

Influence of lecture start times on the sleep behaviour of university students

Introduction

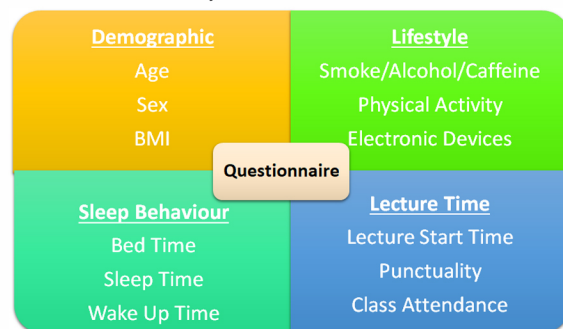
- A lack of sleep results in a lack of concentration, slow reaction times, health problems and poor academic performance (Orzel-Gryglewska, 2010; Lewin et al., 2017)
- It is recommended that teenagers (14-17) sleep for 8-10 hours, and young adults (18-25) sleep for 7-8 hours per night (Hirshkowitz, 2015)
- Studies show that early school start times result in sleep deprivation with 53% of adolescents receiving insufficient sleep durations when attending school (Gradisar, Gardner & Dohnt, 2011)
- The consequences of sleep deprivation make it a logical assumption that later school start times should be implemented
- School start time is fixed (8:30am) in UK middle schools, therefore the following study was conducted with university students

Study aim:

- To investigate the effect of lecture start time on students' sleep outcomes

Method

- Cross sectional design
- Using 301 University of Lincoln students
- Questionnaires were handed to students after 4pm if they had had a lecture that same day to ensure a wide variety of lecture start times were used in the analysis



Statistical Analysis

- Questionnaire data was entered into EpiData (version 3.1)
- 3 sleep outcomes (DV's) were generated based on the questionnaire data: bed time, sleep time, and duration
- Parametric statistical tests (t-test, Pearson's Correlation, One-Way ANOVA) were conducted to examine the associations between covariates and the 3 DV sleep outcomes
- Multiple linear regressions were conducted to assess the relationship between the 3 DV's (independently) and lecture start time, adjusting for age, sex, smoking, alcohol consumption, caffeine consumption and physical activity

Sensitivity Analysis

- The regression analysis was stratified for morning (before noon) and afternoon classes

References:

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Results

Table 1. Descriptives of variables

Variable	n	N	Percent	Mean	SD	Median	Min	Max
Sex		104	300	34.6				
Male	196		65.1					
Female								
Age	301	301	100.0	20.6	1.9		17.7	36.1
BMI	284	284	94.4	23.6	4.7	22.6	16.1	49.9
Smoke yesterday								
Yes	38	301	12.6					
No	263		87.4					
Drink alcohol yesterday								
Yes	81	301	26.9					
No	220		73.1					
Drink caffeine yesterday								
Yes	206	301	68.4					
No	95		31.6					
Physical activity MET score	301	301	100	2105.8	2800.0	942.0	.0	19278.0
Number of devices used at night								
0	86	301	28.6					
1	82		27.2					
2	100		33.2					
3 (s)	33		10.9					
Sleep time	301	301	100.0	25.1	1.7	25.0	20.8	30.8
Bed time	300	301	99.7	23.8	1.8	23.5	19.0	29.8
Latency	300	301	99.7	1.4	1.1	1.0	0.0	6.5
Duration	299	301	99.3	7.7	1.7	7.9	2.0	12.5
Wake time	299	301	99.3	8.8	1.5	8.5	4.0	14.0
Get up time	288	301	95.7	9.3	1.7	9.0	4.0	15.7
Class time	301	301	100.0	11.0	2.0	11.0	8.0	17.0

Table 2. Multiple linear regression

Covariates	Dependent Variables								
	Bed Time			Sleep Time			Duration		
	β	95% CI	p	β	95% CI	p	β	95% CI	p
Class time	0.10	(-0.00; 0.20)	.057	0.13	(0.03; 0.22)	.007	0.17	(0.08; 0.27)	.000
Age	0.01	(-0.10; 0.12)	.802	-0.01	(-0.10; 0.09)	.923	-0.01	(-0.20; 0.00)	.054
Sex	-0.33	(-0.77; 0.10)	.131	-0.40	(-0.79; -0.01)	.045	-0.03	(-0.43; 0.37)	.883
Smoking ¹	0.02	(-0.61; 0.65)	.951	-0.20	(-0.75; 0.37)	.505	0.19	(-0.39; 0.78)	.521
Alcohol consumption ¹	0.66	(0.19; 1.12)	.006	0.51	(0.09; 0.92)	.018	-0.03	(-0.47; 0.40)	.886
Caffeine consumption ¹	0.62	(0.18; 1.06)	.006	0.69	(0.30; 1.09)	.001	-0.73	(-1.14; -0.31)	.001
Physical activity ²	9.35	(0.00; 0.00)	.802	3.32	(0.00; 0.00)	.521	-2.44	(0.00; 0.00)	.482

¹Activities that occurred the day prior to the class
²Activities that occurred the week prior to the class

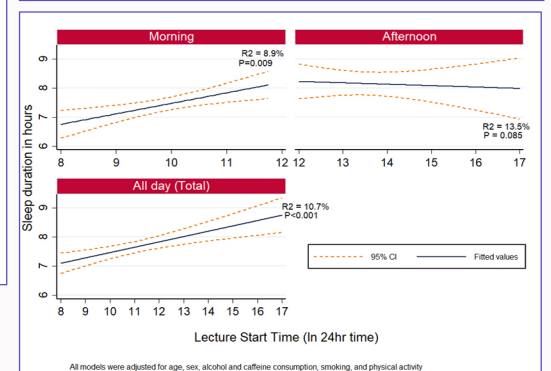


Figure 1. Student sleep duration for morning and afternoon class

- From Table 2, we found that caffeine consumption was associated with later bed time, later sleep time and shorter sleep duration
- Also, alcohol consumption was associated with a later bed time and sleep time
- Most importantly, it was found that a later class start time was associated with a later sleep time and a longer sleep duration. The relationship between later class time and bed time is borderline significant, therefore the results of this association should be taken cautiously**
- These results support previous study findings that later school start times increase student sleep duration (Vedaa et al., 2012)
- However in light of the sensitivity analysis, the major findings of the study have to be revised, as when the regression analysis was stratified by morning and afternoon lectures:
 - The increase in sleep duration (by 19.8 minutes) for every hour delay in lecture start time persisted for the morning group (Figure 1)
 - However, this was not the case for the afternoon group, whereby class time did not affect student sleep duration

Conclusion

- A later school start time (in the morning) is not associated with students' sleep time and latency but it is associated with a longer sleep duration
- Based on these findings, it seems logical that schools should implement later start times to ensure that students receive optimal sleep duration in the preceding night

Public health implication

- Later school start times will likely result in no change in sleep time but longer sleep duration among students. Sufficient sleep duration has been found to improve the physical and mental health of students (Chan, Poon, Leung, Lau & Lau, 2018)

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