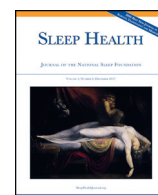




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## Perceived school safety, perceived neighborhood safety, and insufficient sleep among adolescents

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## ABSTRACT

**Objectives:** To examine whether perceptions of school safety and neighborhood safety are associated with insufficient sleep during adolescence.

**Design:** The Florida Youth Substance Abuse Survey (FYSAS) is a cross-sectional study of adolescents.

**Setting:** The state of Florida.

**Participants:** Middle-school and high-school students (n = 7,958) attending public schools in 2017.

**Measurements:** Based on National Sleep Foundation recommendations, sleep was categorized as insufficient (less than 7 hours) or sufficient (7 or more hours) using self-reports of average sleep duration on school nights. Self-reports of perceived safety at school and perceived safety in one's neighborhood were modeled as predictors of insufficient sleep in logistic regression models when accounting for several covariates.

**Results:** Adjusting for model covariates, the odds of insufficient sleep among adolescents who feel unsafe both at school and in their neighborhood are 129% greater relative to adolescents who feel safe in both contexts. In comparison, the odds of insufficient sleep among adolescents who feel unsafe only at school are 39% greater relative to adolescents who feel safe both at school and in their neighborhood, and the odds of insufficient sleep among adolescents who feel unsafe only in their neighborhood are 71% greater relative to adolescents who feel safe both at school and in their neighborhood.

**Conclusions:** The findings of this study indicate that efforts to improve the safety of salient social contexts in which adolescents develop may reduce the likelihood of insufficient sleep faced by a large portion of school-aged children.

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### Introduction

A large body of research finds that insufficient sleep and poor sleep quality are detrimental for adolescent development. For example, insufficient sleep and/or poor sleep quality are negatively associated with academic performance,<sup>1</sup> self-control,<sup>2</sup> and satisfaction with life.<sup>3</sup> Conversely, poor or insufficient sleep are positively associated with depression,<sup>4</sup> delinquency,<sup>5</sup> substance use,<sup>6</sup> and other forms of risk-taking.<sup>7</sup> Thus, the myriad outcomes of problematic sleep during adolescence are well documented. Given such evidence, researchers have devoted considerable attention to investigating the causes of problematic sleep among adolescents. Much of this research has been directed at assessing the role of sleep hygiene, the family environment, exercise, the use of technology at night, and environmental

light at night, among other things.<sup>8</sup> Other research has focused on school start times, finding that delayed start times may benefit both sleep duration and sleep quality.<sup>9</sup> By comparison, less research has focused on the role of contextual environments away from home and their association with sleep, particularly with regard to adolescent perceptions of safety in their surroundings.

On this point, studies have explored the negative impact of risky neighborhood environments,<sup>10</sup> neighborhood disadvantage,<sup>11</sup> and exposure to violence<sup>12,13</sup> on sleep among adolescents. And, while studies using adult samples find that perceived neighborhood safety promotes better sleep,<sup>14–16</sup> less research has focused on perceptions of neighborhood safety and their association with sleep among adolescents. A recent exception is a study by Bagley and colleagues.<sup>17</sup> Using a convenience sample of 252 adolescents, the authors found that community violence (a composite measure including indicators of being worried about getting victimized in one's neighborhood and at school) was negatively associated with sleep duration among boys,

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negatively associated with sleep efficiency among girls, and positively associated with long wake episodes among girls. Other related research points to the impact of the neighborhood context on sleep.<sup>18,19</sup> Studies also indicate that a negative school environment (e.g., a lack of supportive teachers, exposure to bullying, etc.) is detrimental to sleep among adolescents.<sup>20</sup> Even so, such studies do not directly assess perceptions of safety at school in relation to sleep, which could be a more proximate cause of problematic sleep.

Of central importance to the current study, research has yet to assess whether feelings of safety at school and in one's neighborhood combine to impact sleep patterns. Because adolescents spend their days in the school context and their evenings/nights in the neighborhood context, feelings of safety, or lack thereof, in these two contexts should be examined concurrently. A key explanation for why lower levels of perceived safety across multiple contexts might be especially likely to impact sleep patterns is the notion of stress amplification. Specifically, chronic exposure to unsafe contexts can trigger negative mental health outcomes (e.g., depression, anxiety), as well as generalized psychological distress reflecting feelings of sadness, hopelessness, and worthlessness.<sup>21,22</sup> As a result, daily experiences of contextual risk and associated reductions in perceived safety could conceivably impact various components of human physiology, even on a cellular level.<sup>21,23</sup>

Research has shown, moreover, that individuals in high-risk and disadvantaged contexts are more likely to experience chronic activation of the physiological stress responses through the overproduction of and overexposure to stress hormones,<sup>24–26</sup> all of which can contribute to the physical “wear-and-tear” of the body over time<sup>27,28</sup> and impact key brain structures that have been implicated in anxiety and depression.<sup>25,29</sup> As noted, there is reason to believe that as stress becomes more recurrent and amplified across contexts, the negative physiological and mental repercussions for individuals may accumulate.<sup>30</sup> Importantly, reductions in mental and physical health, and increases in allostatic load, have repeatedly been linked to unhealthy sleep patterns, including insomnia, shorter sleep duration, and other sleep disturbances.<sup>31,32</sup>

With the above observations in mind, we are unaware of any studies that have considered the concurrent influence of perceptions of safety at school and in one's neighborhood on sleep among adolescents. Accordingly, in this study we measure both perceived school safety and neighborhood safety in a large statewide representative sample of youth to test the hypothesis that adolescents who feel unsafe in these two contexts will be less likely to achieve sufficient sleep relative to adolescents who feel safe in these settings. More specifically, and in line with the above discussion concerning stress amplification, we anticipate that adolescents who report feeling unsafe in either of the two contexts will be less likely to achieve sufficient sleep relative to adolescents who feel safe in such contexts, but also anticipate that adolescents who report feeling unsafe in both settings will be the least likely to achieve sufficient sleep.

## Participants and methods

### Survey

Data for this study come from the 2017 administration of the Florida Youth Substance Abuse Survey (FYSAS). The FYSAS is a cross-sectional survey of public middle-school and high-school students conducted annually since 2000. The survey employs a two-stage cluster-sampling methodology. Specifically, at the first stage, schools are randomly selected, and at the second stage classrooms from the selected schools are randomly selected for participation in the FYSAS. In accordance with institutional review board standards, consent is obtained from parents prior to the administration of the FYSAS, and assent is obtained from students at school when they are given the

opportunity to complete the survey questionnaire. A passive consent procedure is used for the survey administration in a majority of the participating schools, though some schools require active consent; there is no statewide policy in Florida regarding active versus passive consent.

The participation rate among the sampled middle-school students for the 2017 FYSAS was 69.4%, and the participation rate among the sampled high-school students was 67.4%; students from 84 middle-schools and 79 high-schools participated in the 2017 FYSAS. Administration of the surveys took place at the selected schools using optical scan paper-and-pencil survey instruments, limiting the format of the items on the survey to closed-ended, bubble-filled responses. Both the classroom teacher and the written instructions on the front of the survey form assured students that participation in the study was voluntary and that they did not have to answer any questions they did not want to answer. The university of the lead author of the current study granted exempt IRB approval to access and use the 2017 FYSAS data.

For the 2017 FYSAS, a total of 11,521 surveys were processed. These surveys were subjected to five different validation tests pertaining to such things as unrealistic reporting of drug use, reports of having used a fictitious drug (ie, derbisol), and inconsistency in responses (e.g., reporting using a drug in the past 30 days but reporting no lifetime use of the drug). These validation tests led to the exclusion of 652 surveys by the statistical consultant the state of Florida contracts with to process the FYSAS data, leaving the sample size, before considerations of missing data on items used for the current study, at 10,869 cases. After removal of cases with missing data on the variables we describe below, all models for the current study are based on a sample size of 7,958 adolescents. For additional information on FYSAS history and methodology, readers are referred to the 2017 FYSAS State Report.<sup>33</sup>

### Measures

#### Insufficient sleep

Based on language used in the national Youth Risk Behavior Survey (YRBS), adolescents used in the national Youth Risk Behavior Survey (YRBS), adolescents responded to the item, “On an average school night, how many hours of sleep do you get?” Response options were: “4 hours or less,” “5 hours,” “6 hours,” “7 hours,” “8 hours,” “9 hours,” and “10 or more hours.” Using National Sleep Foundation guidelines stating that achieving less than 7 hours of sleep at night is insufficient for adolescents,<sup>34</sup> we created the variable *insufficient sleep* by collapsing the ordinal values for sleep duration into a dichotomy. Specifically, adolescents were assigned a score of 1 if they reported averaging less than 7 hours of sleep on school nights and a score of 0 if they reported averaging 7 or more hours of sleep on school nights.

#### Perceived school safety and neighborhood safety

To measure *perceived school safety*, adolescents responded to the statement “I feel safe at my school” by selecting one of four responses: “NO!” (= 0), “no” (= 1), “yes” (= 2) or “YES!” (= 3). While such response options are not common, they appear throughout the FYSAS and in published research using FYSAS data.<sup>35</sup> A similar item was used to measure *perceived neighborhood safety*. Specifically, adolescents responded the statement “I feel safe in my neighborhood” by selecting one of four responses: “NO!” (= 0), “no” (= 1), “yes” (= 2) or “YES!” (= 3). For each of the two items, we created dichotomized variables, such that responses of “NO!” or “no” were labeled *unsafe* (= 0) and responses of “yes” or “YES!” were labeled *safe* (= 1). These two dichotomized variables are used in the first portion of our analysis to examine the unique effect of *perceived safety* in the two different contexts on insufficient sleep.

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