

## Effect of Later Start Time on High School Achievement

### Question:

1. What does the research say about a later start of the school day and high school students' achievement?
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### **Report:**

Following an established REL-NEI Reference Desk research protocol, we conducted a search for research reports as well as descriptive and policy-oriented briefs and articles in this area. The sources included federally funded organizations, additional research institutions, several educational research databases, and a general Internet search using Google and other search engines. We also searched for appropriate organizations that may act as resources on this issue. We have not done an evaluation of these organizations or the resources themselves, but offer these resources to you for your information only.

Our researchers have found a number of resources that suggest that school start time can have different effects on students, especially adolescents. Changing the school start time from 7:15 a.m. to 8:40 a.m. in a large, urban school district resulted in several benefits (Wahlstrom, 2002; see resource below). For example: comparison over time revealed a "slight improvement in grades earned overall, but the differences were not statistically significant. The trend lines for letter grades earned for all grade levels 9 through 12 for the years of the later start time are on an upward (positive) slope" (p.11). In addition, "attendance rates for all students in grades 9, 10 and 11 improved ... with the greatest rate of improvement for grade 9 students" (p.18).

Findings from a literature review of school start time and academic achievement found that "1) American adolescents are not having adequate sleep time; 2) insufficient sleep time could impair adolescents' learning and development; 3) insufficient sleep can be ameliorated but not fully addressed by delaying school start time; but 4) it is not clear whether student academic achievement will improve along with a later school schedule; lastly, 5) insufficient sleep might not be as grave as what the media and some studies have depicted" (Yan, 2006; see resource below).

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#### **1.1. Changing Times: Findings From the First Longitudinal Study of Later High School Start Times.** December 2002; Wahlstrom, K.; NASSP Bulletin; Volume 86, Number 633; pp.3-21.

Source: General Internet Search using Google → University of Minnesota

(<http://cehd.umn.edu/CAREI/Reports/docs/SST-2002Bulletin.pdf>)

"This article presents findings from a 4-year study in a large, urban school district that altered high school start times significantly from 7:15 a.m. to 8:40 a.m. This change affected more than 12,000 secondary students within a total K-12 population of nearly 51,000 students" (p.1). Although the researchers had difficulty obtaining "clean" achievement data, "the comparison of students' letter grades for 3 years prior to the change (starting time of 7:15 a.m.) and 3 years after revealed a

slight improvement in grades earned overall, but the differences were not statistically significant. The trend lines for letter grades earned for all grade levels 9 through 12 for the years of the later start time are on an upward (positive) slope. Students' self-report from a written survey on their grades earned corroborate this finding" (p.11).

The author cautions against using student grades to gauge an innovation's success: "In reality, grades are often a rather subjective measure due to local factors such as grade inflation, curricular changes, teacher and administrator turnover, and changes in assessing student work. A minimum of 3 years' worth of grades is needed to gauge any possible changes, and the complicating factors noted here cause the utility of grades earned to be, at best, only one measure among many. There are other equally important measures of impact, such as student physical and emotional well being, benefits associated with teaching and learning and improved family relationships." (pp.18-19). "[A]ttendance rates for all students in grades 9, 10 and 11 improved in the years from 1995-2000, with the greatest rate of improvement for grade 9 students. Furthermore, students who did not have a pattern of continuous enrollment in the school district showed a marked improvement in their daily attendance after the initiation of the later start time in 1997-1998" (p.18).

See also the study's executive summary: **Minneapolis Public Schools Start Time Study**. August 2001; Wahlstrom, K., Davison, M., Choi, J., & Ross, J.; University of Minnesota, Center for Applied Research and Educational Improvement.  
(<http://www.cehd.umn.edu/carei/Reports/docs/SST-2001ES.pdf>)

**1.2. School Start Time and Academic Achievement: A Literature Review. Blue Valley School District Report Series.** August 2006; Yan, B., Slage, M.; ERIC on-line submission; 19 pages; ERIC Document #ED493187.

Source: ERIC

([http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content\\_storage\\_01/0000019b/80/1b/e6/82.pdf](http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/1b/e6/82.pdf))

"This study intends to strengthen our understanding of the relationship between school start time and student achievement by synthesizing findings from both medical and educational research. The review of the past research suggests that 1) American adolescents are not having adequate sleep time; 2) insufficient sleep time could impair adolescents' learning and development; 3) insufficient sleep can be ameliorated but not fully addressed by delaying school start time; but 4) it is not clear whether student academic achievement will improve along with a later school schedule; lastly, 5) insufficient sleep might not be as grave as what the media and some studies have depicted" (p.2).

**1.3. High Schools Find Later Start Time Helps Students' Health and Performance.** June 2009; Lamberg, L.; JAMA: Journal of the American Medical Association; Volume 301, Issue 21; pp.2200-2201.

Source: Internal Search Database

Full-Text Available for purchase from JAMA

(<http://jama.ama-assn.org/cgi/reprint/301/21/2200>)

From the abstract, "The article discusses the benefits of delaying the opening of school and its effect on the health and performance of high school students. Starting in September 2009, students in Duxbury, Massachusetts will start at 8:15 in the morning instead of at 7:30 AM. The author explores the results of studies on delaying school openings, the challenges schools face when changing opening times, and the effects delayed openings have on student safety while driving. ... [The authors] describe the biological and physiological aspects of delaying school openings."

### Additional Organizations to Consult

- **National Sleep Foundation**

(<http://www.sleepfoundation.org>)

From the 'Mission and Goals' page: "The National Sleep Foundation NSF) is an independent nonprofit organization dedicated to improving public health and safety by achieving understanding of sleep and sleep disorders, and by supporting sleep-related education, research, and advocacy."

Article appearing on the website's 'Hot Topics' page: **Backgrounder: Later School Start Times.** Not dated; author not given.

(<http://www.sleepfoundation.org/article/hot-topics/backgrounder-later-school-start-times>)

"Adolescents today face a widespread chronic health problem: sleep deprivation. Although society often views sleep as a luxury that ambitious or active people cannot afford, research shows that getting enough sleep is a biological necessity, as important to good health as eating well or exercising. Teens are among those least likely to get enough sleep; while they need on average 9 1/4 hours of sleep per night for optimal performance, health and brain development, teens average fewer than 7 hours per school night by the end of high school, and most report feeling tired during the day (Wolfson & Carskadon, 1998). The roots of the problem include poor teen sleep habits that do not allow for enough hours of quality sleep; hectic schedules with afterschool activities and jobs, homework hours and family obligations; and a clash between societal demands, such as early school start times, and biological changes that put most teens on a later sleep-wake clock. As a result, when it is time to wake up for school, the adolescent's body says it is still the middle of the night, and he or she has had too little sleep to feel rested and alert."

- **Sleep for Science**

(<http://www.sleepforscience.org/>)

According to the 'About Us' section of the website: "The Sleep for Science Research Lab of the E.P Bradley Hospital and Brown Medical School exists to produce new knowledge about sleep and circadian rhythms in humans, to foster dissemination of knowledge through a variety of academic activities, to contribute to training the next generation of sleep scientists, to treat our research participants and their families with respect, to enjoy the processes involved in these activities." A direct link to resources focused on school start time can be found here:

(<http://www.sleepforscience.org/resources/start.php>)

### Resource on Sleep and Achievement in Students in General

- **Sleep: The E-ZZZ Intervention.** December, 2009; Bergin, C.A., & Bergin, D.A.; *Educational Leadership*; Volume 67, Number 4; pp.44-47; ERIC Document #EJ868289.

Source: ERIC

([http://www.ascd.org/publications/educational\\_leadership/dec09/vol67/num04/Sleep@\\_The\\_E-ZZZ\\_Intervention.aspx](http://www.ascd.org/publications/educational_leadership/dec09/vol67/num04/Sleep@_The_E-ZZZ_Intervention.aspx))

From the ERIC abstract: "Research has shown that students who do not get enough sleep are more likely to misbehave in school and have lower academic achievement than their peers with healthy sleeping habits. In this article, [the authors] share research into students' sleep habits and conclude that helping students get adequate sleep has potential to raise academic achievement. They encourage teachers to talk with parents when students show signs of sleep deprivation. They also recommend that school eliminate late-night activities, ensure that homework does not require students to stay up late, and consider changing their start time."

## Resources on Adolescent Sleep Patterns and Needs in General

- **Meeting Teen Sleep Needs Creatively.** *September, 2005; Wolfson, A.R. & Carskadon, M.A.; Education Digest: Essential Readings Condensed for Quick Review; Volume 71, Number 1, pp.47-51; ERIC Document #EJ741106.*  
Source: ERIC  
Available for purchase ([http://www.eddigest.com/sub.php?page=product&product\\_id=1199](http://www.eddigest.com/sub.php?page=product&product_id=1199))  
From the ERIC abstract: "Research on the sleep needs of adolescents and the influence of sleep on learning and behavior have captured the interest of school districts nationwide and in other countries as well. As a result, school officials are being urged to acknowledge the evidence and to adjust school schedules accordingly (e.g., to delay high school start times). The authors surveyed high school personnel on high school start times, factors influencing school start times, and decision making around school schedules. Surveys were analyzed from secondary schools selected at random from the National Center for Educational Statistics database. The final data set includes 345 surveys from 'regular' public schools serving grades 9-12 for which data at least back to the 1986-87 school year were available. The result of the surveys and some recommended creative solutions that will allow for sleep and quality education and co-curricular activity time for high-school students are presented in this article."
- **The Impact of School Daily Schedule on Adolescent Sleep.** *June 2005; Hansen, M., Janssen, I., Schiff, A., Zee, P.C., & Dubocovich, M.L.; Pediatrics; Volume 115, Number 6; pp.1555-1561.*  
Source: Internal search database → General Internet search using Google  
(<http://pediatrics.aappublications.org/cgi/reprint/115/6/1555>)  
"The results of this study demonstrated that current high school start times contribute to sleep deprivation among adolescents. Consistent with a delay in circadian sleep phase, students performed better later in the day than in the early morning. However, exposure to bright light in the morning did not change the sleep/wake cycle or improve daytime performance during weekdays. Both short-term and long-term strategies that address the epidemic of sleep deprivation among adolescents will be necessary to improve health and maximize school performance" (p.1555).
- **Accommodating the Sleep Patterns of Adolescents within the Current Educational Structures: An Uncharted Path.** *2002; Wahlstrom, K.L.; Adolescent Sleep Patterns: Biological, Social and Psychological Influences; pp.172-197.*  
Source: Internal Search Database  
Available for purchase from Cambridge University Press  
(<http://www.cambridge.org/catalogue/catalogue.asp?isbn=9780511036606>)  
From the book abstract: "This book explores the genesis and development of sleep patterns at this phase of the life span. It examines biological and cultural factors that influence sleep patterns, presents risks associated with lack of sleep, and reveals the effects of environmental factors such as work and school schedules on sleep." The chapter by Kyla Wahlstrom discusses some of the concerns schools face when determining whether to change start times. From the chapter abstract: "[C]oncerns in the areas of transportation, athletics and other school activities, community education, food service, human resources and contractual agreements, elementary school start time, and crime statistics [arise]. The main finding from the study is that any decision to change the starting time of schools, from elementary to high school, is a highly politically charged and extraordinarily complex decision."

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### Key words and search strings used in the search:

"school start times" OR "start time" OR "sleep" OR "sleep deprivation" AND "academic achievement" OR "performance" AND "high school" OR "secondary"

### Search databases and websites:

*Institute of Education Science Resources (IES)*; Regional Educational Laboratory Program (REL); What Works Clearinghouse (WWC); Doing What Works (DWW); National Center for Education Statistics (NCES); Institute for Education Sciences (IES); IES Practice Guides

Other Federally Funded Resources: The National High School Center; The Center on Innovation and Improvement; The Center on Instruction; National Research Center on the Gifted and Talented; Access Center for Improving Outcomes for All Students K-8; Center for Comprehensive School Reform and Improvement; Regional Comprehensive Centers; Regional Resource Centers

Additional Resources: Education Development Center; WestEd; American Institutes of Research; Council; The Campbell Collaboration; Council of Chief State School Officers; Data Quality Campaign; SRI International

Search Engines and Databases: ERIC; EBSCO Databases; <http://www.google.com>; FNS Washington Transcript Service

Criteria for inclusion:

When Reference Desk Researchers review resources, they consider, among other things, four factors:

1. **Date of the publication:** The most current information is included unless in the case of nationally known seminal resources
2. **Source and funder of the report/study/brief/article:** Priority is given to IES, nationally funded, and certain other vetted sources known for strict attention to research protocols);
3. **Methodology:** i.e. Random control trial studies, surveys, self-assessments, literature reviews, policy briefs, etc. Priority for inclusion is given generally to random control trial study findings; however, the reader should note at least the following factors when basing decisions on these resources: Numbers of participants (just a few? Thousands?); Selection (did the participants volunteer in the study, or were they chosen?); Representation (were findings generalized from a homogeneous or a diverse pool of participants? Was the study sample representative of the population as a whole?)
4. **Existing knowledge base:** Although we strive to include vetted resources, there are times when the research base is slim or non-existent. In these cases we have included the best resources we could find, which may include newspaper articles, interviews with content specialists, organization websites, etc.

### **REL Northeast and Islands**

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