**Sleep Duration and Quality, Sleepiness, and Cognitive Performance among Israeli Adolescents: A Field Study**

**Tzischinsky Orna**

**Introduction**

Cognitive performance—memory, learning, attention and other abilities and functions—depends on the amount and quality of sleep, especially during adolescence. Research analyzing self-report sleep data has consistently presented associations between sleepiness and a decline in cognitive ability. This field study extends previous findings by examining objective and subjective sleep patterns, sleepiness, and cognitive performance among Israeli adolescents aged 12–19.

**Materials and Methods**

The study subjects were 59 adolescents (out of 60; 32 female, 27 male) in seventh to twelfth grade in middle and high schools in urban and rural middle-class communities in northern Israel (mean age 16.29±1.86 years). Sleep duration and quality were objectively measured using actigraphs (Actiwatch 2, Respironics, Philips), for seven consecutive days, including both school days and weekends. To measure sleepiness, subjects completed the Karolinska Sleepiness Scale(KSS)**,** a9-point Likert scale self-reporting their level of drowsiness, ranging from 1 (“Very alert”) to 9 “Very sleepy–fighting sleep.” To assess cognitive performance, participants completed a visual psychomotor vigilance task (PVT) and a Digit Symbol Substitution Test (DSST).

**Procedure**: The subjects were collected using the snowball method.

Participants wore the Actiwatch for seven consecutive days, thereby including both school days and weekends. They were instructed to maintain a regular sleep pattern on both school and non-school days. Subjective sleepiness (KSS) and cognitive performance were measured three times daily (morning, noon, and nighttime) on two school days and one weekend day. The ethics committee at Emek Yezreel College (no: 2017-5 EMEK  YVC) approved this study, and parents of the participants gave informed consent.

.

**Results**

**Duration of Sleep:** The duration and quality of sleep adolescents differed significantly between school and non-school days. On the weekends, subjects fell asleep later (25.1±1.76 vs. 25.1±1.76), woke up later (9.20±1.76 vs. 7.15±0.82), and had significantly longer sleep latency (33.58±39.07 vs. 18.8±15.68) and longer duration of sleep (8.1±1.53 vs. 7.36±0.92), ni significant differences in sleep efficiency.

**Sleepiness:** The KSS scale yielded significantly higher assessments of sleepiness on school day mornings than on the weekends (5.84±1.71 vs. 4.39±1.91).

**Psychomotor Vigilance Test (PVT):** Mixed model analysis found significantly more errors (6.0 vs. 4.4; F(1, 278)=6.47, *p*<.01), higher mean reciprocal RT fastest (185.9 vs. 179.9; F(1, 278)=4.64, *p*<.05), more lapses system variability min (4.8 vs. 3.4; F(1, 278)=6.29, p<.01), more lapses system variability max (6.8 vs. 5.3; F(1, 278)=4.52, p<.05) on school days than on the weekend. The subjects offered significantly fewer responses to the DSST test in the morning than at noon or nighttime (F(2, 277)=3.54, *p*<0.05).

**Conclusion**

Actigraphic recording and subjective sleep reports support a shift among adolescents in sleep-wake pattern toward the evening and a late rise time on weekdays and even later on the weekends. About 24% of the participants were sleep deprived (slept less than 7 hours a night), 52% slept between 7–8 hours, and 24% slept longer than 8 hours). Sleep deprivation led to poor performance on the PVT and DSST.