indicates the combination of high personal control *and* high divine control may be optimal for maintaining high quality sleep. Our study tests this proposition with a unique measure of perceived sleep control that we develop in more detail below.

Our study also tests whether health behaviors (ie, smoking and drinking) and psychological distress mediate the associations between different loci of sleep control and high-quality sleep. Because psychological distress and substance use both tend to be associated with worse sleep,<sup>18</sup> we suspect religious perceptions of sleep control may impact sleep quality indirectly by attenuating symptoms of psychological distress and patterns of substance use. For instance, one study found that secure attachment to God buffered the inverse association between adverse life events and sleep quality by reducing depressive symptoms.<sup>13</sup> Other studies have shown that religious believers often internalize religious norms of anti-substance use and thereby tend to avoid using substances like nicotine and alcohol.<sup>1</sup>

Third, we test our conceptual model among a large sample of college students ( $N = 1251$ ) attending a public university in South Texas. This population is important to consider because college students are exceptionally vulnerable to sleep difficulties stemming from academic stressors. College students also commonly abuse over-the-counter drugs, energy drinks, and even prescription medications to maintain wakefulness. Such behaviors have been found to contribute to a host of adverse outcomes for students, including poor academic performance, emotional and relationship troubles, and chemical dependency.<sup>19–21</sup> Religious and spiritual perceptions of sleep control may therefore serve as beneficial psychosocial resources for college students who often struggle to maintain balanced sleep schedules.

## Participants and methods

### Data

We tested our hypotheses with original survey data from the South Texas Inventory of Fatalistic Attitudes (STIFA), a nonprobability sample of students who were enrolled in a Hispanic-serving public university in South Texas during the 2013–2014 academic school year ( $N = 1251$ ). The STIFA received appropriate human subjects institutional review board approvals prior to data collection, and all participants provided informed consent. Students were surveyed across several colleges and completed a self-administered

questionnaire prior to class lecture. Students were not offered compensation or extra credit for their participation. The average student completed the questionnaire in approximately 15–20 minutes.

### Measures

#### High-quality sleep

Sleep quality was measured by asking students, “How would you rate your sleep quality overall for the past 30 days?” Response choices ranged from “excellent” to “poor.” We dummy-coded this item such that “excellent/very good” = 1 and “good/poor” = 0. Findings were comparable whether we treated this variable as a binary or ordinal measure.

#### Locus of sleep control

Students were presented with 2 separate questions asking (a) how much control *they* had over “whether or not they get out of bed on time each day” and (b) how much control *God* had over “whether or not they get out of bed on time each day.” Response choices for both questions included “no control at all” (=0), “very little control” (=1), “some control” (=2), “almost complete control” (=3), and “complete control” (=4). From these 2 questions, we created the following 4 dummy variables: (1): low personal control, low divine control (reference); (2) high personal control, low divine control; (3) low personal control, high divine control; and (4) high personal control, high divine control. Low control groupings included anyone who answered “no/very little/some control.” High control groupings included anyone who answered “almost complete/complete control.”

#### Mechanisms

To measure *smoking*, respondents were asked, “Are you a current cigarette smoker, a former smoker, or have you never smoked?” We dummy-coded this measure such that “current smoker” = 1 and “former smoker/never smoked” = 0. We measured *frequent drinking* by asking respondents, “How many days did you drink beer, wine, or liquor over the past 30 days?” Respondents were then presented with ordinal categories ranging from “0 days” (=0) to “26–30 days” (=6). We coded this item such that 16 to 30 days = 1 and less than 16 days = 0.

We measured *psychological distress* with a 9-item adaptation of the CES-D<sup>22</sup> and Kessler-10<sup>23</sup> scales. Respondents were asked how often over the past 30 days they felt the following: (1) so sad that nothing could cheer them up, (2) nervous or anxious, (3) restless or fidgety, (4) a strong sense of hopelessness, (5) that everything was an effort, (6) worthless, (7) shortness of breath or trouble breathing, (8) numbness or tingling in parts of their bodies, and (9) sweaty but not due to heat or exercise. Response choices ranged from “never” (=0) to “very often” (=4). We took the average of all nine responses to create a mean index ( $\alpha = .85$ ).

#### Control variables

We controlled for *age* (in years), *gender* (1 = female, 0 = male), *race/ethnicity* (Hispanic, African American, White, other), *marital status* (1 = married, 0 = not married), *employment status* (1 = full-time, 0 = part-time/unemployed), and *year at college* (ordinal, 0 = freshman, 4 = graduate student). We also controlled for a 3-item index of *socioeconomic background*. This index included measures of mother's and father's education (ordinal, 0 = none, 10 = professional degree), as well as self-identified social class of the respondent's family (ordinal, 0 = lower class, 3 = upper class). We standardized each item before taking their average ( $\alpha = .70$ ). Finally, we controlled for a 3-item mean index of *religiosity* ( $\alpha = .83$ ). This index included ordinal measures for frequency of prayer (0 = never, 6 = more than daily), religious attendance (0 = never, 5 = more than once a week), and

religious salience (0 = religion is not at all important in my life, 3 = religion is the most important part of my life).

*Analytic strategies*

All statistical analyses were conducted in Stata 15. We used binary logistic regression techniques to estimate the odds of reporting high-quality sleep. To test for mediation, we first estimated the association between locus of sleep control (LOSC) and odds of reporting high-quality sleep conditional on control variables. We then conducted 3 separate estimates that further adjusted for (1) smoking and drinking; (2) psychological distress; and (3) smoking, drinking, and psychological distress.

We used Stata’s “ldecomp” command to estimate direct, indirect, and total effects of LOSC on the log-odds of reporting high-quality sleep. The “ldecomp” program was designed specifically for estimating the decomposition of effects on binary outcomes.<sup>24</sup> We also provided a graph of the predicted probabilities of reporting high-quality sleep across each LOSC group (Fig. 1).

Finally, the following variables had missing data: high-quality sleep (n = 16), LOSC (n = 20), smoking (n = 53), frequent drinking (n = 8), psychological distress (n = 72), age (n = 33), sex (n = 14), race/ethnicity (n = 80), marital status (n = 48), employment status (n = 24), year at college (n = 9), socioeconomic background (n = 90), and religiosity (n = 174). With the exception of our dependent variable, we replaced all missing data with 25 iterations of multiple imputation by chained equation.<sup>25</sup> Findings were substantively identical before and after imputation.

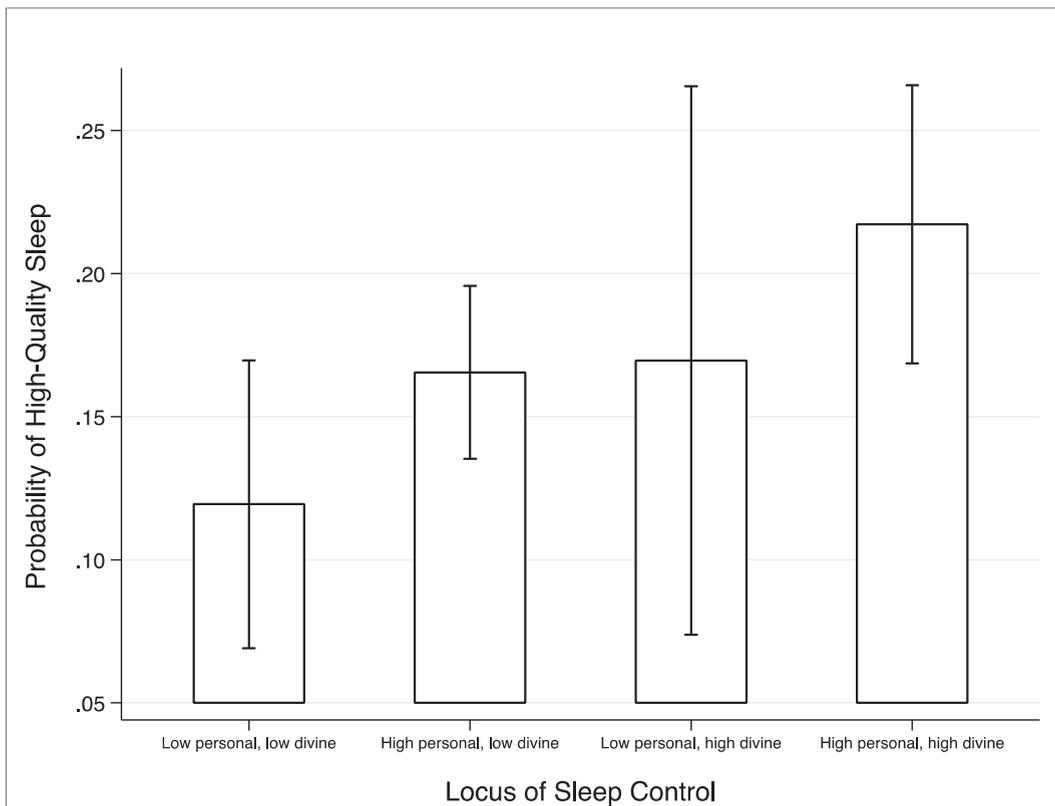
**Results**

Table 1 presents descriptive statistics of study variables. Only 19% of students reported “excellent” or “very good” sleep in the past

**Table 1**  
Descriptive statistics of study variables: STIFA (N = 1251)

	Mean/ proportion	SD	Min	Max
<b>Focal variables</b>				
High-quality sleep	0.19		0	1
LOSC				
Low personal, low divine (reference)	0.14		0	1
High personal, low divine	0.54		0	1
Low personal, high divine	0.05		0	1
High personal, high divine	0.27		0	1
<b>Mechanisms</b>				
Smoking	0.07		0	1
Frequent drinking	0.06		0	1
Psychological distress	1.13	0.68	0	4
<b>Control variables</b>				
Age	23.03	5.22	18	62
Female	0.63		0	1
<b>Race/ethnicity</b>				
Hispanic (reference)	0.46		0	1
African American	0.13		0	1
White	0.30		0	1
Other	0.11		0	1
Married	0.20		0	1
Employed full-time	0.15		0	1
Year at college	1.75	1.20	0	4
Socioeconomic background (z score)	0.00	0.79	-2.69	2.20
Religiosity	2.09	1.22	0	5.43

month. In terms of LOSC, 14% of respondents exhibited low personal/low divine control, 54% exhibited high personal/low divine control, 5% exhibited low personal/high divine control, and 27% exhibited high personal/high divine control. Few students reported being current smokers (7%) or drinking for more than half of the days during the past month (6%). The average respondent was 23 years old and a sophomore in college. Most respondents were



**Fig. 1.** Predicted probabilities of reporting high-quality sleep across LOSC groups (model 4, Table 2).

female (63%), Hispanic (46%), not married (80%), and employed part-time or were unemployed (85%). Additional descriptive statistics are reported in Table 1.

Table 2 reports odds ratios (ORs) (with 95% confidence intervals [CIs] in parentheses) from binary logistic regression estimates of high-quality sleep. Model 1 shows that respondents with (a) a high personal/low divine and (b) a high personal/high divine LOSC reported significantly greater odds of high-quality sleep compared to respondents with a low personal/low divine LOSC. For instance, conditional on the other variables in model 1, respondents with a high personal/high divine LOSC reported 148% greater odds of high-quality sleep relative to respondents with a low personal/low divine LOSC (OR = 2.481;  $P < .01$ ).

Models 2 through 4 suggest that reduced psychological distress partially explained these patterns. First, although model 2 shows that frequent drinkers reported significantly lower odds of high-quality sleep relative to their peers who drank less frequently (OR = 0.453;  $P < .05$ ), adjusting for drinking had very little impact on the LOSC coefficients. On the other hand, adjusting for psychological distress in models 3 and 4 attenuated the LOSC coefficients and their levels of statistical significance.

Table 3 reports the decomposition of effects of LOSC on the log-odds of high-quality sleep derived from model 4 of Table 2. This table includes only the 2 LOSC groups who significantly differed from the reference group and only tests psychological distress as a mediator. Ancillary analyses (not shown) confirmed that smoking and drinking did not mediate associations between LOSC and high-quality sleep. First, this table shows that respondents with a high personal/low divine LOSC tended to report better sleep than their peers with a low divine/low personal LOSC only because the former group also tended to report lower psychological distress. However, this indirect pathway was only marginally significant at  $P < .10$ .

Second, psychological distress explained roughly 10% of the difference in the log-odds of high-quality sleep between respondents with a high personal/high divine LOSC and a low personal/low divine LOSC. Moreover, the total, indirect, and direct effects of having a high personal/high divine LOSC compared to a low personal/low divine LOSC were all statistically significant at least at the  $P < .05$

**Table 3**  
Decomposition of the effects of LOSC on the log-odds of high-quality sleep (N = 1251)

	Log-odds	SE	
High personal/low divine LOSC			
Total	0.418	(0.271)	
Indirect (via distress)	0.046	(0.025)	†
Direct	0.372	(0.271)	
% mediated by distress	11.10		
High personal/high divine LOSC			
Total	0.781	(0.284)	**
Indirect (via distress)	0.081	(0.029)	**
Direct	0.700	(0.285)	*
% mediated by distress	10.39		

Notes: log-odds with standard errors in parentheses. Based on Table 2, model 4.

Comparison group = low divine/low personal LOSC

†  $P < .10$ , \* $P < .05$ , \*\* $P < .01$  (2-tailed).

threshold. We discuss the implications of these findings in more detail to follow.

Finally, Figure 1 depicts the predicted probabilities of reporting high-quality sleep across LOSC groups while holding mediators and control variables at their respective means. Respondents with a low personal/low divine LOSC had a 12% probability of reporting high-quality sleep, which was the lowest probability of all LOSC groups. On the other hand, respondents with a high personal/high divine LOSC had a 22% probability of reporting high-quality sleep, which was the highest probability of all LOSC groups.

**Discussion**

We found that respondents who perceived that they and God both shared full control over their sleep schedules tended to report higher-quality sleep compared to respondents who perceived they and God both had low control over their sleep schedules. Moreover, respondents with a high personal/high divine LOSC exhibited the highest probabilities of reporting high-quality sleep compared to all other LOSC groups. Mediation analyses indicated that lower average levels of psychological distress among respondents with a high personal/high divine LOSC partially accounted for these patterns.

**Table 2**  
Binary logistic regression estimates of the odds of reporting high-quality sleep (N = 1251)

	(1)	(2)	(3)	(4)
LOSC				
Low personal, low divine (reference)				
High personal, low divine	1.739 (1.041- 2.907) *	1.713 (1.022- 2.870) *	1.474 (0.875- 2.480)	1.463 (0.867- 2.467)
Low personal, high divine	1.547 (0.683- 3.502)	1.529 (0.675- 3.464)	1.523 (0.663- 3.495)	1.506 (0.656- 3.460)
High personal, high divine	2.481 (1.434- 4.294) **	2.448 (1.412- 4.244) **	2.068 (1.183- 3.615) *	2.047 (1.169- 3.583) *
Smoking	—	1.114 (0.628- 1.974)	—	1.288 (0.719- 2.308)
Frequent drinking	—	0.453 (0.208- 0.985) *	—	0.459 (0.209- 1.006)
Psychological distress	—	—	0.522 (0.403- 0.677) ***	0.520 (0.400- 0.675) ***
Age	0.983 (0.948- 1.019)	0.982 (0.947- 1.018)	0.983 (0.948- 1.020)	0.981 (0.946- 1.018)
Female	0.758 (0.562- 1.024)	0.741 (0.548- 1.002) *	0.837 (0.616- 1.136)	0.820 (0.603- 1.116)
Race/ethnicity				
Hispanic (reference)				
African American	0.960 (0.584- 1.578)	0.949 (0.576- 1.564)	0.912 (0.552- 1.506)	0.905 (0.547- 1.498)
White	1.455 (0.997- 2.123)	1.483 (1.014- 2.170) *	1.469 (1.004- 2.149) *	1.497 (1.022- 2.194) *
Other	1.283 (0.771- 2.137)	1.267 (0.759- 2.114)	1.373 (0.821- 2.297)	1.361 (0.812- 2.281)
Married	1.434 (0.981- 2.097)	1.433 (0.978- 2.100)	1.391 (0.947- 2.045)	1.380 (0.937- 2.033)
Employed full-time	0.583 (0.369- 0.922) *	0.584 (0.369- 0.924) *	0.585 (0.368- 0.931) *	0.584 (0.367- 0.930) *
Year at college	1.186 (1.029- 1.367) *	1.206 (1.045- 1.392) **	1.193 (1.034- 1.377) *	1.211 (1.048- 1.400) **
Socioeconomic background	0.926 (0.748- 1.147)	0.932 (0.752- 1.157)	0.931 (0.749- 1.157)	0.936 (0.752- 1.166)
Religiosity	0.988 (0.857- 1.140)	0.986 (0.854- 1.137)	0.982 (0.850- 1.134)	0.982 (0.850- 1.135)
Constant	0.149 (0.059- 0.375) ***	0.156 (0.062- 0.394) ***	0.318 (0.119- 0.847) *	0.334 (0.125- 0.891) *
Likelihood ratio chi-square	34.96 ***	39.78 ***	63.72 ***	68.61 ***

Note: ORs are reported with 95% CIs in parentheses

\* $P < .05$ , \*\* $P < .01$ , \*\*\* $P < .001$  (2-tailed).

Our study is consistent with a long line of research on religion and well-being and contributes novel findings to an emerging literature on religion and sleep health. First, numerous studies have found that people who believe they and God work together in life to achieve important outcomes tend to enjoy improved mental health<sup>8–11</sup> and sleep.<sup>12,13</sup> Findings reported here are consistent with this widely observed pattern. In our sample of college students attending a public university in South Texas, we found that respondents who felt they and God shared equally high responsibility for their sleep schedules reported the highest quality sleep, which was due, at least in part, to their lower average levels of psychological distress.

Second, our findings support the conceptual model developed by Hill and colleagues in their recent review of religion and sleep.<sup>1</sup> Accordingly, one pathway by which religious involvement should contribute to better sleep is by reducing symptoms of psychological distress. In our study, adjusting for psychological distress accounted for 10% of the difference in sleep quality between respondents with a low personal/low divine LOSC and a high personal/high divine LOSC. Our study is also the first to test the conceptual model of Hill et al among a sample of college students. This is an important contribution because college students are at high risks of experiencing poor sleep due to their exposures to academic stressors and their engagements in unhealthy lifestyles.<sup>19–21</sup>

Interestingly, those with a high personal/high divine LOSC still reported better sleep even after we adjusted for psychological distress. One possibility is that these respondents enjoyed not only reduced distress but also enhanced subjective well-being, such as greater life satisfaction and optimism, which further accounted for differences in sleep quality. For example, one study found that an increased sense of hope (eg, “I feel confident the rest of my life will turn out well”) fully accounted for the association between belief in God-mediated control and improved sleep.<sup>12</sup> Data limitations precluded us from testing these additional pathways. Future studies of religion and sleep should include measures of subjective well-being in addition to psychological distress.

Our study has several other methodological limitations that should be addressed. First, we analyzed survey data from a nonprobability sample of college students in South Texas and therefore cannot generalize our findings beyond this sample. However, as previously mentioned, our findings are entirely consistent with numerous studies of other community and nationwide probability samples of US adults. Second, our data were cross-sectional, and so we cannot rule out the potential that sleep quality affected respondents' distress levels and perceptions of sleep control rather than vice versa. Panel data are needed to better establish temporal ordering between variables. Third, our measure of sleep quality was limited to a single self-reported survey item. Future studies should test similar hypotheses with validated survey measures such as the Pittsburgh Sleep Quality Index<sup>26</sup> or with objective biomarkers of sleep.<sup>27</sup>

Our analyses can be extended in various other ways as well. For instance, one possibility is that perceptions of divine sleep control will not only predict better sleep quality but also buffer the adverse effects of stressors on sleep. An interesting method for testing this hypothesis among college students could be to take repeated measures at the beginning, middle, and end of the semester to see how sleep quality varies before and after examination periods.<sup>28</sup> We might expect students with a high personal/high divine LOSC to report better sleep even in the face of chronic stress related to examination preparation.

## Conclusions

Despite some methodological limitations, the current study advances an emerging literature on religion and sleep health. We

show that college students who report a high sense of personal and divine control over their sleep schedules report the highest quality sleep, which is partially explained by their lower average levels of psychological distress. Future research could replicate and extend our findings with representative panel data and validated sleep measures. Follow-up studies should also test the stress-buffering effects of perceived divine sleep control on sleep quality.

## Disclosure

Reed T. DeAngelis is grateful to the Carolina Population Center and its NIH Center grant (T32-HD091058) for general support.

## References

- Hill TD, DeAngelis R, Ellison CG. Religious involvement as a social determinant of sleep: an initial review and conceptual model. *Sleep Heal*. 2018. <https://doi.org/10.1016/j.sleh.2018.04.001>.
- Mirowsky J, Ross CE. *Education, Social Status, and Health*. Aldine De Gruyter: Hawthorne, NY; 2003.
- Zarit SH, Pearlin LI, Schaie KW. *Personal Control in Social and Life Course Contexts*. New York, NY: Springer; 2003.
- Morin CM, Rodrigue S, Ivers H. Role of stress, arousal, and coping skills in primary insomnia. *Psychosom Med*. 2003. <https://doi.org/10.1097/01.PSY.0000030391.09558.A3>.
- Bandura A. On the psychosocial impact and mechanisms of spiritual modeling. *Int J Psych Rel*. 2003. [https://doi.org/10.1207/S15327582IJPR1303\\_02](https://doi.org/10.1207/S15327582IJPR1303_02).
- DeAngelis RT, Ellison CG. Kept in his care: the role of perceived divine control in positive reappraisal coping. *Religions*. 2017. <https://doi.org/10.3390/rel8080133>.
- DeAngelis RT. Goal-striving stress and self-concept: the moderating role of perceived divine control. *Soc Ment Health*. 2018. <https://doi.org/10.1177/2156869317717767>.
- Pargament KI, Kennell J, Hathaway W, Grevengoe N, Newman J, Jones W. Religion and the problem-solving process: three styles of coping. *J Sci Study Relig*. 1988. <https://doi.org/10.2307/1387404>.
- Krause N. God-mediated control and psychological well-being in late life. *Res Aging*. 2005. <https://doi.org/10.1177/0164027504270475>.
- Krause N. God-mediated control and change in self-rated health. *Int J Psych Rel*. 2010. <https://doi.org/10.1080/10508619.2010.507695>.
- Krause N, Hayward RD. God-mediated control and optimism: exploring variations by denominational affiliation. *Rev Relig Res*. 2014. <https://doi.org/10.1007/s13644-013-0133-2>.
- Krause N, Ironson G. Is involvement in religion associated with better sleep quality? *Pastoral Psychol*. 2017. <https://doi.org/10.1007/s11089-017-0766-0>.
- Ellison CG, DeAngelis RT, Hill TD, Froese P. Sleep quality and the stress-buffering role of religious involvement: a mediated moderation analysis. *J Sci Study Relig*. 2019. <https://doi.org/10.1111/jssr.12581>.
- Bradshaw M, Ellison CG, Marcum JP. Attachment to God, images of God, and psychological distress in a nationwide sample of Presbyterians. *Int J Psych Rel*. 2010. <https://doi.org/10.1080/10508611003608049>.
- Ellison CG, Bradshaw M, Kuyel N, Marcum JP. Attachment to God, stressful life events, and changes in psychological distress. *Rev Relig Res*. 2012. <https://doi.org/10.1007/s13644-011-0023-4>.
- Ellison CG, Bradshaw M, Flannelly KJ, Galek KC. Prayer, attachment to God, and symptoms of anxiety-related disorders among U.S. adults. *Soci Relig*. 2014. <https://doi.org/10.1093/socrel/srt079>.
- Ellison CG, Bradshaw M, Storch J, Marcum JP, Hill TD. Religious doubts and sleep quality: findings from a nationwide study of Presbyterians. *Rev Relig Res*. 2011. <https://doi.org/10.1007/s13644-011-0019-0>.
- Strine TW, Chapman DP. Associations of frequent sleep insufficiency with health-related quality of life and health behaviors. *Sleep Med*. 2005. <https://doi.org/10.1016/j.sleep.2004.06.003>.
- Buboltz WC, Brown F, Soper B. Sleep habits and patterns of college students: a preliminary study. *J Am Coll Health Assoc*. 2001. <https://doi.org/10.1080/07448480109596017>.
- Lund HG, Reider BD, Whiting AB, Prichard JR. Sleep patterns and predictors of disturbed sleep in a large population of college students. *J Adolesc Health*. 2010. <https://doi.org/10.1016/j.jadohealth.2009.06.016>.
- Wolfson AR. Adolescents and emerging adults' sleep patterns: new developments. *J Adolesc Health*. 2010. <https://doi.org/10.1016/j.jadohealth.2009.11.210>.
- Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. *App psych meas*. 1977. <https://doi.org/10.1177/014662167700100306>.
- Kessler RC, Andrews G, Colpe LJ, Hiripi E, Mroczek DK, Normand SL, Walters EE, Zaslavsky AM. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psych med*. 2002. <https://doi.org/10.1017/S0033291702006074>.
- Buis ML. LDECOMP: Stata module decomposing effects in logistic regression into direct and indirect effects. *Stata Journal*. 2008;9:1–6.

25. Johnson DR, Young R. Toward best practices in analyzing datasets with missing data: comparisons and recommendations. *J Marriage Fam.* 2011. <https://doi.org/10.1111/j.1741-3737.2011.00861.x>.
26. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh sleep quality index: a new instrument for psychiatric practice and research. *Psychiatry Res.* 1989. [https://doi.org/10.1016/0165-1781\(89\)90047-4](https://doi.org/10.1016/0165-1781(89)90047-4).
27. Clinton JM, Davis CJ, Zielinski MR, Jewett KA, Krueger JM. Biochemical regulation of sleep and sleep biomarkers. *J Clin Sleep Med.* 2011. <https://doi.org/10.5664/jcsm.1360>.
28. Robotham D. Stress among higher education students: towards a research agenda. *High Educ.* 2008. <https://doi.org/10.1007/s10734-008-9137-1>.