

Teens & Sleep


LINKING DISCOVERY, PRACTICE, AND POLICY

Later School Start Times

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Earliest Research Completed in 1996-2001 by Univ. of MN

- Edina, MN school district in 1996 was first in U.S. to shift to a later start, based on medical research about sleep phase shift in teens:
7:20 → 8:30
- Minneapolis School District in 1997 also shifted start time, based on findings in Edina:
7:15 → 8:40



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Initial Academic Performance Findings in Minneapolis

- Significant increase in attendance rates (pre-post) were identified for 9th, 10th, and 11th grade students in all Minneapolis high schools.
- Graduation rates significantly improved over the three years after the later start time was initiated in Minneapolis.
- A positive trend line was found for pre-post comparisons on actual GPAs of Minneapolis high school students, but were not statistically significant.



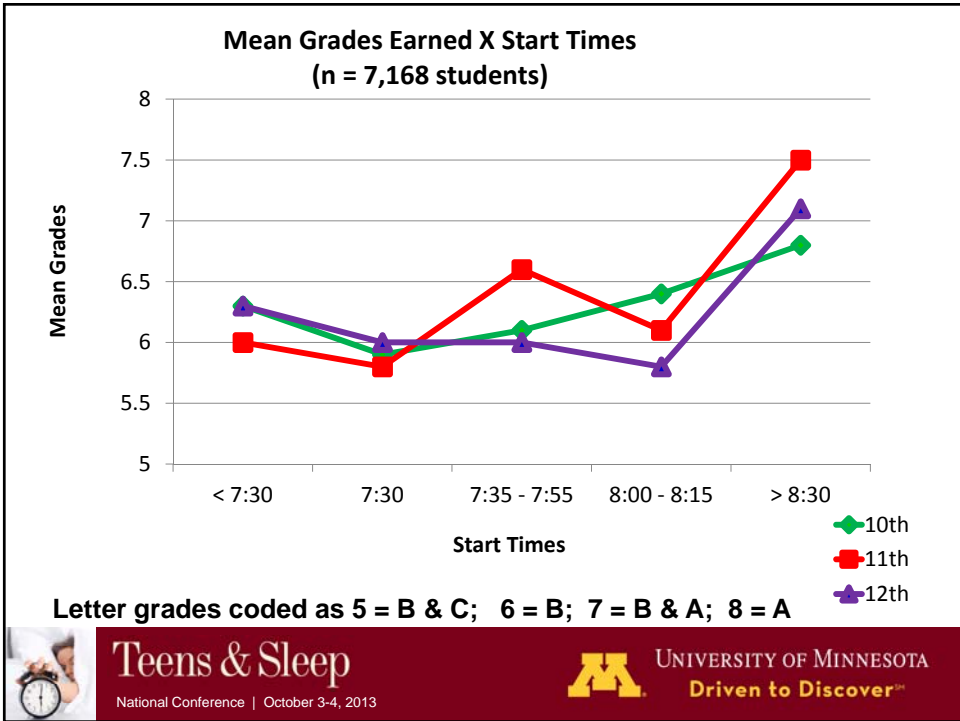
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Initial Findings in Edina

- Students in Edina reported statistically significant less depression compared with two similar districts.
- School counselors and nurses reported fewer students seeking help for emotional problems and somatic physical complaints.
- 92% of parents in Edina said their teenagers were “easier to live with”



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Current Research Study (2009-2013) funded by CDC

- Five school districts
- Eight high schools:
 - 5 schools in three Minnesota districts
 - 2 schools in Colorado district
 - 1 high school in Wyoming district
- Grades 9-12 (n=9,395)
- Start times ranged from 8:00 AM to 8:55 AM



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Percentage of HS students sleeping ≥ 8 hours on school nights by start time

- 7:30 AM 33.6 % Fairview HS, CO (2010)
- 8:00 AM 49.7% Mahtomedi, MN
- 8:00 AM 44.5 % Boulder HS, CO
- 8:05 AM 42.5% Fairview HS, CO (2011)
- 8:35 AM 57.0% Woodbury HS, MN
 - 58.9% East Ridge HS, MN
 - 60.0 % Park HS, MN
- 8:55 AM 66.2% Jackson Hole, WY



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Rates of negative outcomes associated with insufficient sleep: CDC Youth Risk Behavior National Survey, 2007

N= 12,154 students in grades 9-12

	<u><8 hrs vs. > 8 hrs</u>
• Used 1+ cigarettes daily	24% / 15%
• Used alcohol in past 30 days	50.3% / 36.7
• Used marijuana in past 30 days	23.3% / 15.6
• Currently sexually active	39.1% / 27.8
• Felt sad or hopeless (felt daily in past 2 wks & stopped usual activities)	31.1% / 21.6

McKnight- Eily, L.R. et al., *Preventive Medicine*, 2011



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Health and Wellness Findings: Teen Sleep Habits Survey— All Schools Combined with Start Times of 8:00 AM-8:35 AM

- Administered to 8,652 students
- Mean bedtime was 11:28 PM on school nights and mean wake time was 7:03 AM on school mornings, for an average of 7.8 hours of sleep on school nights.
- Mean weekend bedtime was 12:56 PM and mean wake time was 10:35 AM, for an average of 9.4 hours of sleep on weekends.
- Average amount of time from wake up to leaving the house for school was 54 minutes.



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Health Findings Across All Districts (cont'd)

Students who slept 8+ hours were significantly less likely ($p = <.001$) to:

- Report symptoms of depression
- Fall asleep in class
- Drink caffeinated beverages
- Have a phone or computer in bedroom
- Do dangerous things without thinking



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Academic Performance Findings

- Statistically significant increases in 1st and/or 3rd period GPAs in core courses of English, math, social studies, and science were obtained in the four districts which provided sufficient data for comparison.
- There was no consistent pattern between or across the specific subject areas.



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Standardized Test Performance

- Pre-post comparison on math scores in state achievement assessments revealed a statistically significant positive increase for two districts.
- All districts provided ACT scores, and two of the four districts' pre-post comparisons resulted in a statistically significant increases.



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Attendance and Tardiness

- Significant positive increases in attendance rate were noted for 11th graders and 12th graders.
- Statistically significant decreases in 'tardiness to class' were obtained for grades 9, 10, 11, and 12, as well as across grade levels in the schools with the latest school start times (8:35 & 8:55 AM).



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Health and Outside Activities

- Students who work at a job for pay or participate in clubs or other organized activities are statistically significantly more likely to get insufficient sleep (less than 8 hours per night)
- Students who work for a job for pay are statistically significantly more likely to:
 - report symptoms of depression.
 - drink soda and energy drinks, coffee or tea, use tobacco, alcohol, and other drugs than students who do not work for pay.



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Health and Outside Activities (cont'd)

- Students who play sports are statistically significantly less likely to:
 - report symptoms of depression.
 - drink soda and energy drinks, coffee or tea, use tobacco, alcohol, or other drugs than students who do not play sports.
- Students who participate in clubs, or other organized activities such as music, are statistically significantly less likely to use tobacco, alcohol, and other drugs, but more likely to drink coffee or tea.



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Additional Findings

- There is no relationship between participation in sports and letter grades when practice occurs after school or on the weekend.
- The more days per week students spend practicing *before* school, the lower the self-reported grades.



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Effect of Technology on Sleep

- Students who reported more bedroom distractions were statistically significantly more likely to get less than 8 hours of sleep on school nights.
- Teens who reported getting insufficient sleep on school nights were significantly more likely to:
 - Have a computer in their bedroom (46.5% have one in their bedrooms)
 - Have a cell phone in their bedroom (87.6% have one in their bedrooms)
- We found no significant differences in amount of sleep for teens who had a T.V. in their bedrooms.



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FINDINGS FROM OTHER RECENT STUDIES



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US Air Force Academy study 2004-08

(Carrell, 2010)

- True randomized assignment of freshmen to early (7 AM) or late (7:50) start classes
- Controlled for nearly all variables that cause many studies' findings to be cautionary
- Found significant negative effect every year on achievement for early start students
- Positive effect on achievement equivalent to raising teacher quality by one standard deviation



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Wake County, NC School District

1999-2006 (Edwards, 2012)

- Examined performance on standardized tests for 27,686 students in grades 6-8
- Start time ranged from 7:30 to 8:45 AM
- Students with a 1 hour later start had a gain 3 percentile points in state reading and math scores for the average student.
- Positive effects of later start time were stronger for lowest performing students.



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Wake County, NC Economic Analysis

- Impact on test scores persisted into 10th grade.
- Return on Investment analysis of busing costs versus hiring more teachers to reduce class size shows a delay in the start of the school day is substantially cheaper than reducing class size to gain a comparable improvement in test scores.



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Hingham, MA: SAT Scores

Early Start

2002	Verbal	Math	Combined
	564	565	1129

Late Start

2004	573	587	1160
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Research Findings: Real Issues vs. Those Not Substantiated

Real

- Athletics—schedules and last class missed
- Younger children in AM darkness
- Child care schedules for younger kids before and after school
- Parents' work schedules
- Local traffic patterns

Not Substantiated

- Athletics—less participation, fewer games won
- Transportation costs higher
- After-school activities decline
- After-school employment negatively affected



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Secondary Teachers' Opinion of Optimal Start Time for First Class Period for Majority of Students

<7:30	382	12.8%
7:45	162	5.5
8:00	1062	35.2
8:15	294	9.8
8:30	707	23.53
8:45>	371	12.2
No Opinion	36	1.0
TOTAL	3014	100.0%



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Interviews with District Leaders and Stakeholders

- In four of the five districts, there were many public discussions at school board meetings and informational forums, which spanned the course of a school year, before the decision was reached to change to a later high school start time.
- Research information on teen sleep patterns and needs, costs, and previous start time findings were widely shared.



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Decision Processes

- In one district, the high school principals are able to decide the starting time for their schools.
- A parent engagement network in those schools was one of the strongest catalysts to move the decision towards a later start time change.
- There was no organized opposition in any of the five districts which made the change.



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How Late is “Late Enough?”

- Our findings suggest that districts who make a modest move to a later start (e.g., from 7:25 to 7:55; from 7:35 to 8:05) experience only modestly proportional benefits, but have experienced the same amount of community disruption as did the districts that make the change to start at 8:30 or later.



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Competing Pressures for Changes

- Policy initiatives (e.g., accountability pressures) stimulate interest.
- Schools & districts find change difficult...
 - changing start times for secondary schools usually also affects elementary schools.
 - schools are highly bureaucratic structures.
 - change destabilizes our cognitive and interpersonal worlds.
 - personal belief systems often override facts.



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Conclusions

- Need to emphasize the use of all data when measuring the change, and not a single metric.
- Need frequent reminders that the sleep phase shift is based in human development and not in rebellious adolescent behavior.
- Keep focus on the child, not the system.



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