



## A qualitative exploration of adolescent perceptions of healthy sleep in Tucson, Arizona, USA

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### ABSTRACT

Adolescents in the United States are known to be sleep deprived; early school start times, a biological propensity to stay up late, and a variety of wake-inducing activities lead to teens who often do not sleep enough. This chronic lack of sleep has measurable negative effects on health and well-being for adolescents. Though research has documented adolescent sleep behavior, few studies have addressed perceptions of sleep. The purpose of this study was to identify common sources of sleep information for a sample of Southwestern adolescents and examine general message content delivered to adolescents by each source. A convenience sample of 51 adolescents (mean age 14.5) completed a semi-structured, in-person interview between October 2006 and November 2007 in a Tucson, Arizona high school. Participant observation and a brief questionnaire regarding parent behavior were used to triangulate results. Parents, teachers, and in some cases the media stressed the importance of sleep for teens, while friends typically complained of tiredness. Individual experiences of sleep were reported to shape future sleep behavior. Rationales for adequate sleep included value placed on alertness, health, and achievement. Improving sleep in adolescents will not only require further education of the “sleep messengers” about the negative health consequences of inadequate sleep, but a larger cultural shift in how healthy sleep for teenagers is conceived and prioritized by schools, families and adolescents themselves.

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### Introduction

Sleep is a biocultural behavior that impacts health. Both sleep behaviors and perceptions of sleep are shaped by an interaction of biological drives, environmental influences, and cultural factors. Despite known negative health consequences of insufficient sleep, it has become normalized for many U.S. adolescents due to a mismatch between their sleep need of more than nine hours per night (Carskadon, 1999) and the sleep they typically obtain, especially on school nights. As teens move through adolescence, they have an increased biological propensity to stay up late, coupled with increased academic and social demands. Instead of accommodating these social and biological changes, however, school districts most often set early school start times for older adolescents, curtailing their morning sleep and starting school at a time when teens are least prepared to pay attention. In addition to the exhaustion associated with insufficient sleep, this type of chronic

partial sleep deprivation may result in both short and long term physical and mental health effects. This paper reviews some of the major detriments to health and well-being associated with inadequate sleep in adolescents and then presents a biocultural model useful for exploring cultural factors that shape adolescent sleep. This model is then applied to sleep perception data collected from students in a Southwestern U.S. high school.

#### *Insufficient sleep & health and well-being*

Many adolescents in the U.S. experience chronic insufficient sleep, especially during the school year, averaging 7–7.5 h per night on school nights (Hansen et al., 2005; National Sleep Foundation, 2006; O'Brien & Mindell, 2005; Wolfson & Carskadon, 1998, 2003). Inadequate sleep has serious short and long-term health consequences. Adolescents, who are still actively developing in physical, mental and emotional realms, may be at increased risk for poor sleep and its associated consequences. Many studies have connected chronic insufficient sleep with negative physical and mental health consequences in adolescents. Short term consequences of insufficient sleep include poorer memory (McCoy & Strecker, 2011), deficits in information processing (Curcio, Ferrara,

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& De Gennaro, 2006; Sadeh, Gruber, & Raviv, 2003; Wolfson & Carskadon, 1998), and problems with attention and impulse control (Dahl & Lewin, 2002; Roberts, Roberts, & Chen, 2002). Research has also shown that insufficient sleep contributes to depression, anxiety, and poor self-esteem (Fredriksen, Rhodes, Reddy, & Way, 2004; Roberts et al., 2002). Finally, individuals with insufficient sleep are more likely to engage in risky behaviors including drowsy driving and substance abuse (Dahl, 2008; Mednick, Christakis, & Fowler, 2010; Roane & Taylor, 2008; Taylor & Bramoweth, 2010).

Long-term consequences of chronic insufficient sleep are less studied, but several cohorts have provided data on potential consequences. Insufficient sleep in childhood and adolescence has been linked with later psychological problems such as depression, anxiety and suicidal thoughts (Roane & Taylor, 2008; Roberts, Roberts, & Chan, 2008; Wong, Brower, & Zucker, 2011), substance abuse (Wong, Brower, Nigg, & Zucker, 2010) and the potential for increased body mass index and high cholesterol (Gangwisch et al., 2010; Noland, Price, Dake, & Telljohann, 2009). In addition, insufficient sleep in adolescence may be associated with the rewiring of the prefrontal cortex in the brain (Dahl & Lewin, 2002; Dang-Vu, Desseilles, Peigneux, & Maquet, 2006; Seugnet et al., 2011) and set up poor sleep habits that may persist into adulthood (Calamaro, Mason, & Ratcliffe, 2009).

#### Modeling adolescent sleep: biocultural perspectives

Knowledge about sleep – especially poor sleep – permeates popular culture, but it remains a rare topic of study for anthropologists. With few exceptions, the only sustained anthropological study of sleep has concerned mother–infant co-sleeping (Ball & Moya, 2009; McKenna & Volpe, 2007). To extend the anthropology of sleep across the life cycle, this paper takes a biocultural approach to examining adolescent sleep. Although there are earlier expressions of this approach, notably work by Wiley (1992) and McElroy (1990), a particularly comprehensive explanation of how anthropologists may conduct a biocultural study comes from Thomas (1998). He suggests that researchers investigate the historical and political-economic context of a research site to begin to understand local social relations and their impact on health. Researchers must also be attuned to local environmental conditions that promote or constrain actions (and subsequently, health) among individuals. Finally, overlaying history, political economy and the local environment, the researcher should investigate the kinds of biological and cultural adjustments individuals are making to local conditions, including an examination of the effectiveness of these adjustments, their short and long-term consequences, and their potential position in a feedback loop affecting the local biology, culture and environment. The graphic depicting the interrelationships among biology, culture, environment, sleep behavior, and sleep perceptions addressed in this paper draws on Thomas' description of biocultural studies, and a biocultural model introduced by McElroy (1990), who emphasizes the overlap of biological, cultural and environmental variables (see Fig. 1).

#### Adolescent sleep: biological influences

Biologically, adolescents demonstrate different circadian rhythms than adults, with circadian clocks that favor phase-delay. That is, adolescents are biologically predisposed stay up later and get up later (Dahl & Lewin, 2002). Although adolescent sleep has not been studied in all parts of the world, research from the United States, Western Europe, and parts of Asia (specifically Japan, Korea, Taiwan and Hong Kong) support this adolescent sleep pattern as predominant at least in industrialized nations (Carskadon, Vieira, &

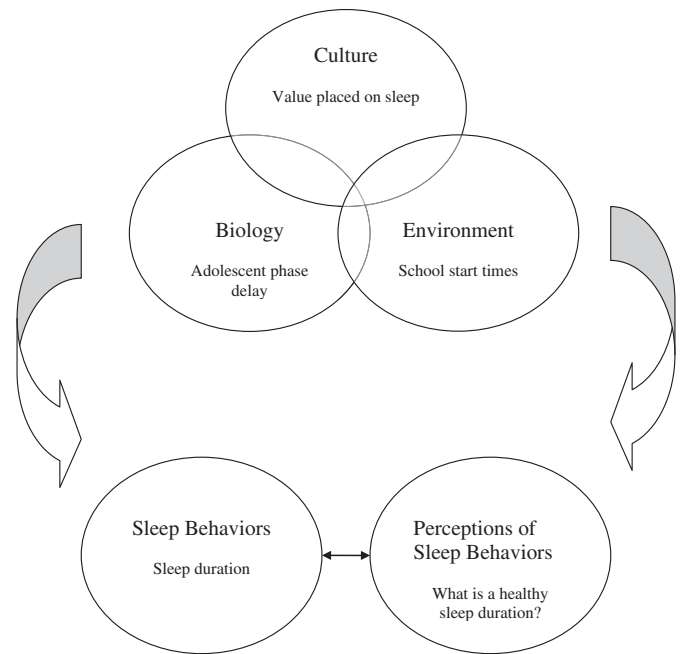


Fig. 1. Biocultural model. Model of interacting sleep health behaviors and perceptions.

Acebo, 1993; Huang, Gau, & Guilleminault, 2007, p. A73; Park et al., 2002; Tynjälä, Kannas, & Välimaa, 1993; Viot-Blanc et al., 2007, p. A84; Wong & Chan, 2007, p. A84; Yang et al., 2003).

#### Adolescent sleep: environmental influences

In addition to physical changes in sleep that teens experience during adolescence, school schedules are an environmental variable that influences adolescent wake time, cutting off sleep before adolescents reach the recommended 9.25 h per night (Carskadon, 1999). A number of studies have shown that adolescent circadian rhythms are “out of sync” with school schedules (Carskadon, 1999; Carskadon et al., 1998; Wolfson & Carskadon, 1998). One study that monitored adolescents as they returned to school in the fall found that they lost as much as 120 min of sleep per night in the week after the start of school as they switched from an adolescent-controlled sleep schedule to a school-dictated one (Hansen et al., 2005). Studies that have investigated the impact of changing school start times have found positive effects of later high school start times, including increased school night sleep duration, improved school attendance, reduced daytime sleepiness, and less student-reported depression (Owens, Belon, & Moss, 2010; Wahlstrom, 2002).

#### Adolescent sleep: cultural influences

Sleep is a biological need, but it is also socially prescribed and culturally patterned (Williams & Bendelow, 1998). Cultural influences on adolescent sleep have been alluded to as a potential cause for observed differences in sleep timing and duration in many articles. One way to begin to investigate cultural influences is to document perceptions. While anthropologists, notably Worthman and colleagues, have begun to explore how sleep behaviors are patterned by culture (Worthman & Brown, 2007; Worthman & Melby, 2002, pp. 69–117), only two published articles have addressed adolescent perceptions of sleep (Noland et al., 2009; Owens et al., 2006). When 384 Ohio high school students were asked on a survey about the effects of sleeping too little for them

personally, the majority reported that they were more tired during the day (94%), had difficulty paying attention (84%), received lower grades (61%), experienced increased stress (59%), and had difficulty getting along with others (58%) (Noland et al., 2009). Similarly, 64 Rhode Island middle-school students reported consequences including tiredness (77%), irritability and mood changes (31%), low motivation (20%), cognitive and attention problems (30%), and a perceived negative effect on physical appearance (9%). They also reported that sleeping too little led to negative effects on athletic activities (66%), school performance (33%), and social functioning (23%). However, 41% of participants experienced no discernable consequences from sleeping too little (Owens et al., 2006). In addition to assessing the perceived consequences of inadequate sleep, Owens and colleagues also queried sources of sleep information among middle-school students. These included teachers, the media, parents, doctors, coaches, and peers.

Of the elements considered in the biocultural model in Fig. 1, most research has focused on the biology of adolescent sleep, specifically how it differs from adult sleep, and on documenting sleep behaviors, specifically sleep timing and duration, among adolescents. Environmental influences on adolescent sleep have typically been limited to school start times (although see (Bénéfice, Garnier, & Ndiaye, 2004) for an exploration of seasonality and sleep in Senegal). This paper focuses on the two elements least considered in the sleep literature to date; cultural influences on sleep, and perceptions of sleep behaviors.

## Research questions

Researchers have rarely investigated culturally-informed perceptions of sleep in adolescents, despite the potential impact of such perceptions on health behaviors, and the beneficial effects of improving sleep behaviors in this age group. This paper draws on interviews, participant observation, and questionnaires with a multi-ethnic sample of high school freshmen in the U.S. Southwest to answer the following research questions:

- 1) Who are the messengers adolescents rely on to construct their perceptions of sleep?
- 2) What messages are delivered to adolescents about sleep, especially healthy sleep?
- 3) How can messages about healthy sleep be more effectively communicated to adolescents?

## Materials and methods

### Participants

Research was conducted at a large (3000+ student) public high school located in Tucson, Arizona, a Southwestern city where 36% of the population identifies as Hispanic or Latino (U.S. Census Bureau, 2000). Within the school, the vice-principal approved the project and served as a liaison to three freshman science teachers who together taught approximately 450 students, 53% of the freshman class in the 2006–2007 school year. Students were given information about the study by the researcher (KMO) in Fall 2006. Potential participants received a consent form to be signed by them and a parent. The final sample was 51 students, 45% Hispanic (mainly of Mexican descent), 45% White and 10% Other (including African American, Native American, and Multiracial). Females made up 53% of the sample, and the mean age of all participants was 14.5 years. To investigate whether the sample was representative, participants and non-participants were compared on the variables gender (51 participants, 158 non-participants) and ethnicity (3

categories, White, Hispanic and Other, 51 participants, 205 non-participants). Comparisons using Chi-square tests revealed that the participants did not differ from the overall pool of students in terms of gender ( $\chi^2(1, N = 209) = 2.22, p = .14$ ) or ethnicity ( $\chi^2(2, N = 256) = 1.77, p = .41$ ). The Institutional Review Board at the University of Arizona and the school district research office approved this research.

### Data collection

Data were collected from October 2006 through November 2007. Sleep perceptions were measured using a semi-structured interview. Taylor (2005) suggests that interviews are an appropriate methodology for accessing study participants' understanding of the world, and also their experiences. Fifty-one students engaged in a face-to-face interview (24 questions, 30–60 min) during science class. The interview included questions on the adolescent's own sleep patterns and perceptions of sleep, ideas about sleeping too much and sleeping too little, sources of information about sleep, sleep and food intake, and girls vs. boys sleep. The three science teacher contacts taught their freshman classes 1st – 4th period, so a disproportionate number of interviews were conducted early in the school day. With interviews beginning as early as 8:15 am, some participants may have been less talkative or engaged than in an interview later in the day.

Beyond interviews, two additional methods were used to triangulate interview findings: participant observation and brief questionnaires. Participant observation, which is a process of learning through exposure to or involvement in the day-to-day activities of participants in the research setting (Schensul, Schensul, & LeCompte, 1999, p. 91) involved observing and interacting with students before school, during science classes and homeroom, at lunch, and after school. The researcher spent one to 3 h per day at the school and participant observation was often broken up – for example, 30 min before school, 10 min in the beginning of class before taking a student out for an interview, and 5 min at the end of a class. Notes were made on the alertness level of teens in class, events that affected their alertness (for example, a lab or a film) and any overheard comments or conversations about sleep or sleepiness. Though participant observation did not involve structured data collection, it contextualized data collected directly from teens about their sources of information about sleep and messages received from those sources. Questionnaires were created by the researcher about topics of interest raised by participants during the interview. The questionnaire relevant to this analysis was completed by 41 participants in September/October 2007 and asked participants about their parents' priorities around their child sleeping and doing homework.

### Techniques of data analysis

With participants' permission, interviews were audiorecorded and transcribed verbatim. As interview transcripts were completed, pseudonyms were selected for each participant. All first names in this paper are pseudonyms, linked with accurate age and ethnicity. Interview notes, full interview transcripts and field notes from participant observation were entered into the qualitative data management program Atlas.ti. The data analysis was driven by grounded theory, which requires a close reading and re-reading of texts (here, interview texts and field notes) to discover and label categories and their interrelationships. In this way, theory can be derived from systematically obtained data, and then illustrated by characteristic examples of that data (Glaser & Strauss, 1967). All documents were coded in Atlas.ti following an open coding method to name and describe phenomena found in the text (Strauss &

Corbin, 1990). A list of codes was developed based on literature review, contents of the semi-structured interview, and theoretically informed areas of researcher interest (such as comments made about the sleep-health relationship). KMO coded all documents to ensure consistency in application of codes. For this analysis, text associated with the code “sleep ideas” was examined to discern (1) sources of sleep information for adolescents and (2) content of sleep messages, which were grouped into a number of salient themes as illustrated in Fig. 2. Adolescents were free to discuss more than one message that a source presented to them about sleep, so numbers of messages may exceed the number of times a source was mentioned by individuals.

## Results: cultural influences on adolescent sleep

### Sources of sleep information

Fifty-one interviewees reported five main sources of sleep information, including parents and other adults (mentioned by 35 individuals, 69%), themselves (23, 45%), friends (23, 45%), media (21, 41%) and teachers (18, 35%). When prompted by the researcher, some participants acknowledged a category but stated it did not provide any sleep information. For the five categories, these numbers were 3 (6%), 1 (2%), 5 (10%), 9 (18%) and 9 (18%).

### Messages about sleep

Despite stereotypes of teens paying more attention to friends than to parents, teens reported that a primary source of information about sleep was their parents, other family members, and parents of their peers. The overwhelming message from parents to adolescents (27 mentions) was the importance of teens getting enough sleep. Three parents stressed a certain number of hours of sleep as important, though the precise number of hours specified ranged from 6 to 8 h. Four parents were named as sources of sleep information, but no specific content was discussed; for example Heather, a 15-year-old White female, said, “Well, they [parents] must have [discussed sleep] in the past. I mean, not like every day. It’s not like a lecture or anything.”

Adolescents reported a variety of reasons parents gave for the importance of sleep, detailed in Fig. 2. The most common included 7 instances of “no reason given” (parents telling their children to go to bed, or that they needed sleep) and “to be rested” (7), which included comments about sleep alleviating tiredness, being relaxing, and increasing alertness. Three parents gave reasons related to physical health, while two cited mental health outlook – teens were told they would be less “moody” or “crabby” if they slept. The two parents who cited “it’s good for you” as a reason to sleep may have been referring to health, but this was unclear.

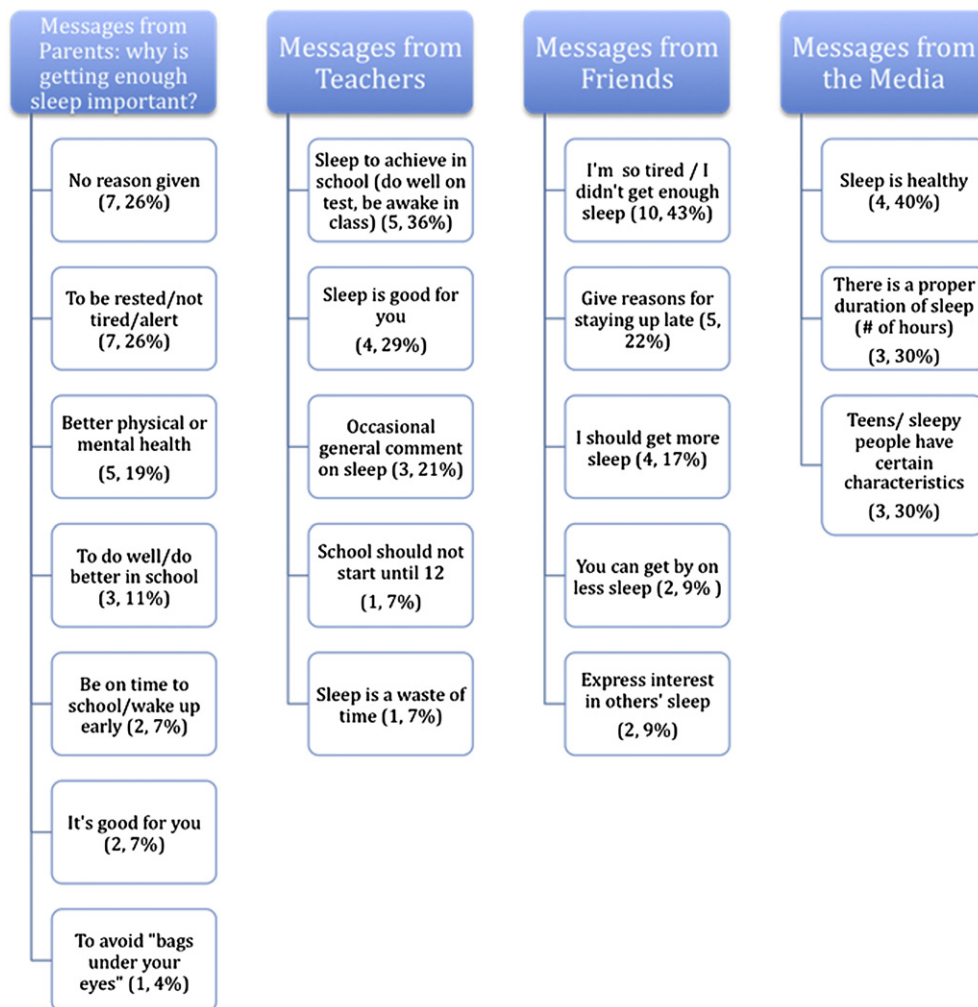


Fig. 2. Major themes and subcategories of sleep perception identified. Note: Numbers in parentheses indicate the total number of individual interviewees mentioning the specific subcategory indicated in the box, and the percentage based on the total number of responses for that category. Participants could mention more than one source of information and express more than one message delivered by that source.

If a family member had some medical knowledge, adolescents perceived their influence as magnified when they linked sleep to health. This is an example of the larger phenomenon of information filters, where information from individuals who are simultaneously intimate acquaintances and “experts” may be given more credence (Thompson, 2011). Mike, a 14-year-old White male, explained, “My mom, she’s a registered nurse. She would tell me what sleep does for me and how it helps like, diseases and colds because when your body’s sleeping it’s not hurting, it’s warm.” Although this message got a bit garbled, Mike, and others who relied on parents or family members with medical knowledge (3 individuals), internalized the fact that sleep could have a positive impact on health.

In addition to the benefits of being rested and having better health, adequate sleep was also seen as supporting success in school by three parents, and a parallel concern “being on time to school” prompted two parents to encourage their teen to go to bed. Norma, a 15-year-old Hispanic female, talked about her parents’ comments on sleep in this vein:

...like, he says, “You’ve got to go to sleep, or else you’re going to be tired,” or “you’ve got to go to sleep, or else you’re not going to do well in school,” or “you’ve got to go to sleep,” you know? I’ll be, like, “Dad, be quiet.” And my mom... She’ll make us go to sleep at 10. She says, “You’ve got to go to sleep because you’ll be all late for school and won’t be able to wake up...”

To clarify associations among sleep, homework, and parental monitoring, participants ( $N = 41$ ) were asked to complete a questionnaire including the question, “Do your parents let you stay up to finish homework past your usual bedtime?” Teens most often said yes, parents let them stay up if they said they were finishing homework (41.5%). Many teens also chose the response “I am in charge of when I go to bed, parents don’t have much to do with it” (34%). Twelve percent of parents encouraged teens to stay up to finish homework, with an equal percentage encouraging their sons and daughters to go to bed even when not all their work was completed.

At school, teachers made some explicit statements about sleep to individual students or to entire classes. The content of these messages reported by adolescents in interviews appears in Fig. 2. The most common message included an exhortation to sleep more to achieve success in school, which included sleeping well before a big test (2 individuals), and being alert in class (3). One teacher was observed encouraging her sleepy 5th period students to get more sleep: [Teacher], to a male student, “If you need to sleep, do it at home.” To others, “Go to bed earlier!” A female student protested, “Sometimes it doesn’t work – I went to bed at like 8:00.” Teachers also echoed parents in saying that sleep was good for adolescents (4), though like parents, they did not provide details about the meaning of “good for you.” Although no high school teachers were observed incorporating sleep into the curriculum, five adolescents reported that they had completed sleep-related coursework in middle school, including learning about sleep as facilitating alertness (1) and creativity (1). Teacher messages typically encouraged sleep, but one participant reported that her dance teacher said sleep was a waste of time, and one of the three science teacher contacts frequently made comments about her lack of sleep, including a question to her class recorded in field notes: “Anybody else tired? I’ve got to start going to bed before 2:30 am.”

Also in the school context, teens explained that their friends mainly talked about sleep by saying, “I’m so tired,” and by complaining of how little sleep they had obtained the night before (10 individuals). As 15-year-old Hispanic male Ben said, “All my friends complain about not getting enough sleep.” This rhetoric of “I’m so tired” was reported across genders, ethnicities and activity levels. It was a way to start or continue a conversation with something

everyone had in common, as Mimi Nichter also found in her work with teen girls and their discussions about weight and body image (Nichter, 2001). The “I’m so tired” discourse rarely connected with any kind of solution to the problem for students, and comments from teens gleaned from participant observation reinforced that friends most often commiserated about their collective lack of sleep rather than informing each other about how to achieve healthier sleep. Some friends provided reasons for staying up late, which included talking on the phone (1), working on a paper (1), having a sleepover (1), or having trouble sleeping (2). Four adolescents reported that their friends talked about needing more sleep, and three gave reasons for this, including the need to get up early, the perception of sleep as positive, and a need for “beauty sleep.” While two adolescents said their friends expressed interest in the sleep of others (sharing dreams in one case and asking when the participant went to sleep in the other case), two participants also reported that their friends encouraged them to get by on less sleep. As one 14-year-old White male participant put it, “They tend to say, Don’t sleep! Stay up as late as you can! Party! Yeah!”

Adolescents reported that the main messages they received from the media were that sleep was healthy (4 individuals) and that there is a proper duration of sleep for teens (3), ranging from six to twelve hours. Mario, a 15-year-old Hispanic male who said he heard about sleep in the news, reported the message he received from that source was, “...it’s important and that it’s healthy.” Some participants reported types of media that were most likely to convey information about sleep. These included science TV shows (4 individuals), print media like books or magazines (3), commercials/advertisements (3) and TV sitcoms or cartoons (3). One of the adolescents who discussed sleep information in TV sitcoms, Ana, a 15-year-old Hispanic female, commented on her perceptions of TV shows stereotyping teenagers as sleepy:

**Ana:** I’ll watch TV shows and I’ll watch how teenagers my age fall asleep in class because they were up on the phone all night and I just think, “Oh, that’s me, too, some days.”... Like, I never see...TV shows with adults in them when they fall asleep with that. It’s only teenagers because I have no idea why most, like, more adults than teenagers fall asleep or get tired more. I have no idea.

In addition to relying on information from others to learn about sleep, teens also used their own experiences of sleep to figure out how much sleep they needed (14 individuals). Although most did not specify what kind of experience shaped their sleep habits, two adolescents mentioned a bad reaction to too little sleep and two mentioned feeling fine with what they perceived to be too little sleep. Grace, a 14-year-old White female, explained, “I’ve always said that [I can get by on less than 8 h of sleep] because usually on days that I go to bed later for some reason I feel more awake the next day.” Teens also relied on their own thoughts (5), a combination of thoughts and experiences (3), hearing others’ views on sleep (3) and observing others’ sleep (3).

The most common way teens learned about sleep supports sleep as a cultured behavior. Teens learned about sleep from participating in and observing interactions with individuals around them, every day. They may not have consciously noticed that they were adding to their store of knowledge about sleep as they listened to their parents nag them, their uncle tell a story, their teacher make an offhand comment, or as they watched a sitcom on TV. Like many teens, Katie, a 14-year-old White female, and Olivia, a 15-year-old Hispanic female, reported that they learned about sleep from a variety of sources.

**Katie:** I don’t know, I watch a lot of PBS [Public Broadcasting Service] shows about, like everything, and so I think I saw one

on sleep, but I'm not really sure... But, I've always heard in health class last year, like sleep helps you, like makes you more alert. [Parents] say it's good, but that's about it.

**Olivia:** ...sometimes my mom she'll tell me, like, "If you go to sleep earlier, you'll be able to get up, like, early in the morning and be good at school." Yeah, but I think it's stupid. I think it's like – Maybe it does matter but it doesn't. I don't really see a difference.

**KMO:** Do your teachers talk about sleep at all?

**Olivia:** Only when tests, like, finals and...anything like that comes up.

#### *Messages about healthy sleep*

Of the multiple sources of sleep information discussed above, parents and the media provided messages about healthy sleep. Teachers focused on enforcing school rules and making sure their students achieved at least some measure of success in the classroom, leaving little time for talking about how teens might fit more sleep into their schedules, or make the most of the sleep time they already had (i.e., sleep healthier). The peer-to-peer discourse of "I'm so tired," generally conveyed to teens that sleeping in a "healthy" way meant sleeping enough to function, but did not provide any guidance on why sleep might affect health.

Adolescents reported hearing health related or medical comments related to sleep from parents, other family members, and parents of friends. These messages spanned both physical and emotional health, but the messages that got through to teenagers tended to be non-specific. Parents and other adults referred to the body's need for rest, told teens they needed more sleep, and sometimes commented on biological processes – for example, Jason, a 15-year old White male, noted, "My mom used to say you grow in your sleep...I guess it's true 'cause I used to sleep a lot." Links between sleep and emotional health were similarly vague – teens were told they would "be crabby" if they didn't sleep, or that if their parents noticed they were especially "moody" they would be advised to sleep more. Adolescents reported using their own experience to answer questions such as "How much sleep do I need?" but did not explicitly connect these explorations to ideas of being healthy. They recognized that sleep had benefits for their physical, mental and emotional well-being, but the array of non-sleep options, ranging from the required (homework) to the exciting (going out or communicating with friends) typically left teens calculating how *little* sleep they needed to get by, rather than how *much* sleep they could get to feel at their peak.

#### *Teen perceptions of "sleeping too much"*

Teens were almost evenly divided on whether or not it was possible to "sleep too much." When asked, twenty-two participants (44%) said "no" (often with a surprised laugh), while 24 (48%) thought of their own experiences for a moment and said "yes." This answer of "yes" is likely to reflect experiences of feeling over-tired on awakening after sleeping for a long time, and a message of "moderation in all things" that frequently comes across in health messages in the United States. Gabriella, a 15-year-old Hispanic female, explains how she tried to balance wanting to sleep more, and not sleeping too much; "You always want more sleep, but I don't think that's a bad thing, especially if you're not going anywhere...What I'm trying to say, is too much of anything is bad... If I sleep an entire day, I can't sleep when I need to." Nine adolescents (18%) equated sleeping too much not only with disrupting routines and engaging in excessive behavior, but with being lazy. Marcus,

a 15-year-old African American, used the word lazy to emphasize the low value he (and his parents) placed on sleeping "too much."

"...it's impossible for me to just sleep a lot. Like, the latest I can sleep in is like 11 o'clock, a lot of people sleep in 'til like, 3 or 4, but I can't do all of that. I can't be in bed all day...I can't sleep in, it feels good, but then it feels too—I don't know, too lazy? I wasn't raised like that, I wasn't raised to be lazy."

## **Discussion**

### *Messages received by adolescents*

Previous research on adolescent sleep has emphasized how biological elements such as circadian timing change across adolescence, intersecting with (mostly unexplored) cultural and environmental factors to create the "perfect storm" of chronic insufficient sleep in teenagers. This research used a biocultural model to bring environment and culture back into the picture of adolescent sleep, asking who (or what, in the case of the media) provided adolescents with information about sleep and exploring the content of those sleep messages. Cultural value placed on alertness, health, and achievements in school were all reflected in the messages teens reported receiving about sleep. The environmental element of early rise times was alluded to by parents and teens who both said teens needed more sleep, or needed to go to bed earlier. The biological context of teen sleep, however, namely the well-established knowledge of phase delay (a biological predisposition to sleep and rise at later clock times) was not mentioned in messages to teens. The function of sleep was the preferred biological topic of discussion, but these functions were often not well-explained or glossed vaguely as "sleep is good for you."

Interviews, participant observation and questionnaires revealed that teens in this sample sought to balance being a good son or daughter, being a good athlete or actor or journalist or club member, being a good friend, and perhaps being a good gamer or skateboarder in their spare time. This large number of roles and activities often left sleep as a loser in the balancing act of teen life. Most of these teen participants needed more sleep (mean week-night sleep = 7 h 13 min, mean weekend night = 8 h 28 min). The value on alertness and achievement emphasized both at school and at home, however, coupled with incomplete explanations of the benefits of sleep, served as an unintentional cultural barrier to sleep, making too much sleep seem "lazy."

### *Improving messages about healthy sleep*

Although parents and the media sent messages to adolescents in this sample that began to link sleep to health, the non-specific nature of many of these messages may have made them easier to ignore. Owens et al.'s study (2006) found that teachers, parents, doctors and coaches provided sleep information to middle-school students. Coaches and doctors, while not mentioned as sources of sleep information in this study, may be seen as even more reliable sources of health information than parents for high school students. An important element of producing stronger messages about sleep-health links lies initially in educating the messengers. The more adolescents, parents, teachers, coaches and doctors know about the health benefits of sleep, the better chance they will have to influence the adolescents who are listening to them. Changing media messages requires those who do research on sleep to communicate research findings to the public, check what is written to insure its accuracy and clarity, and be vigilant about misinformation that may be disseminated.

## Limitations

Limitations of this research include its design, implementation and analysis by a single researcher. In order to minimize potential bias, data was collected using three different methods and triangulated to arrive at conclusions about key sleep perception themes. In addition, the relatively small sample size and non-random selection of participants mean that it may not be possible to generalize the findings of this study to a larger population of adolescents. Given the exploratory nature of this work, however, these findings may be useful in constructing hypotheses about targets for adolescent sleep interventions or further study of these phenomena.

## Conclusions

Rigorous studies have demonstrated how the biology of sleep changes across the adolescent years, contingent on age and pubertal status, and a number of researchers have now published their findings on sleep behaviors and sleep timing in adolescents. Given this progress, the other parts of a biocultural study of adolescent sleep deserve attention. By examining sleep behaviors and perceptions as culturally embedded, this work informs the intersection of adolescent sleep, culture and health. Ideas of healthy sleep are informed by parental exhortations, the media, and ultimately by teens' own experience of sleep outcomes that they classify for themselves as "healthy" or "not so healthy."

Research on cultural aspects of sleep in teens is timely not only because the popular press has seized on this issue in the last few years, making teens, parents and teachers much more aware of the complex web of interacting factors that result in adolescents sleeping too little. It is also timely because this media attention coupled with scientific research results in the lab and in schools has shown that sleep is an essential health behavior. Sleeping an appropriate amount is *at least as important* as eating well and engaging in physical activity for maintaining both physical and mental health. National campaigns address "eating right" and being more active, but sleep is often ignored. Sleep behavior, sleep need, and coping with inadequate sleep are seen as individual and private; something that schools do not have the time or resources to tackle. This research, focused on cultural aspects of adolescent sleep perceptions and behaviors, revealed that teens internalize small amounts of information about sleep from multiple sources including parents, friends, the media and their own bodily experience of sleep and sleep deprivation, but that these "sleep sound bites" often conflict. To turn the tide of inadequate sleep in adolescents, a first step is education of the "sleep messengers" about the negative physical and mental health consequences associated with too little sleep. Necessary additional steps for improving sleep among U.S. adolescents, however, are 1) a cultural shift in perceptions of "healthy" sleep as enabling only a minimal level of functioning and 2) a reformulation of priorities among schools, families and adolescents so that sleep (and its associated health benefits) does not drop to the bottom of the priority list for teenagers.

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## References

Ball, H., & Moya, E. (2009). Infant sleep-related practices and SIDS risk among South Asian and European origin families in Bradford. *Journal of Reproductive and Infant Psychology*, 27(3), 300.

- Bénéfice, E., Garnier, D., & Ndiaye, G. (2004). Nutritional status, growth and sleep habits among Senegalese adolescent girls. *European Journal of Clinical Nutrition*, 58(2), 292–301.
- Calamaro, C., Mason, T., & Ratcliffe, S. (2009). Adolescents living the 24/7 lifestyle: effects of caffeine and technology on sleep duration and daytime functioning. *Pediatrics*, 123(6), E1005–E1010.
- Carskadon, M. (1999). When worlds collide; adolescent need for sleep versus societal demands. *Phi Delta Kappan*, 80, 348–353.
- Carskadon, M., Vieira, C., & Acebo, C. (1993). Association between puberty and delayed phase preference. *Sleep: Journal of Sleep Research & Sleep Medicine*, 16(3), 258–262.
- Carskadon, M., Wolfson, A., Acebo, C., Tzischinsky, O., et al. (1998). Adolescent sleep patterns, circadian timing, and sleepiness at a transition to early school days. *Sleep*, 21(8), 871–881.
- Curcio, G., Ferrara, M., & De Gennaro, L. (2006). Sleep loss, learning capacity and academic performance. *Sleep Medicine Reviews*, 10(5), 323–337.
- Dahl, R. (2008). Biological, developmental, and neurobehavioral factors relevant to adolescent driving risks. *American Journal of Preventive Medicine*, 35(3 Suppl.), S278–S284.
- Dahl, R., & Lewin, D. (2002). Pathways to adolescent health sleep regulation and behavior. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, 31(6 Suppl.), 175–184.
- Dang-Vu, T., Desseilles, M., Peigneux, P., & Maquet, P. (2006). A role for sleep in brain plasticity. *Pediatric Rehabilitation*, 9(2), 98–118.
- Fredrikson, K., Rhodes, J., Reddy, R., & Way, N. (2004). Sleepless in Chicago: tracking the effects of adolescent sleep loss during the middle school years. *Child Development*, 75(1), 84–95.
- Gangwisch, J., Malaspina, D., Babiss, L., Opler, M., et al. (2010). Short sleep duration as a risk factor for hypercholesterolemia: analyses of the National Longitudinal Study of Adolescent Health. *Sleep*, 33(7), 956–961.
- Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Transaction Publishers.
- Hansen, M., Janssen, I., Schiff, A., Zee, P., et al. (2005). The impact of school daily schedule on adolescent sleep. *Pediatrics*, 115(6), 1555–1561.
- Huang, Y., Gau, S., & Guilleminault, C. (2007). *An epidemiologic study of self-reported sleep problems and daytime sleepiness among adolescents in North Taiwan, Vol. 30*. Minneapolis, MN: Associated Professional Sleep Societies, LLC, Presented at the SLEEP 2007 21st Annual Meeting of the Associated Professional Sleep Societies, LLC.
- McCoy, J., & Strecker, R. (2011). The cognitive cost of sleep lost. *Neurobiology of Learning and Memory*. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/21875679>.
- McElroy, A. (1990). Biocultural models in studies of human health and adaptation. *Medical Anthropology Quarterly*, 4(3), 243–265.
- McKenna, J., & Volpe, L. (2007). Sleeping with baby: an internet-based sampling of parental experiences, choices, perceptions, and interpretations in a western industrialized context. *Infant and Child Development*, 16(4), 359–385.
- Mednick, S., Christakis, N., & Fowler, J. (2010). The spread of sleep loss influences drug use in adolescent social networks. *PLoS One*, 5(3), e9775.
- National Sleep Foundation. (2006). *2006 sleep in America poll: Teens and sleep*. Washington D.C: National Sleep Foundation. Retrieved from <http://www.sleepfoundation.org/article/sleep-america-polls/2006-teens-and-sleep>.
- Nichter, M. (2001). *Fat talk: What girls and their parents say about dieting*. Harvard University Press.
- Noland, H., Price, J., Dake, J., & Telljohann, S. K. (2009). Adolescents' sleep behaviors and perceptions of sleep. *The Journal of School Health*, 79(5), 224–230.
- Owens, J., Belon, K., & Moss, P. (2010). Impact of delaying school start time on adolescent sleep, mood, and behavior. *Archives of Pediatrics & Adolescent Medicine*, 164(7), 608–614.
- O'Brien, E., & Mindell, J. (2005). Sleep and risk-taking behavior in adolescents. *Behavioral Sleep Medicine*, 3(3), 113–133.
- Owens, J., Stahl, J., Patton, A., Reddy, U., et al. (2006). Sleep practices, attitudes, and beliefs in inner city middle school children: a mixed-methods study. *Behavioral Sleep Medicine*, 4(2), 114–134.
- Park, Y., Matsumoto, K., Seo, Y., Kang, M., et al. (2002). Changes of sleep or waking habits by age and sex in Japanese. *Perceptual and Motor Skills*, 94(3 Pt 2), 1199–1213.
- Roane, B., & Taylor, D. (2008). Adolescent insomnia as a risk factor for early adult depression and substance abuse. *Sleep*, 31(10), 1351–1356.
- Roberts, R., Roberts, C., & Chan, W. (2008). Persistence and change in symptoms of insomnia among adolescents. *Sleep*, 31(2), 177–184.
- Roberts, R., Roberts, C., & Chen, I. (2002). Impact of insomnia on future functioning of adolescents. *Journal of Psychosomatic Research*, 53(1), 561–569.
- Sadeh, A., Gruber, R., & Raviv, A. (2003). The effects of sleep restriction and extension on school-age children: what a difference an hour makes. *Child Development*, 74(2), 444–455.
- Schensul, S., Schensul, J., & LeCompte, M. (1999). *Essential ethnographic methods: Observations, interviews, and questionnaires*. Rowman Altamira.
- Seugnet, L., Suzuki, Y., Donlea, J., Gottschalk, L., et al. (2011). Sleep deprivation during early-adult development results in long-lasting learning deficits in adult *Drosophila*. *Sleep*, 34(2), 137–146.
- Strauss, A., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park: Sage Publications.
- Taylor, M. (2005). Chapter 3: interviewing. In I. Holloway (Ed.), *Qualitative research in health care* (pp. 39–55). Maidenhead, Berkshire, England: Open University Press.
- Taylor, D., & Bramoweth, A. (2010). Patterns and consequences of inadequate sleep in college students: substance use and motor vehicle accidents. *Journal of Adolescent Health*, 46(6), 610–612.

- Thomas, R. (1998). Chapter 2: the evolution of human adaptability paradigms: toward a biology of poverty. In A. Goodman, & T. Leatherman (Eds.), *Building a new biocultural synthesis* (pp. 43–73). Ann Arbor, MI: University of Michigan Press.
- Thompson, J. (2011). "I Called My Sister Who Is An OB/GYN": Personal experts as information filters in contemporary Risk Society. Presented at the American Anthropological Association Annual Meeting, Montreal, QC, CA.
- Tynjälä, J., Kannas, L., & Välimaa, R. (1993). How young Europeans sleep. *Health Education Research*, 8(1), 69–80.
- U.S. Census Bureau. (2000). *Table 5. Population by race and Hispanic or Latino origin, for the counties and 15 largest incorporated places in Arizona: 2000*. U.S. Census Bureau. Retrieved from <http://www.census.gov/census2000/states/az.html>.
- Viot-Blanc, V., Muzet, A., Krieger, J., Davenne, D., et al. (2007). *Sleep and sleep behaviours in a sample of French adolescent population*, Vol. 30. Minneapolis, MN: Associated Professional Sleep Societies, LLC, Presented at the SLEEP 2007 21st Annual Meeting of the Associated Professional Sleep Societies, LLC.
- Wahlstrom, K. (2002). Changing times: findings from the first longitudinal study of later high school start times. *NASSP Bulletin*, 86(633), 3–21.
- Wiley, A. (1992). Adaptation and the biocultural paradigm in medical anthropology: a critical review. *Medical Anthropology Quarterly*, 6(3), 216–236.
- Williams, S., & Bendelow, G. (1998). Chapter 9: the "dormant" body: sleep, nighttime and dreams. In *The lived body: Sociological themes, embodied issues* (pp. 171–187). London: Routledge.
- Wolfson, A., & Carskadon, M. (1998). Sleep schedules and daytime functioning in adolescents. *Child Development*, 69(4), 875–887.
- Wolfson, A., & Carskadon, M. (2003). Understanding adolescent's sleep patterns and school performance: a critical appraisal. *Sleep Medicine Reviews*, 7(6), 491–506.
- Wong, M., Brower, K., Nigg, J., & Zucker, R. (2010). Childhood sleep problems, response inhibition, and alcohol and drug outcomes in adolescence and young adulthood. *Alcoholism, Clinical and Experimental Research*, 34(6), 1033–1044.
- Wong, M., Brower, K., & Zucker, R. (2011). Sleep problems, suicidal ideation, and self-harm behaviors in adolescence. *Journal of Psychiatric Research*, 45(4), 505–511.
- Wong, T., & Chan, J. (2007). *Sleep loss in secondary school students in Hong Kong*, Vol. 30. Minneapolis, MN: Associated Professional Sleep Societies, LLC, Presented at the SLEEP 2007 21st Annual Meeting of the Associated Professional Sleep Societies, LLC.
- Worthman, C., & Brown, R. (2007). Companionable sleep: social regulation of sleep and cosleeping in Egyptian families. *Journal of Family Psychology*, 21(1), 124–135.
- Worthman, C., & Melby, M. (2002). *Toward a comparative developmental ecology of human sleep. Adolescent sleep patterns: Biological, social and psychological influences*. Cambridge: Cambridge University Press.
- Yang, C., Wu, C., Hsieh, M., Liu, M., et al. (2003). Coping with sleep disturbances among young adults: a survey of first-year college students in Taiwan. *Behavioral Medicine (Washington, D.C.)*, 29(3), 133–138.