



Social jetlag and its association with life style variables and academic achievement among Swedish adolescents

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Objectives

1. Associations between social jetlag and stress related life style variables
2. The role of stress symptoms, gender, sleep duration and social jetlag in predicting subsequent academic achievement among adolescents



Background

Social jetlag (indicated by a high discrepancy in sleep timing between work and free days) has been associated with psychological distress and mood disorders among adults. However, social jetlag might be even more relevant in adolescents because they have a higher prevalence of being an evening chronotype and it is further known that late chronotypes are especially prone to social jetlag.

Methods

In total, 961 sixteen year old adolescents answered questions about their average bed and rise times during the week and during their free days. The chronotype was assessed using the mid-sleep on free days, which is the midpoint between sleep onset and rise time after correction by the sleep deprivation during the school week (Wittmann, Dinich, Merrow, & Roenneberg, 2006). The degree of social jetlag was determined by the absolute difference between mid-sleep on school days and mid-sleep on free days. Moreover, participants answered a questionnaire about life style variables and stress symptoms. In a subgroup of 333 adolescents, the final grades at the end of high school were available and were used as objective indicators for academic achievement.

Results

The mean chronotype, defined as the sleep-corrected mid-sleep on free days, was 5.20 a.m. local time (SD= 1h 12min). The mean social jetlag was 3h 10min (SD=18 min). As expected, the chronotype correlated positively with social jetlag ($r=0.785$; $p<0.001$).

Social jetlag was significantly correlated with more perceived stress symptoms ($r=0.085$; $p=0.010$) and worse sleep quality ($r=-0.069$; $p=0.032$), skipping breakfast ($r=-0.157$; $p<0.001$) more often, smoking more frequently ($r=-0.205$; $p<0.001$) and increased alcohol consumption ($r=-0.211$; $p<0.001$).

Mixed effect regression model fitting (with a random coefficient for school) was conducted to investigate the contribution of stress symptoms, gender, sleep duration and social jetlag to academic achievement. Covariates were consecutively added to the model; nested model were compared by means of Likelihood Ratio tests (Table 1).

Table 1: Overview of the fitted models and statistical testing for final grades and the results from likelihood ratio testing.

Model	Model estimates LL (df)	Likelihood ratio testing Tested against	p
Baseline	-754.7 (3)		
Stress	-750.2 (4)	Baseline	0.0028
Stress & gender	-744.6 (5)	Stress	0.0008
Stress x gender	-744.5 (6)	Stress & gender	0.6523
Sleep duration sw	-744.5 (6)	Stress & gender	0.6277
Sleep duration we	-744.4 (6)	Stress & gender	0.4860
Sleep duration sw & we	-744.2 (7)	Stress & gender	0.6900
Social jetlag	-741.7 (6)	Stress & gender	0.0153
Social jetlag x gender	-741.7 (7)	Social jetlag	0.9678
Social jetlag & sleep duration (sw, we)	-741.5 (8)	Social jetlag	0.8075

sw= school week; we= weekend; The best fitted model shown in bold type; The criterion for the best-fitted model was to be significantly better than the less restricted model ($p<0.05$) (Rabe-Hesketh & Skrondal, 2008).

Table 2: Model prediction final grades (best fitted model: Social jetlag).

	Coefficient	Standard error	z	p
Stress symptoms	-0.476	0.130	-3.67	<0.001
Male	-0.859	0.255	-3.37	0.001
Social jetlag	-0.302	0.124	-2.44	0.015
Constant	19.573	0.631	31.00	<0.001
SD of random effects				
School	0.291	0.204		
Residual	2.235	0.087		

Discussion

According to our expectations, late chronotypes were more prone to social jetlag. Social jetlag was associated with unhealthy life style habits, stress symptoms and the perception of poor sleep quality.

Social jetlag, stress symptoms and gender were significant predictors of academic achievement. Including sleep duration in the regression model did not significantly improve the model fit indicating that maybe inadequate sleep timing might be more important for academic performance than sufficient sleep.

Conclusion

Social jetlag was a significant predictor of academic achievement and thus might have a negative influence on young people's future career prospects. The present findings emphasize the importance of reducing social jetlag in young age groups.

CONTACT