The effects of individual biological rhythm differences on sleep quality, daytime sleepiness, and dissociative experiences

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A B S T R A C T

Individuals who differ markedly by sleep chronotype, i.e., morning-type or evening-type also differ on a number of psychological, behavioral, and biological variables. Among several other psychological functions, dissociation may also lead to disruption and alteration of consciousness, which may facilitate dream-like experiences. Our study was aimed at an inquiry into the effects of individual biological rhythm differences on sleep quality and daytime sleepiness in conjunction with dissociative experiences. Participants were 372 undergraduate college students, completed a package of psychological instruments, including the Morningness–Eveningness Questionnaire, Dissociative Experiences Scale, Insomnia Severity Index, and Epworth Sleepiness Scale. Using logistic regression models, direct relations of pathological dissociation with sleepiness, sleep quality and circadian preferences were investigated. Poor sleep quality and sleepiness significantly contributed to the variance of dissociative symptomatology. Although there was no substantial linear association between circadian preferences and pathological dissociation, having evening-type preferences of sleep was indirectly associated with higher dissociation mediated by poor sleep quality. Poor sleep quality and daytime sleepiness seems to be significant antecedents of pathological dissociation. Sleep chronotype preferences underlie this relational pattern that chronobiological characteristics seem to influence indirectly on dissociative tendency via sleep quality.

1. Introduction

Living organisms show cyclic rhythmicity in a variety of physiological, hormonal, behavioral, and psychological processes. Sleep-wake cycles, body temperature, hormone levels, mood and cognition display variation in relation to the circadian rhythm in humans. Desynchronization of the circadian cycle is known to be strong correlates of mental problems (Wirz-Justice, 2005). In healthy individuals, the sleep-wake cycle is influenced by both endogenous (e.g., circadian pacemaker) and exogenous (e.g., work schedules, social commitments) factors. Individuals who differ markedly in their chronotypical characteristics, i.e., morning-type or evening-type, exhibit significant variations in a number of psychological, behavioral, and biological variables, including usual meal times, performance, mood, alertness, appetite, task performance, body temperature, and cortisol and melatonin secretion (Gau et al., 2007; Jankowski and Ciarkowska, 2008; Kerkhof, 1985; Monk et al., 1997; Muro et al., 2009; Natale and Adan, 1999; Nielsen, 2010; Selvi et al., 2007; Tankova et al., 1994).

It is well recognized that morning-types report earlier bedtime and rise time compared with evening types (Mongrain et al., 2006; Roenneberg et al., 2003). In comparison to evening-types display more variability in bedtime and rise time (Griefahn, 2002; Kudielka et al., 2006; Mongrain et al., 2005; Taillard et al., 1999). Additionally, evening-types had greater levels of daytime sleepiness and more maladaptive beliefs about sleep (Adan et al., 2006; Ong et al., 2007; Taillard et al., 1999). Evening-type individuals had more irregular sleep-wake habits which were indicative of poor voluntary control of sleep habits or inadequate circadian entrainment and greater circadian...
dysregulation (Barclay et al., 2010). Collectively, these findings suggest that evenness is associated with sleep disturbances.

Dissociation is characterized by disruption or alteration in usually integrated mental functions, including consciousness, perception, and sensori-motor functioning (American Psychiatric Association, 2013). Dissociation is multifaceted in nature that vary along a continuum from normal daily dissociative experiences such as absorption to pathological dissociative symptomatology such as dissociative amnesia and/or derealization and depersonalization (Butler et al., 1996; DePrince and Freyd, 2007). High dissociative symptomatology generally accompanies psychiatric disorders (Foote et al., 2006; Sar et al., 2004, 2007), predicts severity of morbidity and poor treatment outcomes (Lanius et al., 2012).

Associations between dissociation and trauma are well-elicited. A widely held notion about the etiology of dissociation premises that pathological dissociative symptomatology serve as a defensive function in which they help trauma victims deal with traumatic memories (Vermutten et al., 2007). Emotion regulation difficulties in regard to trauma are often associated with sleep disturbance (Bryant et al., 2010; Spoormaker and Montgomery, 2008). In early studies as to these relations, Agargun and his colleagues (2003) provided compelling evidence in clinical and non-clinical samples that a majority of 30 patients who met diagnostic criteria for dissociative disorders (DD) also met DSM-IV TR diagnostic criteria for nightmare disorder (%57). Patients who reported greater frequency of nightmares scored higher dissociation scores (Agargun et al., 2003b). Co-occurrence of nightmares and dissociative experiences was examined in a non-clinical sample of college studies. Greater frequency of nightmares and higher dream anxiety among those who reported early physical and sexual traumatic experiences were accompanied by higher dissociation scores (Agargun et al., 2003a). Research has consistently found substantial overlaps between nightmare frequency and increased dissociative symptomatology (Levin and Fireman, 2002; Soffer-Dudek and Shahar, 2011).

The fact that rapid eye movement activity typically occurring along with paralysis of the skeletal muscles continuous when the individual wake up and come into aware of surroundings is called sleep paralysis (Hobson, 1995). Respondents sexually abused in childhood had greater sleep paralysis problems along with greater levels of dissociative experiences (Abrams et al., 2008; McNally and Clancy, 2005). Using latent profile analysis, based on data obtained with 351 sexually assaulted participants, Armour et al. (2014) classified the respondents into four homogenous sub-groups, one of which consisted of subjects with dissociative-PTSD. The dissociative-PTSD group scored significantly higher mean scores on sleep difficulties than other three groups. van der Kolk et al. (1984) observed that combat-exposed veterans significantly differed in their nightmare patterns from those who had not been in combat. Veterans who failed to psychologically integrate their traumatic experiences were more vulnerable to continue eliciting posttraumatic stress reactions and to use dissociation counterproductively in dealing with emotion-laden memory content.

Fantasy proneness refers to a disposition or trait in which the person is often likely to experience extensive and deep involvement in fantasy (Lynn and Rhue, 1998). The conceptualization of cognitive failures inform self-reported failures in memory and perception that are linked to fantasy proneness (Rauschenberger and Lynn, 1995) both of which are suggested to play part in dissociative information processing (Dalenberg et al., 2012; Giesbrecht et al., 2008; Merckelbach et al., 1999). In an examination of differences in severity of dissociative symptoms, cognitive failures, and sleep difficulties across three groups of patients with dissociative identity disorder (DID), patients with posttraumatic stress disorder (PTSD) and controls, van Heutgen-van der Kloet et al. (2014a) found that patients with either DID or PTSD displayed higher unusual sleep experiences, poorer sleep quality and greater levels of fantasy proneness and cognitive failures than did controls. Patients with DID were discernible in their unusual sleep experiences from patients with PTSD.

Watson (2001, 2003) contended and empirically attested a continuity model of human consciousness that people more prone to unusual experiences during the day may also tend to display continuity at night. Therefore, dissociative experiences possess dream-like properties, which might be fueled by a labile sleep-wake cycle. Another study put emphasis on absorption in accounting for the connections between dissociation and sleep. The association between unusual sleep experiences and dissociation fell short of significance after controlling for the absorption (Fassler et al., 2006). The significant connections between sleep and dissociation have been replicated and extended in further studies (Giesbrecht and Merckelbach, 2006; Knox and Lynn, 2014; Koffel, 2011).

Sleep deprivation studies in community samples showed that sleep loss exert significant effect on mood, sleepiness and memory (Giesbrecht and Merckelbach, 2004; Giesbrecht et al., 2007; Selvi et al., 2015; van Heutgen-van der Kloet et al., 2015). However, evening-types were more prone to confusion and improvement in mood relative to morning-types after partial sleep deprivation (Selvi et al., 2007).

Considering sleep pattern, greater levels of dissociation were significantly associated with longer REM-sleep periods and more sleepiness at night awakening (van Der Kloet et al., 2013). van der Kloet et al. (2012a) observed in a mixed clinical impatient sample that decreased narcoleptic experiences were predictive of a reduction in dissociative symptomatology, which can be interpreted as the sleep-wake cycle can be an antecedent of daytime dream-like states in terms of dissociation. This would imply that individuals having frequent dissociative experiences more easily pass from normal waking mentation to dream like states. Using the path analysis approach, van Heutgen-van der Kloet et al. (2014b) displayed that trauma exert direct and indirect effects via sleep on dissociation and unusual sleep experiences serve as an antecedent of dissociation.

To date accumulated evidence provided support for the potential relations between sleep characteristics and a tendency to dissociative symptomatology (van der Kloet et al., 2012b). These associations have been addressed in various lines of research conducted in miscellaneous samples such as patients with DID (e.g., Ross, 2011), patients with borderline personality disorder (e.g., Semiz et al., 2008), community samples (e.g., Soffer-Dudek and Shahar, 2011; Yu, 2010; Giesbrecht et al., 2006) using various measures of these psychological constructs. Studies have consistently provided evidence supporting the moderate to strong relations between unusual sleep experiences and dissociative experiences. Elevated dissociative symptoms seem to be a by-products of labile sleep-wake cycle (Koffel and Watson, 2009) and these relations may be crucial in elucidating the role of sleep on mood regulation or dysregulation in terms of dissociation. In a preliminary analysis, it was demonstrated that associations between dissociation and early-childhood traumatic experiences were mediated via unusual sleep experiences (van Heutgen-van der Kloet et al., 2014b). From a chronobiological view, variations in psychological, behavioral, physiological, and hormonal rhythms are strongly associated with sleep, and dys-functionality in biological rhythmicity may have extensive implications in mood regulation via sleep (Wirz-Justice, 2005). Nevertheless, the relationships between insomnia, sleepiness and dissociative tendency on the basis of sleep chronotype differences have received almost no attention in the literature. In this study, we aimed at investigating the direct effects of sleep chronotype on sleep and dissociative symptoms as well as indirect influences on dissociation via insomnia and sleepiness. We hypothesized that eveningness sleep chronotype would intensify dissociative experiences through elevated insomnia and sleepiness.

2. Methods

2.1. Participants

Participants were 372 undergraduates from a state university settled in the Middle Anatolia region of Turkey. The mean age of the
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