SLEEP QUALITY: TEMPORAL EFFECTS ON STUDENT'S ALERTNESS, ACADEMIC PERFORMANCE, BURNOUT, AND SATISFICTION WITH INSTITUTION AND LIFE

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Abstract

Sleep deprivation and efficiency may have negative such as cardio-vascular problems and diabetes, along with concentration problems, burnout syndrome, and decline in life satisfaction. This paper examines students' sleeping quality and their sleeping habits and addresses to the question of whether "sleeping quality has any effect on students' daily alertness, perceived academic performance, burnout, and satisfaction with life and institutional services". A survey instrument based on previously developed and tested scales was constructed and applied with conveniently selected university students. It was found that subjective academic performance appears to be independent from sleep quality. However, oneway anova tests revealed significant relationships among sleep quality and students' feeling of alertness, their level of burnout and satisfaction with life. Overall, the findings of the study indicate that evaluations about institutional services may differ as a result of sleep quality and this has may have major implications on research taking respondents opinions as the basic input for statistical analysis to develop managerial suggestions.

Key Words: *Sleep deprivation, sleep quality, academic performance, life satisfaction, burnout*

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INTRODUCTION

"To be satisfied with life" and "to have suitable opportunities for spiritual, intellectual and cultural development" are important goals in life (Güler and Emeç, 2006). The concept of "satisfaction with life", which is defined as "how much the individual enjoys his/her present life", has vital consequences. Happy people are less suicidal, and the rates of divorce, separation from work, displacement, and using drugs are relatively low (Luhmann et al., 2012; Zou et al., 2013). Happy people are healthier, more productive and more social (Sirgy, 2012). Individuals who are satisfied with their life are also reported to earn more income than those who are not (Neve and Oswald, 2012). Moreover, studies show that governments should concern with life satisfaction of their citizens since happy people are less likely to commit crimes or to participate in illegal actions (Goudie et al., 2012).

An increase in life satisfaction will improve a person's physiological, social and psychological well-being (Luhmann et al., 2012). Attempt to understand what affects life satisfaction is thus critical. Among other things, sleep has been reported as an important instrument for life satisfaction. That is, maximal life satisfaction is associated with about seven to eight hour of sleep on a typical day (Piper, 2015; Piper 2014, a-b), while both shorter and longer sleep predict morbidity and mortality (Ferrie et al., 2007; Hublin et al., 2007). Sleep is not only vital for major components of life satisfaction (e.g., health and well-being) (Pilcher & Ott, 1998), but also critical for motor performance, memory consolidation, learning, decision making, and critical thinking (Cohrane, 2001).

Sleep is necessary for the optimal operation of key cognitive functions related to academic and perhaps social success in higher education (Aytaç et al. 2007; Biss & Hasker, 2012; Gilbert & Weaver, 2010). Authorities should therefore bother with sleep efficiency and quality of students. Young adults, with all the basic characteristics of late adolescence begin a different life cycle when they first experience higher education away from their usual home environment (Pilcher et al., 1997; Pilcher, & Walters, 1997). Changes in educational approaches, spatial differences, lifestyle etc., are likely to influence biological cycles, as well as, the physiological and psychological well-being of young adults. Due to increased educational liabilities, changes in social life, etc., a serious level of sleeping problems is likely to be experienced by university students. They suffer at least twice as many sleep difficulties as the general population (Brown et al., 2001). Despite its importance, students' sleep efficiency has been rarely studied (Chiang, 2013) and interestingly the focus of these rare studies was mainly on the relationship between sleep and academic performance only (see Curcio, Ferrara, & Gennaro's 2006). Students whose sleep is more quality and longer tend to have a higher grade point average and higher overall functioning. While the effects of sleep quality on academic success in young adults have been examined in previous studies (Chiang, 2013; Kelly, Kelly, and Clanton, 2001), these studies have not adequately addressed the likely relationships between sleep quality and satisfaction of students with their college services in particular and their life in general.

Training individuals not only for vocational skills and for undertaking research independently but also for being happy should be among the main missions of university authorities. University administrations' interest in learning students' sleeping efficiency and accordingly teaching preventive techniques to improve their sleep efficiency may have a significant impact on students' well-being and quality of life, especially during stressful times like mid-term and/or final exams. This study therefore explores temporal relationships between sleep quality and daytime sleepiness, academic performance, burnout, college and life satisfaction of young adults. In the first section of the three-parted article, studies on sleep quality effects, burnout and life satisfaction concepts were screened first. The second part explains the research methodology (the development of the questionnaire, the survey administration and the data analysis). In the last section, findings about sleep quality were discussed in the light of previous studies and suggestions for university administrations were provided.

Literature Review

The effects of sleep duration and quality on human chemistry and health, especially the daily life, body, mental and spiritual health (Alzeimer etc.), have long been studied in different disciplines for a long time (medicine, psychology, tourism etc.) (See Birben & Karadeniz, 2010; Boz, 2015; Brown et al., 2001; Engin, 1999; Günayd?n, 2014; Güler & Emeç, 2006; Dinges et al., 1994; Ferrie et al., 2007; Karagozo?lu &Bingöl, 2008; Koç & Boz, 2014; Lowry et al., 2010; Luhmann et al., 2012; Polat, 2008; Martelluci & Fagiolini, 2014; Rasekhi et al., 2016; Shaver et al., 2012; Üstün & Yücel, 2011; Şenol et al., 2012; Yumusak & Boz, 2013). Sleep is the "temporary, partial, periodic disappearance of the communication of the organism's environment in a reversible manner with different vigorous stimuli" (Engin, 1999). A regular night's sleep, one of the basic needs of a person, is considered as one of the most important factors of health and quality of life and satisfaction at all ages (Günayd?n, 2014). Attention/memory disorders, emotional variability, even hallucinations and delusions can be seen when the sleep quality, defined as "feeling self-fit, form and ready for a new day after the individual wakes up," is qualitatively and quantitatively poor (Hublin et al., 2007). As a result of sleep problems, working efficiency decreases (Üstün and Yücel, 2001, Birben and Karadeniz, 2010, Karagözo?lu and

Bingöl, 2008). Wakefulness and sleep rhythm are associated with the "oxidant-antioxidant system". It is claimed that there is an increase in free radicals in wakefulness, and that they are cleared during sleep. Sleep deprivation has a significant relationship with behavioral problems and personality disorders (Semiz, Algül, Başo?lu, Ateş, Ebrinç, Güneş, and Günay, 2008). Some sleep disorders, such as insomnia were more common in people with antisocial personality characteristics, and were associated with increased aggression behavior.

The attention, memory and problem-solving skills, job performance and academic performance of a person are influenced by sleep quality (Curcio, Ferrara, & Gennaro, 2006; Lowry et al., 2010). The decline of the sleeping time, which has decreased by an average of 2 hours since the 19th century, to 7 hours (Ferrie et al., 2007; National Sleep Foundation, 2005), may be a cause of the increasingly depressive judicial cases, interpersonal problems, and social explosions. The average American sleeps less than 7 hours. 37% of adults state that they are so tired during the day, it interferes with daily activities. 75% of adults experience at least one symptom of a sleep disorder a few nights a week or more and 55% of adults nap at least once during the week. Highly fatigued workers are 70% more likely to be involved in accidents. And workers with chronic insomnia have higher rates of accidents.

In some studies, it was reported that anxiety, depression, somatic complaints, and paranoia, which are temporarily occurring in healthy individuals after sleep deprivation, are due to a decrease in cerebral flow in the prefrontal cortex (Kahn-Greene et al., 2007; Kahn-Greene et al., 2006). The importance of chronic sleep deprivation has been pointed out in the emergence of psychopathology. Anxiety and somatization were found to be more frequent in sleep deprived individuals than other psychiatric disorders, including depression. It was also found that the level of anxiety was higher in the less sleeping individuals (Selvi et al., 2010). Sleep deprivation imbalances chemicals associated with the immune system and this imbalance affects behavioral (fatigue, drowsiness, focus) and physiological reactions (Daujan & Moehlehoff, 2011; Dinges et al., 1994; Dinges et al. 1995). It is known that a poorly balanced chemistry at the end of sleep deprivation causes obesity, anemia, high blood pressure, heart diseases and deaths (Simpson and Dinges, 2007). Low work performance and occupational accidents are more common in employees who suffer from sleep deprivation (Rosekind et al., 1995).

Student's Burnout

Research revelaed that students' with sleep loss performed low on attention, memory, and problem-solving tasks and academic performance. Burnout has been increasingly noted as a common problem among students (Schaufeli, Salanova, Gonzales-Roma and Bakker, 2002, Schaufeli and Salanova, 2007, Yang, 2004). Burnout affects the academic performance of the student and it leads to absenteeism, low motivation to complete schoolwork and school dropout (Yang, 2004 Schaufeli, Martínez, Marqués-Pinto, Salanova and Bakker, 2002;). The burnout experienced by students can be seen as emotional discomfort, a lack of interest in schoolwork, and inadequate self-perception (Schaufeli, Martínez, Marqués-Pinto, Salanova and Bakker, 2002).

Life satisfaction

The cumulative effects of sleep loss and sleep disorders, associated with a wide range of health consequences including an increased risk of hypertension, diabetes, obesity, depression, represent an under-recognized predictor of life satisfaction. It is surprising that the relationship between sleep quality and life satisfaction has not been adequately investigated, since approximately 37% of the life span of adults, about 32 years, is spent on sleep (Tufnell, 2014). Another interesting point (Piper, 2015) is that although sleep produces economic (sleep-assisted drug sector has reached billions of dollars) and social effects, only health effects have been

frequently examined. In rare studies on young adults, it is reported that sleep quality, impairment or duration has effects on life satisfaction and that higher quality sleep leads to a higher life satisfaction (Kelly, 2004; Kelly, 2000). It has been argued that the younger adults who are less sleeping perform low on academic performance, their psychological health is adversely affected and this has a negative impact on life satisfaction (Kelly et al., 2001).

MATERIAL AND METHOD

This study examined the relationships among students' sleeping quality and sleeping habits, sleepiness, student burnout, and satisfaction with life and institutional services. The questionnaire included previously developed and tested scales. The Pittsburg Sleep Quality scale was used to measure participants' sleeping habits; the Stanford Sleepiness Scale was included to measure how active, energetic, or sleepy the student feels; a six-item Student Satisfaction Scale was used to gauge participants' level of satisfaction in college; the Maslach's Student Burnout Scale was used to measure their burnout level, and the short version of the Life Satisfaction Scale was sued to measure the extent to which they enjoy their life.

The Pittsburg Sleeping Scale probed participants' sleeping habits, sleep quality, duration, depth, adequacy, etc. during the week and the end of sleeping problems (sleep shift, nighttime awakening, time needed for a good sleep, average sleeping period). Sleep-length estimates were self-reported as a continuous variable by using the method of Kumar & Vaidya (1984), whereby participants were asked to write the amount of time, hours and minutes, they habitually sleep, on average, in a day. A week-long administration of the study was carried out in November 2016 with the participation of students from a university located in Istanbul. The central cafeteria was chosen for the administration. A daily quota of 50 was determined and randomly selected participants entering the cafeteria at different times of the day were given questionnaires to fill-in.

Self-judgments on academic performance, burnout levels and subjective well-being were questioned through already developed and tested scales. The scales were then subjected to a reliability analysis. Then, scores of three groups with good, poor or very poor sleep on burnout, sleep habits, university satisfaction and life satisfaction were compared. One-way ANOVA was used to assess the differences among three groups of sleep quality (good, poor, very poor) measured in the study

RESULTS AND DISCUSSIONS

A total of 250 questionnaires were distributed, those with missing information were eliminated and the remaining fully filled-in 203 questionnaires were used for the analysis. 40% of the participants were male. 21, 22 and 23 years of age constituted the most intensive age group (58.4%). Most of the participants were young adults, enrolled in the 4^{th} grade (34.4%), followed by the 3^{rd} and the 2^{nd} year students respectively (26% and 20%). A fairly low proportion of participants reported that their academic achievement was below the average (0.08), with a large majority reporting an average performance (0.66), and 25% perceived their performance above the average. Participants' morning wake-up times on weekdays varied, with 7.00 am in the morning being the most preferred time (28%). 1.00 am after midnight was the most preferred sleeping time on the weekdays (30.6%). 25% of the participants reported that the most preferred time to get-up during weekends was 10.00 am in the morning. According to the findings, one out of every three young adults appeared to have a sleeping problem. Among the sleeping problem sufferers (29%), various reasons were reported, including stress, noise, physical fatigue, worries, loads of lessons and so on. A large majority (65%) of the participants

stated that their weekend and weekday sleeping habits were different. The percentage of participants who experienced problems of remaining awake during day time was 0.36. 18% of the participants who reported they had a sleeping problem in the last week said that they were taking sleeping pills, and 26% of the sleep deprivation sufferers felt that they had no energy to finish work during the last week.

Sleeping habits

Differences and indifferences were found in the sleep habits of participants who subjectively reported their sleep quality as "very poor", "poor" or "good". No significant differences were found among the sleeping quality groups and "the extent to which the participants had any problem staying awake while engaging in social activity" (F= .595 sig: .071) and their frequency in taking medicine to help their sleep (F= 1.058 sig: .349). However there was a significant difference between sleep quality groups and their scores on keeping up enough enthusiasm to get things done. According to the findings those who reported to have poor sleep quality tend to report significantly lower scores on keeping up enough enthusiasm for getting things done (F: 5.965 sig: .003, Mean for very poor, poor and good sleep quality groups: 2.65, 3.21, and 3.54 respectively). However; there were statistically significant differences in three items: these were "feeling drowsiness in the first half hour after getting up" ((F= 3.24, 0.41, ; "waking in the middle of the night" and "getting up at night for a toilet need". Further analysis revealed that respondents with different sleep quality patterns tend to have some different sleeping habits. For example three sleeping quality groups differed significantly on items including "cannot get to sleep within 30 minutes (F: 7.51, sig: .001)", "wake up in the middle of the night (F: 11.951, sig: .000)" and have to get up to use the bathroom (F: 3.071, sig: .04)". The group, which reported to have a very poor sleep quality over the last week appeared to experience problems in going into sleep, they frequently woke up in middle of the night, and they visited toilet more frequently. It is clear that individuals with poor sleep quality tend to have trouble in sleeping comfortably and sleeping uninterruptedly. As a result of these problems, the stress hormone is likely to be released and this keeps them wakeful. The negative correlation between the release of stress hormone and sleep quality, has been often emphasized by previous studies. Shaver, Johnston, Lentz, and Landis (2002) and Akerstedt, Fredlund, Gillberg, and Jansson (2002) found a significant negative correlation between level of stress and sleep efficiency. As this finding suggests, stress increases when sleep efficiency goes down (Raab & Moehlehof, 2011).

Satisfaction with the Institution

There are statistically significant differences in the students' judgments about satisfaction with their university. The differences among the three groups were significant at the level of 0.05. In line with the previously published studies, this research shows that sleep quality would influence service evaluations (Hornik et al., 2010). The group with poor sleep quality were less agree with the item stating that "I am satisfied with my decision to read this university (F: 5.49 sig: .005)". Those who perceive their sleep quality as good stated to have a high level of satisfaction with the university. Their mean score for the item was 1.96 whereas respondents with a very poor sleep quality rated their score on satisfaction with the university was 2.69 on a 5-point scale where 1 means strongly agree and 5 means strongly disagree. Similarly, statistically significances were found in the values given to the item stating "if I had to re-select, I would read at this university again (F:3, 84 sig: .023)". As the figure shows, those with poor sleep quality reported less satisfaction with the university services than those who perceived their sleep quality good.

Alertness

The Stanford Sleepiness Scale was used to measure how alert participants felt themselves (e.g., mentally and physically active, energetic, or feeling drowsy or depressed). When the scores were compared, the group with "very poor" sleep quality gave lower scores on feeling active, as expected. We examined their alertness at present and it appeared that three groups with different sleeping quality scores tended to differ on "whether they feel somewhat foggy and let down at the moment (F: 3.24 sig.: .041)" and "whether they felt sleepy, woozy, prefer to lie down at the moment (F: 6.89 sig: .001)" with respondents reported to have very poor sleep quality scored the lowest on these two items. They were less likely to agree with the item expressing "feeling active and energetic", but they were strongly agreeing with the expression of "I feel sleepy, prefer to lie down and rest". Those with good sleep quality reported to feel "more active and energetic", did not feel "sleepy", and did not need "day time nap to rest".

Academic Performance

As noted earlier a fairly low proportion of participants reported that their academic achievement was below the average (0.08), with a large majority reporting an average performance (0.66), and 25% perceived their performance above the average. Oneway Anova test among sleeping quality groups and their academic achievement perceptions revealed no significant differences amongst these groups. From this finding which is inconsistent with other studies reporting negative relationship between the two (Gilbert and Weaver, 2010), one may claim that sleep quality has no effect on academic achievement. We have to note that we have adopted a different approach from that of Gilbert and Weaver who used grade-point averages. We used self-judgments of the students and academic achievement was measured with a single item. We need to note that academic achievement can be perceived to be affected by many other factors that were excluded in this present study.

Burnout

The sample's scores for the items on the burnout scale provided similar findings. Groups' differences were statistically significant in four of the items measuring burnout. More specifically significant differences were found on items "I feel burned out from my studies", "studying and attending class is really a strain for me", "I feel used up at the end of a say at university" and "I feel tired when I get up in the morning and I have to face another day at the university" (F: 6.46; 4.88; 3.62; 5.94, sig: .002; .015; .029 and .003 respectively). The group with poor sleep quality felt more exhausted. This group believed that as a result of poor sleep quality they were "consumed" because of their studies, felt emotionally drained, burned and they were not looking forward to for another day in the college.

Life satisfaction

Finally, the participants' subjective assessments of life satisfaction were measured. With three items: "I am really happy with my life; Although I have my ups and downs, in general I feel good about my life; I lead a meaningful and fulfilling life". The differences among the sleep quality groups were significant. In line with previous studies, those who report their sleeping quality as good were "happier" with their life, and they felt good despite the ups and downs and they led a meaningful life worth of living (F: 6.684; 3.272, and 4.72 and sig: .002; .040 and .010 respectively).

CONCLUSION

Higher education is an important period of time in one's life, in which the individual is equipped not only with knowledge but also seeds of happiness. Sleep efficiency during the years of university may have direct and indirect temporal impacts on the students' emotional capital and cognitive skills, and it may also shape their future. Although sleep quality problems may have temporal effects on students physiological and psychological states, the cumulative temporal effects may have unforeseen and long-lasting consequences later in life. Mood changes initiated by sleep deprivation may involve corrosive effects in social life, including breakdowns in relationships.

This study examined temporal relations between sleep quality and students' alertness, burnout levels, perceived academic performance and satisfaction with university services and life. Subjective academic performance appears to be unrelated with sleep quality. This is a surprising finding as previous studies reported a significant association between sleep deprivation and academic performance. Dissimilarity may be attributed to the measurement approach adopted in the study. Instead of grades, the subjects were asked to indicate how they find their academic performance. However, significant relationships among sleep quality and students' evaluations, their level of burnout and satisfaction with life were identified. This study indicates that evaluations about university services may differ as a result of sleep quality. This may have a bearing on University management. For example, better sleeping policies may provide higher satisfaction with services.

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