

Changing School Start Times: A Socioecological Perspective




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Adolescents need 8.5 to 9.25 hours of sleep per night

75% of adolescents in the United States
get 7 hours or less per night




Carskadon et al. (1980, 2002), McKnight-Eily et al. (2011), NSF (2006, 2014), Owens et al. (2014), Kann et al. (2018)

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What happens when kids/teens don't get enough sleep?

- Mood and affect changes
- Behavior problems
- Neurocognitive deficits
- Increased risk taking behaviors and accidents
- Weight gain



Beebe et al. (2010); Beebe et al. (2013); Gruber, et al. (2012); Hart et al. (2013); Owens et al. (2014); Sadeh et al. (2003)

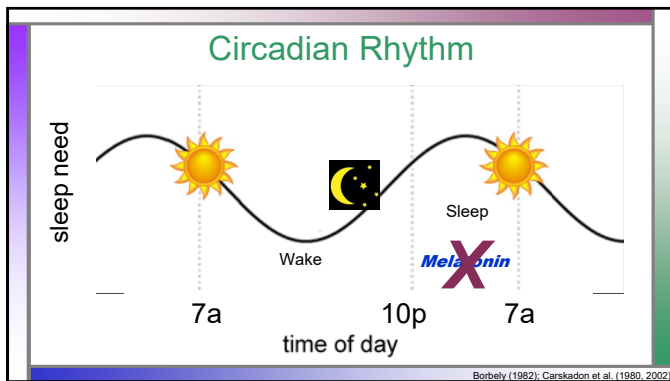
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What Keeps Kids/Teens From Sleeping?

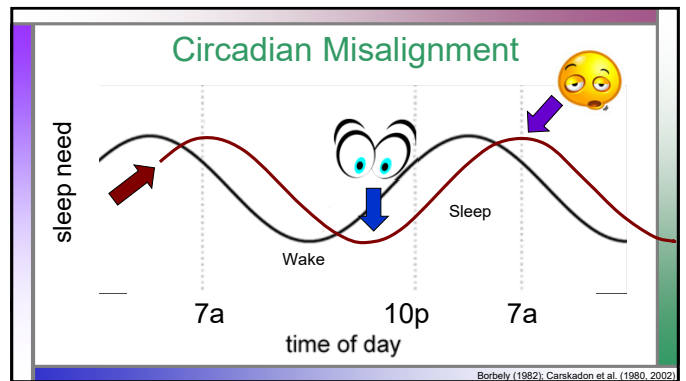


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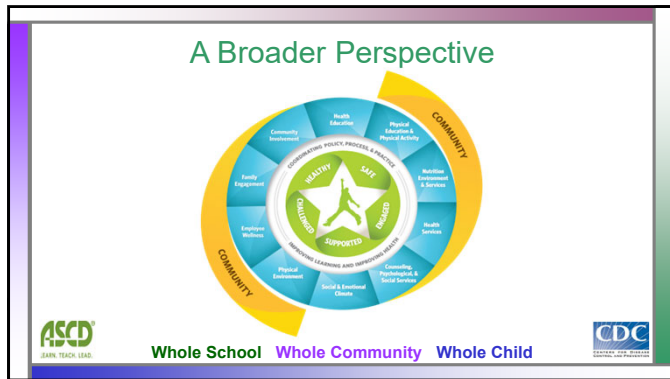
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Cherry Creek School District (CCSD)

- 4th largest district in Colorado
- Over 55,000 students
- 53% White, 20% Hispanic
- 29% Free/reduced lunch
- Southeast Denver metro area with a geographic footprint 108 square miles

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CCSD Change in Start Times

	2016 – 2017	2017 - 2018
Elementary	9:00 a.m. to 3:30 p.m.	8:00 a.m. to 2:45 p.m.
Middle	7:50-8:10 a.m. to 2:50-3:10 p.m.	8:50 a.m. to 3:45 p.m.
High	7:10 a.m. to 2:30-2:51 p.m.	8:20 a.m. to 3:30 p.m.

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Promoting Healthy Sleep Behaviors

- Important to maximize the positive impact
- Provide information to students and parents about healthy sleep habits: sleep needs, consistent bedtime routines, and limits to technology and caffeine

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CaSTLES: Changing Start Times – Longitudinal Effects Study

- Comprehensive evaluation of outcomes
- Three annual surveys of students (pre-change, post-change, follow-up)
- Student cohort with linked survey data year-over-year
- Community data from Colorado Department of Transportation

Meltzer, McNally, Plog, & Siegfried (2017) Sleep Health

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Individual Level Outcomes

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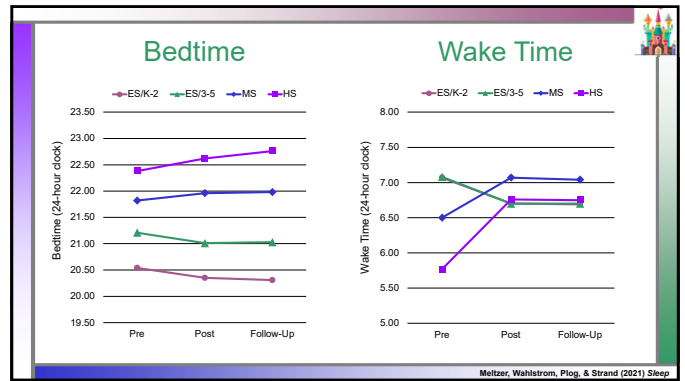
Student Survey Demographics

Surveys completed in spring 2017, 2018, and 2019

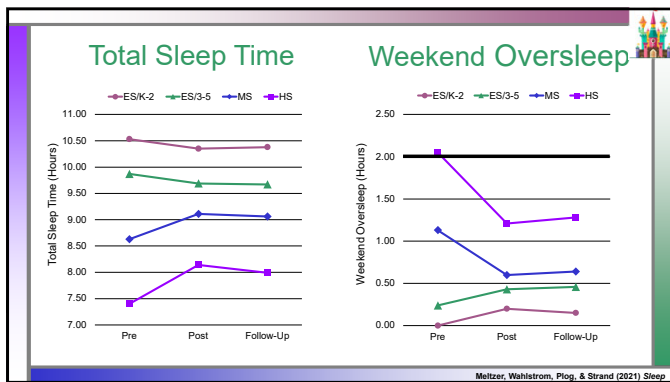
	Full Sample				Cohort			
	ES (K-2)*	ES (3-5)	MS (6-8)	HS (9-11/12)	ES (K-2)	ES (3-5)	MS	HS
Average N	3505	9712	9316	8880	2782	2700	2316	1471
% Female	53%	48%	50%	52%	48%	47%	50%	53%
% White	64%	55%	56%	55%	75%	66%	68%	65%
% FRL	17%	21%	19%	18%	18%	17%	14%	15%

Meltzer, Wahlstrom, Plog, & Strand (2021) Sleep; Meltzer, Plog, Strand, & Wahlstrom (2022) Sleep Medicine

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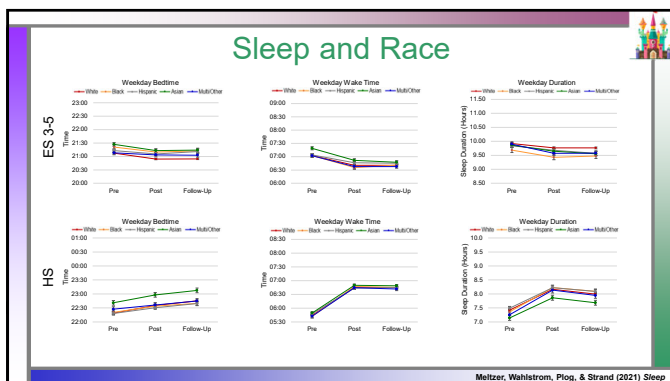
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Goal SH-3: Increase the proportion of students in grades 9 through 12 who get sufficient sleep (8 or more hours of sleep on an average school night)

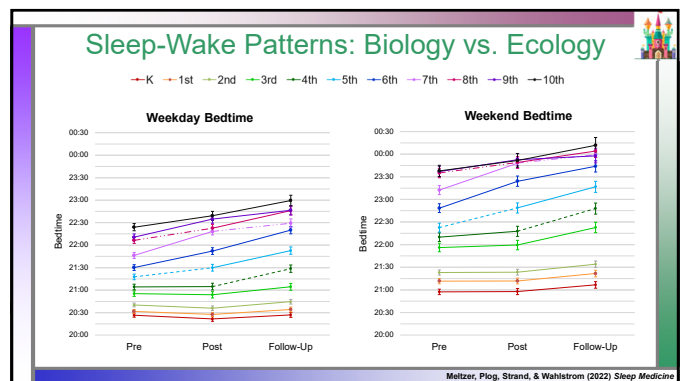
Sample	Pre	Post	Change	Follow-Up
Healthy People 2020	30.9%	33.1%	+2.2%	2030 target: 27.4%
CCSD (HS)	30.4%	62.7%	32.3%	57.6%
CCSD (MS ≥ 9 hrs)	40.5%	61.0%	+20.5%	59.6%
YRBS June 2018	30.9%	25.4%	-5.5%	

Meltzer, Wahlstrom, Plog, & Strand (2021) Sleep

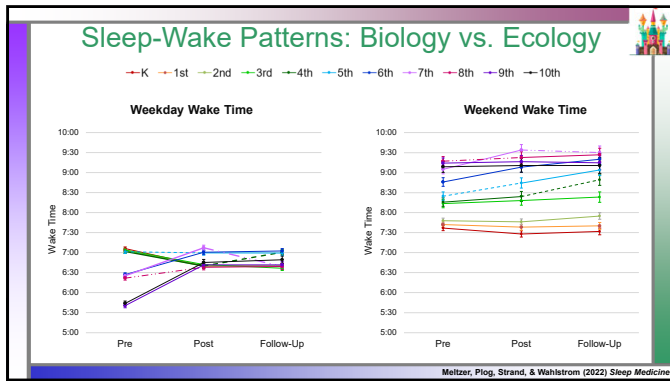
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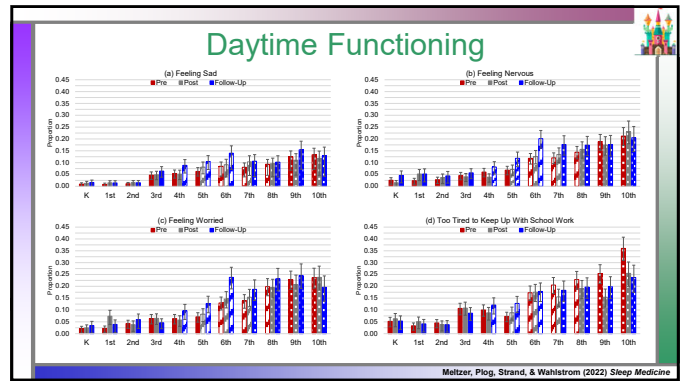
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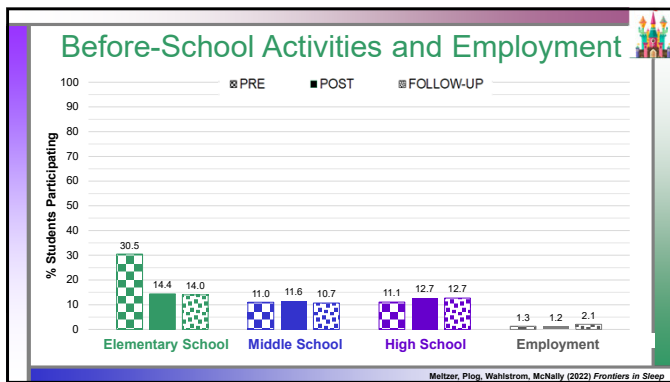
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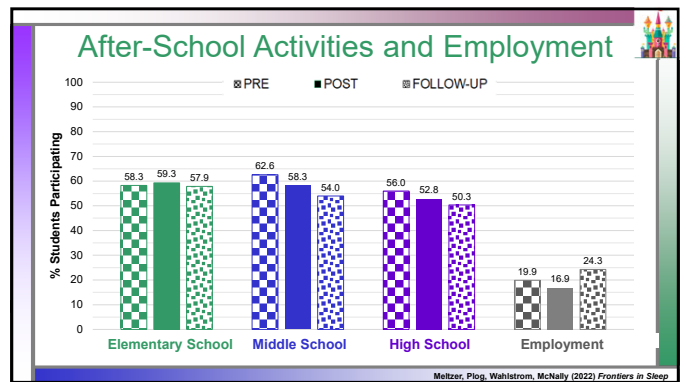
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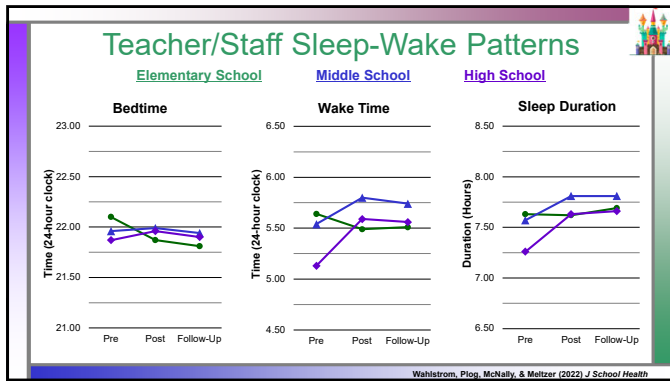
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Parent Sleep

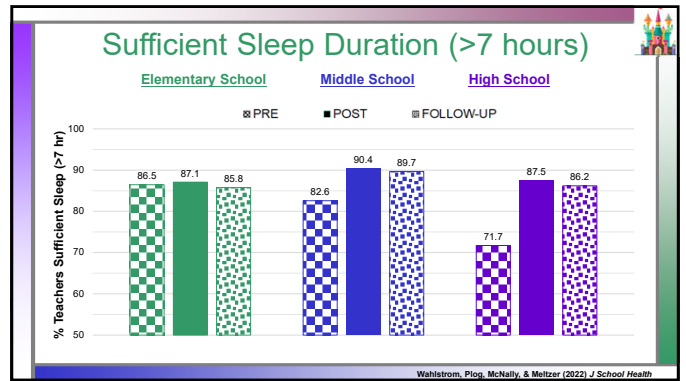
	ES Only	MS Only	HS Only	ES/MS	ES/HS	MS/HS	ES/MS/HS
Bedtime	-9 min						
Wake Time	-14 min	+9 min	+23 min			+25 min	
Sleep Duration		+12 min	+20 min			+20 min	
Sufficient Sleep		+4.6%	+10.2%	+6.1%	+7.1%	+12.5%	+9.6%
Good Sleep Quality		+9.3%	+9.3%		+4.8%	+9.0%	
Tired			-6.3%			-8.5%	

Meltzer, Wahlstrom, Plog, & McNally (2021) Sleep Health

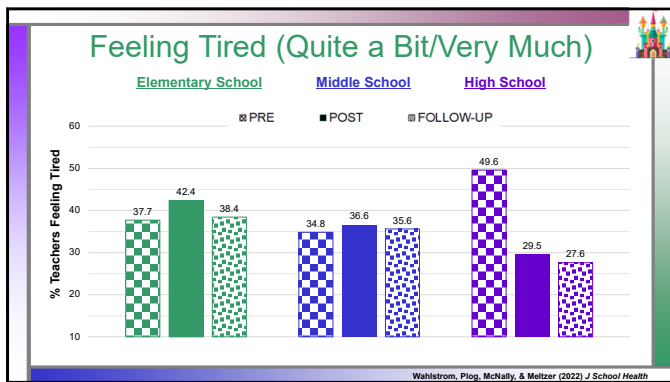
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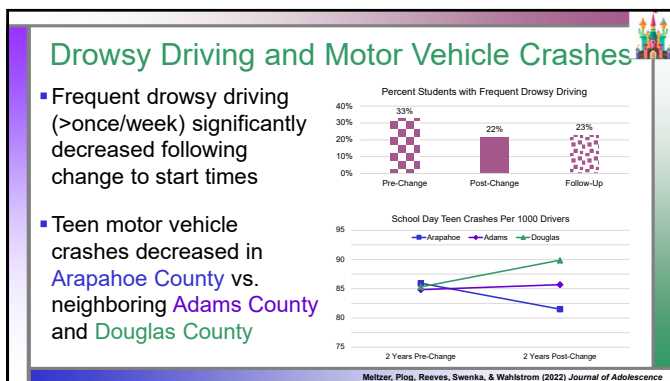
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Art is I, Science is We Claude Bernard



[CaSTLES](#)



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