

Cambridge University Press

0521642914 - Adolescent Sleep Patterns: Biological, Social, and Psychological Influences

Edited by Mary A. Carskadon

Excerpt

[More information](#)

## 1. Sleep and Adolescence: A Social Psychologist's Perspective

SANFORD M. DORNBUSCH

My immediate reaction to reading the chapters in this book is shame. Generations of researchers have studied the psychological and social lives of adolescents, and their main tools have been time-use studies. Among numerous examples, how much time each day or week does the adolescent spend watching television, hanging out with friends, or engaging in extracurricular activities? What is the relation of such time expenditures to measures of academic performance, deviance, or other indicators of adolescent functioning?

The emphasis has been completely on the waking hours, and this book impressively underscores the importance of hours spent sleeping. An undergraduate friend, with whom I had discussed some of the findings in various chapters, immediately provided a real-life illustration of the interaction between the physiological imperatives of sleep and the social perceptions by which we structure our lives. She had been accustomed to staying up very late and sleepily forcing herself to attend her morning classes. In general, she found Stanford professors boring. Now she is getting more sleep and finding her teachers more interesting.

A constant theme of life in society is determining the causes of the phenomena we perceive. Often, there is a choice to be made between internal causes and external causes. For example, I was once feeling sick in Guatemala City and, feeling dizzy, I decided that I was even sicker than I had believed. I was one of the few persons who was relieved to discover that I was experiencing a minor earthquake. A different example occurs in the study of hyperactive children, some of whose restlessness in school may be a product of boring teachers.

Let me use an example of considerable importance in the lives of American adolescents. Part-time employment while attending high school is more common in the United States than in other industrial



Cambridge University Press

0521642914 - Adolescent Sleep Patterns: Biological, Social, and Psychological Influences

Edited by Mary A. Carskadon

Excerpt

[More information](#)

societies. Those American adolescents who work a moderate number of hours each week tend to have higher grades in school than do adolescents who do not work at all. Yet, those adolescents who are employed for a large number of hours, say for more than 20 hours a week, tend to have lower grades than those in the other two groups.

The typical explanations of the negative relation between many hours of work and high school grades reflect the problems of explaining this simple association. Perhaps spending so much after-school time at work (external) prevents an appropriate investment of energy on schoolwork, or perhaps the adolescent chooses to work so much (internal) because he or she has done poorly in school and developed low educational expectations. Probably both explanations are partially correct, but neither considers the additional impact of being sleep-deprived.

Those adolescents who work long hours go to bed later and get less total sleep than do those who do not work that much. Getting insufficient sleep has an impact on the quality of the activities of adolescents and on their perceptions of the contexts in which they find themselves. The high-work group has trouble staying awake in class or while doing homework. Cross-cultural research reinforces the view that less total sleep time among adolescents is associated with inability to concentrate on schoolwork and poorer school performance, as well as with mood disorders and substance abuse.

Many years ago I did a study of gender differences in adolescents' satisfaction with their bodies (Dornbusch et al., 1984). As expected, American females were more likely to want to be thinner, but what was striking was the extent to which social class, as predicted by Thorstein Veblen (1889), led adolescent females to be increasingly dissatisfied with their bodies as they moved through puberty. The fat that normally accompanies female sexual development was negatively evaluated, whereas males were pleased with the musculature that was associated with their pubertal development. Perceptions in the social world were allowing societal standards to override biological processes.

Research on adolescent sleep is revealing a similar pattern. I must admit to my own surprise on learning that adolescents need more, not less, sleep as they move out of childhood. Neither adults nor adolescents are generally aware of the biological need for increased sleep during pubertal development. Instead, believing that sleep can be shortened for the sake of compliance with the social standards of those around them, adolescents reduce their sleep time in order to engage in activities that bring them immediate rewards. Whether for parties or jobs or cramming for examinations, adolescents engage in activities that



Cambridge University Press

0521642914 - Adolescent Sleep Patterns: Biological, Social, and Psychological Influences

Edited by Mary A. Carskadon

Excerpt

[More information](#)

deprive them of sleep. Adults, unaware of the sleep needs of adolescents, require them to start school earlier in the day than is required of younger children. The social norms of the wider society, as well as those of most peer groups, do not discourage patterns of behavior that displace sleep.

The sleep needs of adolescents appear similar across cultures, but there are, as is evident in these chapters, cultural differences in sleep patterns, reflecting differences in parental and peer control, in leisure activities, and in schooling. These chapters reflect a complex mixture of biological and developmental forces that are expressed within social and cultural settings. It seems obvious that, unaware of the sleep needs of adolescents, norms for behavior have developed that have unwittingly created additional problems for adolescents.

Researchers who study adolescent functioning should take advantage of this new knowledge and reshape part of the research agenda. For example, there are already hints that knowledge about sleep patterns may contribute to the study of deviant behavior, school failure, and psychological symptoms among adolescents beginning in the prepubertal period and extending into young adulthood. My prediction is that sleep time will have a small, but measurable, influence on various indicators of adolescent functioning even after controlling for the contributions of the usual variables that affect adolescent development.

Such studies also have practical consequences in the short run. Parents and adolescents may become more aware of the consequences of sleep deprivation; far more significant, policy makers may assess the negative impact of current practices in part-time employment and schooling. With so many adolescents working too many hours or too late in the evening, and adolescents starting school so early each weekday, there appears to be a need for thoughtful oversight of the demands of employers and schools. Adolescence is defined as a time for development, and harmful sleep patterns that increase risks for adolescents during that sensitive period cause adult society to pay a high price. Policy makers will soon be asked to take into account the impact of sleep deprivation on adolescents.

## REFERENCES

- Dornbusch SM, Carlsmith JM, Duncan PD, Gross RT, Martin JA, Ritter PL, Siegel-Gorelick B (1984). Sexual maturation, social class, and the desire to be thin among adolescent females. *Journal of Behavioral and Developmental Pediatrics* 5:308–314.
- Veblen T (1889). *The Theory of the Leisure Class*. New York: Macmillan.



## 2. Factors Influencing Sleep Patterns of Adolescents

MARY A. CARSKADON

How I hated her method of waking me. My adolescent sleeps were long, dark and sullen. Never once in all those years did I wake of my own accord. It was Margaret, always, knocking on my door like some rodent trapped behind a wall. This would bring me to a rage of wakefulness and I would stomp into the bathroom, bad-tempered and clearly in the wrong, while Margaret, who had been up and gone to six o'clock Mass, would watch me with a silent and superior reproach. That would increase my fury; it is impossible to feel the equal of someone who's been awake longer than you.

Mary Gordon, *Final Payments*

Sleep patterns in humans emerge from a complex interplay of several distinct processes: maturation and development, behavioral phenomena, and intrinsic sleep and circadian regulatory mechanisms. Each factor likely plays an important role during the transition from childhood to adulthood, a time when significant changes in sleep patterns occur. Sleep also affects many facets of waking human life, although a definitive explanation of sleep's function(s) remains undiscovered. Unquestioned, however, is the obligatory nature of sleep and our commonsense intuition that sleep fulfills some vital role in our waking lives, a role that enhances our abilities to think, perform, feel, and interact.

This research program has received support from the National Institutes of Health grants MH45945 and MH52415. Many individuals have contributed to this research program, including Christine Acebo, Ronald Seifer, Amy Wolfson, Orna Tzischinsky, Pamela Thacher, Susan Labyak, Barbara A. Tate, Gary S. Richardson, Catherine Darley, Katherine Sharkey, Jenifer Wicks, Elizabeth Yoder, Christina Orringer, Katherine Minard, Liza Kelly, Clayton Bennett Jr., Jeffrey Cerone, Thomas Maloney, and many undergraduate trainees.



Cambridge University Press

0521642914 - Adolescent Sleep Patterns: Biological, Social, and Psychological Influences

Edited by Mary A. Carskadon

Excerpt

[More information](#)*Factors Influencing Sleep Patterns*

5

The patterns of sleep that unfold during adolescence differ markedly from those of preadolescents. Our sense is that many adolescents in the United States obtain insufficient and ill-timed sleep and that daytime functioning suffers as a consequence. This review will focus on a number of major factors that affect sleep patterns of adolescents, summarize a recent study that examines several factors in an operational setting, and speculate on major consequences of these changes.

Although large-scale epidemiologic studies of broadly generalizable samples are not available, our group is reasonably certain that many adolescents do not obtain adequate sleep, based upon self-reported sleep-wake patterns of children and adolescents investigated by a number of groups, primarily using cross-sectional sleep habits surveys (Strauch, Dubral, & Strucholz, 1973; Webb & Agnew, 1973, 1975; Zepelin, Hamilton, & Wanzie, 1977; Anders, Carskadon, Dement, & Harvey, 1978; Price, Coates, Thoresen, & Grinstead, 1978; Carskadon, 1979; White, Hahn, & Mitler, 1980; Klackenberg, 1982; Petta, Carskadon, & Dement, 1984; Bearpark & Michie, 1987; Billiard, Alperovitch, Perot, & Jammes, 1987; Henschel & Lack, 1987; Strauch & Meier, 1988; Carskadon, 1990a,b; Andrade, Benedito-Silva, & Menna-Barreto, 1992; Gau & Soong, 1995; Saarenpaaheikkila, Rintahaka, Laippala, & Koivikko, 1995; Wolfson & Carskadon, 1998). A few longitudinal survey studies have also been done (Klackenberg, 1982; Strauch & Meier, 1988; Andrade et al., 1992). Several major trends emerge from such data:

- Older teenagers sleep less than younger teenagers.
- The timing of sleep is delayed in older versus younger teenagers.
- With age, teenagers show an increasingly large discrepancy between school night and weekend sleep schedules.

This chapter focuses on the first two of these trends; the third is examined by Acebo and Carskadon (Chapter 13 in this volume).

**Behavioral Phenomena**

Physiological processes play an important role in regulating sleep and wakefulness. Yet, human sleep patterns are also determined by choices, often rooted in psychosocial phenomena. Such phenomena include, for example, delaying bedtime to socialize or to finish reading a good book, advancing bedtime in anticipation of an early rising, truncating sleep



Cambridge University Press

0521642914 - Adolescent Sleep Patterns: Biological, Social, and Psychological Influences

Edited by Mary A. Carskadon

Excerpt

[More information](#)

length with an alarm clock, and so forth. Behavioral contributions to sleep patterns are strong in both children and adolescents; however, a rapidly changing psychosocial milieu during adolescence contributes to marked alterations in the behavioral phenomena affecting sleep patterns.

### *Parents*

One of our first studies of sleep patterns at the childhood-to-adolescent transition (Carskadon, 1979) showed a change in the influence of parents on children's sleep patterns, particularly on school days. Among other items, this sleep habits survey of 218 children asked students to describe the reasons they had for going to bed at night and waking up in the morning. Children aged 10 and 11 years were significantly more likely to report that parents set their school-night bedtimes (age 10 = 54.3%; age 11 = 48.3%) than were the 12- and 13-year-old children (age 12 = 38.5%; age 13 = 19.6%); conversely, the 12- and 13-year-olds reported more frequently (age 12 = 73.1%; age 13 = 70.2%) that parents or alarm clocks provided the morning stimulus to wake up on school mornings than did the younger children (age 10 = 45.7%; age 11 = 37.9%).

Our subsequent studies of high school students have shown that older adolescents report much later bedtimes and give such reasons for staying up late as watching television, finishing homework, and socializing. For example, our group recently undertook a survey of approximately 3,000 9th through 12th grade students from four Rhode Island school districts (Acebo & Carskadon, 1997; Wolfson & Carskadon, 1998; referred to here as "the high school survey") using an eight-page anonymously administered self-report form (reproduced at <http://www.sleepforscience.org>). Only 5.1% of these older teens had a school-night bedtime set by parents; 32.7% went to bed when homework (13.1%), TV viewing (8.7%), or socializing (10.9%) was finished for the day, and 44.1% reported that bedtime was set by the time they feel sleepy. Furthermore, an even higher percentage of high school than primary school students reported relying on an external source for a school-morning wake-up cue. Our high school survey data show that 87% of older teens use an alarm (59.9%) or parent (27.1%) for waking them up on school days. As summarized in Figure 2.1, these data indicate strong developmental trends: parents are more likely to set bedtimes for younger adolescents, more likely to assist with waking up older adolescents, and the younger adolescents are



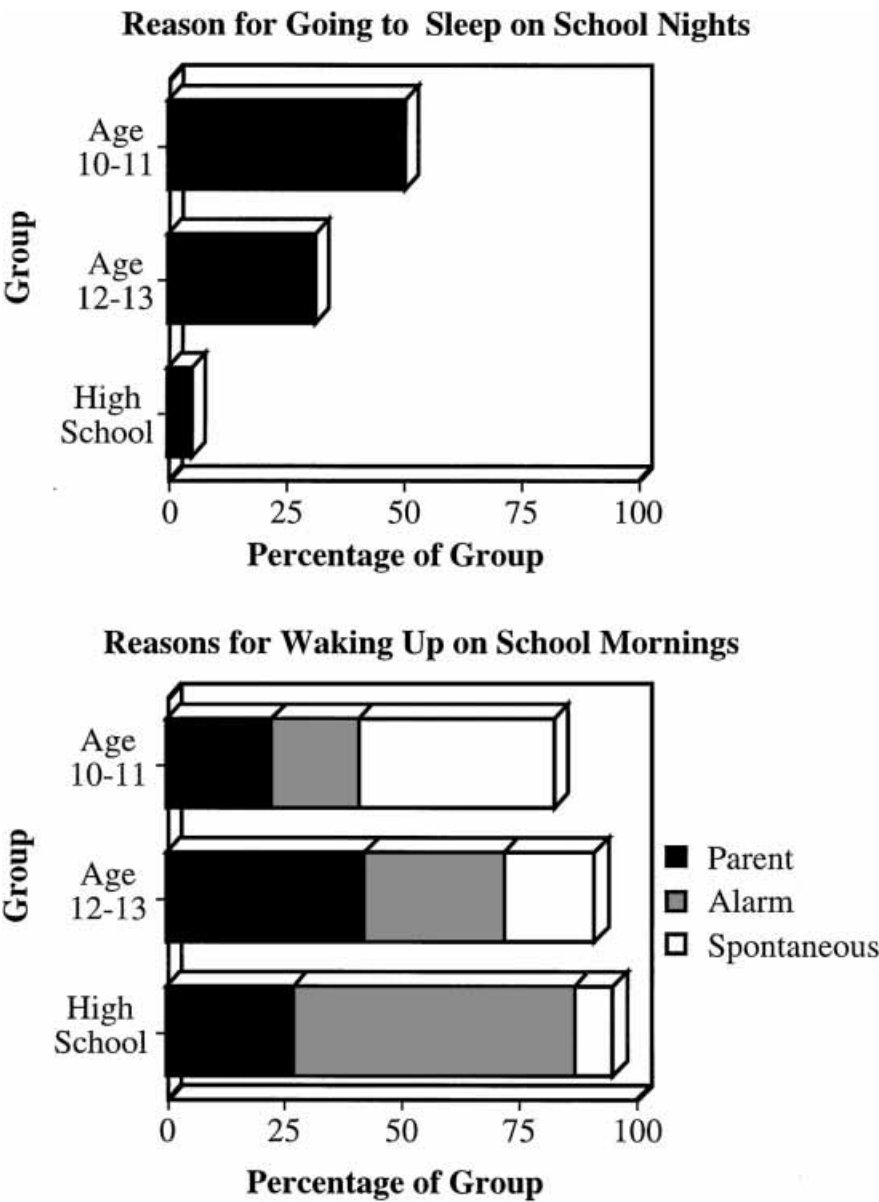


Figure 2.1. Self-report data from sleep habits surveys of younger (ages 10 and 11 years; 12 and 13 years) and older adolescents (high school students ages 14 to 18 years). The top figure shows the percentage of students who reported that their parents set their bedtimes on school nights. In the lower panel, data are similarly summarized for three of the reasons students reported for factors that determine what time they wake up on school mornings, parents (black), alarm clock (gray), or spontaneous (white, i.e., “I don’t know, I just wake up”) arousals.



Cambridge University Press

0521642914 - Adolescent Sleep Patterns: Biological, Social, and Psychological Influences

Edited by Mary A. Carskadon

Excerpt

[More information](#)

significantly more likely than older teens to wake spontaneously on school mornings.

### *Peers*

Although a commonly remarked feature of adolescent development is the increasing influence of peer group on behavior, we are aware of no data that directly assay this factor with regard to sleep patterns. Our recent high school survey data indicate a minor influence of school on one or two sleep variables; however, this effect may be more a result of the school schedules per se than of peer influences. The data show that evening “socializing” is a factor influencing school-night bedtimes in only 10.9%, although a case might be made that TV watching (associated with bedtimes in 8.7% of students) may have a peer-group component. These adolescents reported a significantly greater influence of social activities to account for bedtime on weekend nights, with 40.9% reporting this factor as the chief reason they choose to go to bed. One conclusion, therefore, is that the older adolescents have more social opportunities or greater access to evening social activities, and these activities have a greater influence on sleep patterns during the weekends than on school nights.

### *Academics*

Academic obligations are often mentioned by adolescents when asked about factors affecting their sleep patterns. Our high school survey data show evidence that homework is a significant factor influencing sleep patterns for only a limited number of students. Thus, approximately 13% of the 9th through 12th grade students reported that their school-night bedtime is set according to the time they finish their homework. This relationship does not seem to reflect a developmental change, because about 15.2% of 12- and 13-year-old students in our earlier study reported staying up until homework was finished (Carskadon, 1979). Our high school survey data also indicate a rather low mean number of hours these students reported studying in the last week, on average about an hour a day ( $6.7 \pm 5.9$  hours per week). Data from students in another educational system – Taipei, Taiwan – showed that the students in more academically challenging programs reported less sleep and lower levels of alertness than those students in the less challenging program (Gau & Soong, 1995). In the United States, as well, those students on



Cambridge University Press

0521642914 - Adolescent Sleep Patterns: Biological, Social, and Psychological Influences

Edited by Mary A. Carskadon

Excerpt

[More information](#)*Factors Influencing Sleep Patterns*

9

the academic fast track are likely to sleep less, although data confirming this trend are not available.

*Extracurricular Club Activities and Sports*

Other activities that may influence sleep patterns of adolescents include extracurricular club activities, such as chorus, band, orchestra, and scouting, as well as after school sports. Our recent high school survey examined these factors by asking students to describe the nature of these obligations. Only about one-quarter of the sample reported participating in extracurricular club activities during the preceding week, and 90% of these students took part fewer than 12 hours per week. Students in this survey reported somewhat more participation in sports, with about one-third of students involved in organized athletics in the past week, 80% of whom reported participating 12 or fewer hours per week. For the majority of the students, therefore, extracurricular club activities or after school sports were not a major factor determining sleep patterns. Future analyses will examine these issues more closely, particularly to identify students whose commitments span many activities, in which case sleep may be affected more significantly. One group most likely to experience significant sleep loss includes those students with multiple commitments who also work.

*Employment*

As we have indicated elsewhere (Carskadon, Mancuso, & Rosekind, 1989; Carskadon, 1990a,b), a major influence on sleep patterns of U.S. high school students is the number of hours they spend working for pay. Thus, we have previously noted that students who report working 20 or more hours per week (about 28% of our earlier high school sample) report having later bedtimes, sleeping fewer hours per night, and falling asleep in school and oversleeping more frequently than do those who either do not work or who work fewer than 20 hours per week. Our more recent high school survey, which asked students to report hours worked in the last week, shows similar findings. About half the students reported working, and the average number of hours worked was 19.5 (median = 18 hours). As further explicated in Chapter 12, the association of hours spent working with sleep parameters and other outcome variables is also similar to our previous findings. For example, number of hours worked across the week reported by the new high school sample



Cambridge University Press

0521642914 - Adolescent Sleep Patterns: Biological, Social, and Psychological Influences

Edited by Mary A. Carskadon

Excerpt

[More information](#)

is correlated with school-night total sleep time ( $r = -.235$ ;  $p < .001$ ) and school-night bedtime ( $r = .345$ ;  $p < .001$ ).

The developmental psychologist Laurence Steinberg and his colleagues Bradford Brown and Sanford Dornbusch (1996) make the point that the rather impressive amount of time adolescents in the United States spend working for pay is a relatively new phenomenon, appearing only in the second half of the 20th century. Furthermore, they note that the typical adolescent is neither working to save for college education or to supplement family income nor serving in a true apprenticeship position to learn valuable job skills but rather is earning money to spend on personal consumables by working as largely unskilled laborers. Hours of work are not confined to weekends but extend significantly into the school week. According to Steinberg (1996), "by the time they are seniors in high school, many students spend more time on the job than they do in the classroom" (p. 169).

### *School Start Time*

In most U.S. school districts, the start of the school day is progressively earlier as students move from grade school to middle school to high school (Allen, 1991, 1992). Thus, adolescents are required to rise earlier in the morning than preteens in order to get to school on time. We have hypothesized that older adolescents do not adjust appropriately to these demands. As with adolescent employment, historical trends may play a role in the issue of early school start time for older teens. Preliminary data, for example, show that the starting times for U.S. high schools have moved to an earlier hour across the past 20 years (Carskadon & Acebo, 1997). Other countries are not immune to this problem, as noted in Israel, where the "zero hour" (i.e., 7:00 A.M.) for school start time has become a recent concern (Epstein, Chillag, & Lavie, 1995). Clearly for most teenagers, the school bell is a major nonnegotiable factor that mandates the termination – often premature – of nocturnal sleep.

One other important consequence of earlier school start times unrelated to sleep patterns is the amount of largely self-supervised time adolescents have when school release times are also moved earlier. Increasingly, investigators (and legislators, at least in Minnesota) are noting this phenomenon with concern. For example, Richardson, Radziszewska, Dent, and Flay (1993) note an association with after school "self-care" in adolescents and substance abuse, risk taking, depressed mood, and lower academic grades.