



Associations between Virtual Schooling, Sleep, and Learning among Adolescents

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INTRODUCTION

- Research shows that approximately 65% of high school students in the United States are sleep-deprived.
- Adequate sleep is associated with improved learning and mental health.
- Previous studies have shown increases in sleep and decreases in social jet lag (differences in sleep patterns between school and free days) among adolescents during the COVID-19 pandemic.
- Gap
 - Previous research has not examined adolescent perceptions of learning during the pandemic.
 - Previous research has not compared bedtimes prior to virtual schooling and bedtimes during virtual schooling.
- Purpose
 - This study aimed to understand:
 - Students' perceptions of learning through virtual schooling in the COVID-19 pandemic.
 - Differences in hours of sleep and bedtimes before and during virtual schooling in the COVID-19 pandemic.

METHOD

- Setting
 - An online survey was conducted using Google Forms.
 - The survey took approximately 5-10 minutes to complete.
- Subjects
 - High school students between the age of 13-18.
 - The survey was sent to high schools students via email.
 - Participants must have experienced virtual schooling at any point in time during the COVID-19 pandemic.

Measures

Variables	Measures
Virtual Schooling	<ul style="list-style-type: none"> Asked whether the student experienced virtual schooling during the COVID-19 pandemic.
Perception of Learning	<ul style="list-style-type: none"> Assessed by asking students questions relating to 3 main topics of interest: their access to instructors, their productivity, and the quality of their work. Quality of work was assessed by asking adolescents questions relating to their performance as well as asking them whether or not their GPA's (Grade Point Averages) increased. Likert scales from strongly disagree to strongly agree were used in the survey.
Sleep	<ul style="list-style-type: none"> Asked students their bedtime as well as their wake time before and during the pandemic.

- Analyses
 - Descriptive statistics were calculated.
 - Hours of sleep before and during virtual schooling were compared using paired samples t-tests.

RESULTS

Demographic Information

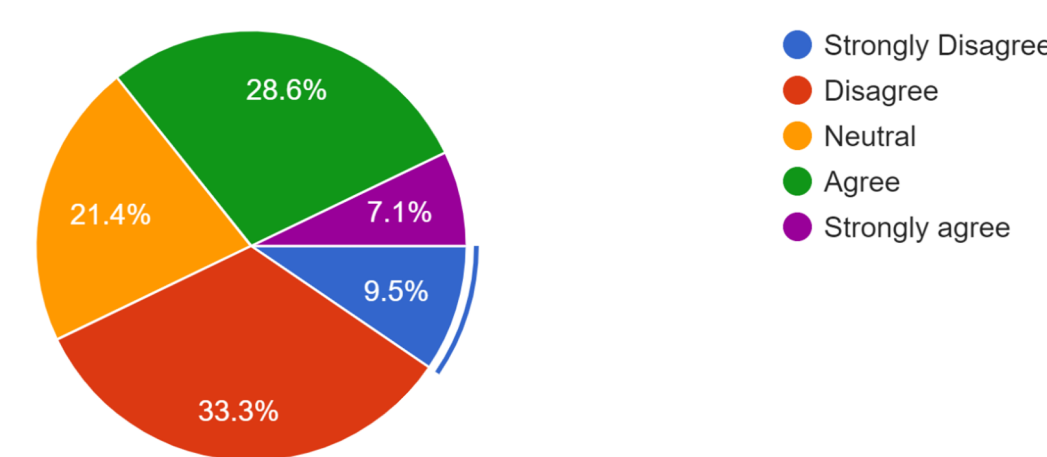
Gender	Number of Participants (n)	Percentage
Male	42	87.5%
Female	5	10.4%
Non-Binary	1	2.1%

- Total Number of Participants: 48
- Average age of Participant: 15.49 years

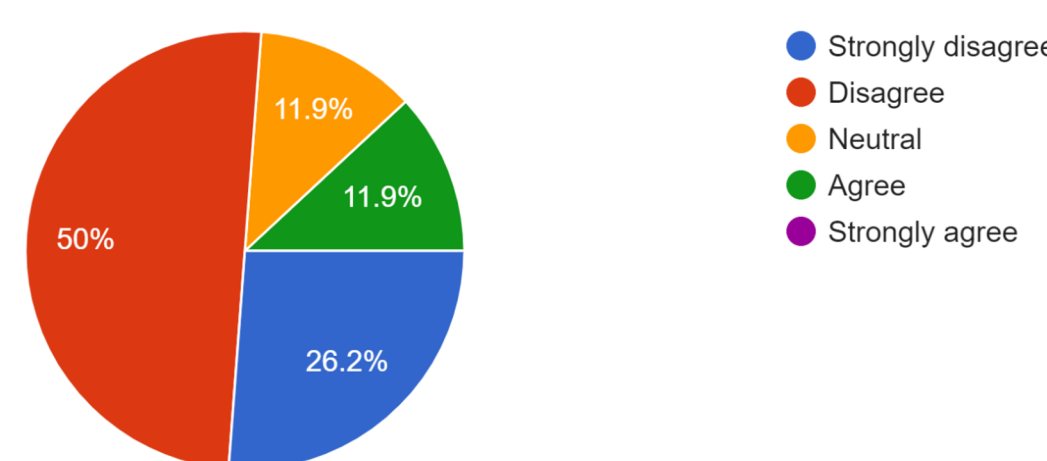
Asian	22
White/Caucasian	17
Black/ African-American	3
Other	3
Multi- Racial	2

Adolescents Perception of Learning During Virtual Schooling

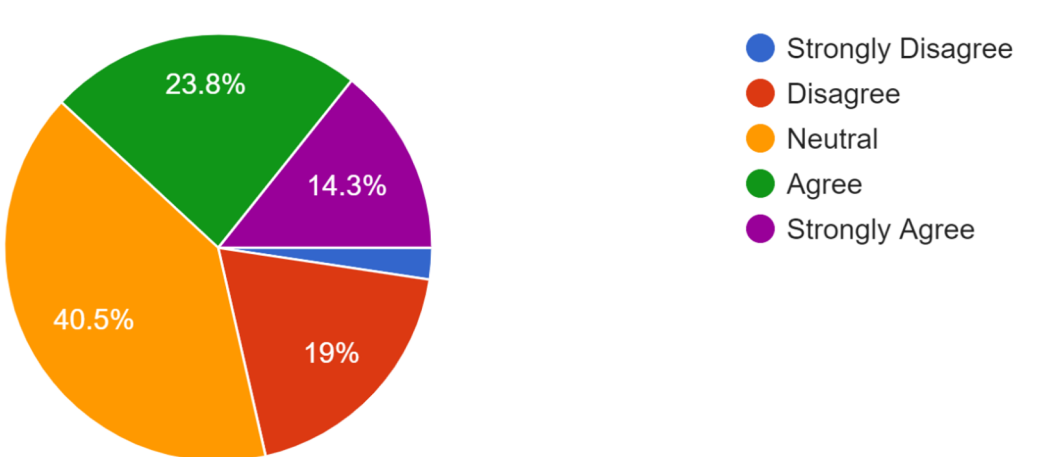
While schooling was virtual, I performed better in classwork and assignments than in person. 42 responses



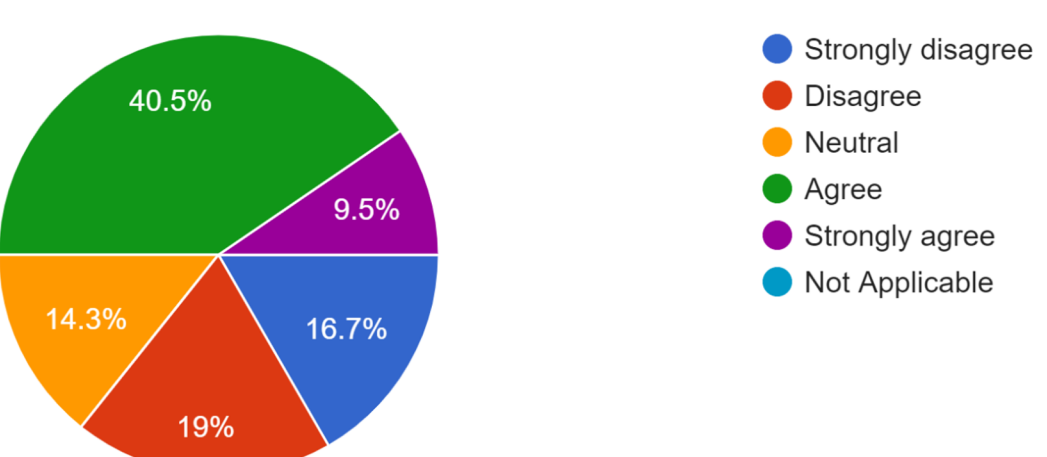
Virtual schooling allows me to actively engage with my teacher. 42 responses



My grade point average was higher during virtual schooling than in person schooling. 42 responses



As compared to in-person schooling, in virtual schooling I used more tutoring services or additional help outside of class to help understand concepts. 42 responses



Changes in Sleep among Adolescents During the COVID-19 Pandemic

Reported Bedtimes by Participants

	Prior to Virtual Schooling	During Virtual Schooling
Range 1- Bedtime between the hours of 8:00 P.M.- 10:59 P.M.	16	5
Range 2- Bedtime between the hours of 11:00 P.M.- 1:59 A.M.	24	32
Range 3- Bedtime after 2:00 A.M.	0	3

Average Amount of Sleep Received by Participants

Time period	Mean hours of sleep before and during virtual schooling	Standard Deviation
Before virtual schooling during COVID-19	7.60	1.109
During COVID-19 virtual schooling	8.04	1.292

- The paired samples t-test suggested greater average hours of sleep was reported during virtual learning than before ($t = -2.172, p = .036$).

CONCLUSIONS

- Main Findings
 - Consistent with previous studies, our study suggested increases in hours of sleep during virtual schooling.
 - The increase in sleep could be because of a later wake time due to lack of commute time during virtual schooling.
 - Adolescents' delayed sleep times during virtual schooling could be a result of compensating for a lack of social interaction otherwise experienced prior to virtual schooling.
- Limitations
 - "Most participants identified as Asian males, and few reported Hispanic ethnicity. Generalizability to other groups is unclear.
 - Small sample size
- Implications
 - Findings suggest additional resources may be needed for adolescents attending virtual schooling.
 - Additional research could be conducted regarding adolescents' delayed sleep times during virtual schooling and its effects on their circadian rhythms.

ACKNOWLEDGEMENTS

Thank You

- I would like to thank Ananya Krishna, Nimai Belur, and Owen Tsao for their critical feedback without which this project would be incomplete.
- I would like to thank the SMAHRT team for its overall goal to bring out the best in all scholars.
- Thank you to all students who participated in our survey. Without your help, this project would not be much of a project at all.
- I am extremely grateful that I got the opportunity to be surrounded by my fellow scholars as well as the veteran researchers from UW Madison who made all of this possible.

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