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Impulsivity but not venturesomeness is related to morningness

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Abstract

The Composite Scale of Morningness (CSM) is a psychometrically sound instrument available in several languages, including French, aimed at arranging individuals along a continuum from high "eveningness" to high "morningness." On the other hand, impulsivity is involved in many personality disorders and is thought to be orthogonal to venturesomeness, which can be seen as a component of the broader construct of sensation seeking. We hypothesized that evening-type subjects would be more impulsive than morning-types. Self-administered questionnaires were distributed to students, and only complete forms were analyzed (194 males and 358 females). A four-way analysis of covariance showed significant effects of age, gender and impulsivity, but not venturesomeness, on morningness in the sense of a higher degree of eveningness in more impulsive subjects. In addition, the correlation coefficients in both genders were similar to those reported in smaller samples. Our findings deserve further interest because, regardless of gender, they suggest a possible physiopathological approach to impulsivity that may be accessible by circadian interventions such as midday bright light exposure or pharmacological treatments.

Keywords: Personality; Impulsive behaviors; Sensation seeking; Morningness; Biological rhythms

1. Introduction

Many physiological, biochemical, and psychological variables (e.g., mood, alertness, drowsiness, task performance, and cortisol) show circadian rhythms that are mainly endogenous but can be disturbed by external conditions (e.g., night and shift work). It has been further suggested that individuals may be arranged in a bipolar continuum from low morningness (or high eveningness) to high morningness (or low eveningness) with reference to their preferred times of day for achieving various activities (Freeman

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and Hovland, 1934). This tendency has genetic and environmental factors (Katzenberg et al., 1998, 1999; Pedrazzoli et al., 2000; Vink et al., 2001), and it is related to the human circadian system, mainly located in the suprachiasmatic nucleus of the hypothalamus (Miller et al., 1996).

From a psychopathological point of view, circadian rhythm disturbances are implied in bipolar mood disorders (Mayeda and Nurnberger, 1998) in which impulsivity plays a key role (Moeller et al., 2001). It has even been suggested that eveningness may be a vulnerability factor for depression (Chelminski et al., 1999). The neurotransmitter serotonin is involved in the regulation of the circadian clock—it is the precursor of melatonin, a marker of the phase of the circadian clock (Reiter, 1998), and is negatively related to impulsivity (Soubrié, 1986).

About 45 years ago, impulsivity was thought to be, along with sociability, a simple component of the broader Extraversion dimension of personality (Carrigan, 1960), whereas nowadays it is rather conceived of as a multidimensional construct. In the sixties, Blake (1967) reported that introverts had a quicker increase in body temperature in the morning and an earlier drop in the evening than did extraverts. He therefore predicted a time-of-day effect: introverts would perform better than extraverts in the morning (when they would be more aroused), and extraverts would perform better than introverts in the evening. Using caffeine to manipulate arousal, researchers found that impulsivity but not sociability appeared to be the component of the Eysenck Personality Inventory (EPI) Extraversion scale responsible for this effect (Revelle et al., 1980; Smith et al., 1981; Anderson and Revelle, 1994). Subsequent experimental results have been equivocal, although they also suffer from methodological weaknesses. For instance, Matthews (1987), who did not use caffeine to manipulate arousal, failed to replicate the results of Revelle et al., but the experiments did not control for caffeine intake before participation (Matthews, 1985; Matthews et al., 1989). With regard to the performance on attentional tasks, a time-of-day effect has been found (in the sense of better performance in the evening), but the authors failed to link it to impulsivity (Lawrence and Stanford, 1999). The subjects were randomly chosen from individuals scoring low and high on the BIS-11 (Barratt Impulsivity Scale), a specific impulsivity scale, but their diurnal type was not taken in consideration. Overall, these studies use somewhat different outcome variables, and they also do not take into consideration the gender of the subjects (although impulsivity is constantly found higher in males) and their diurnal type (which is known to interact with time of day in affecting cognitive performance; Natale et al., 2003).

Nevertheless, the hypothesis of a negative relationship between morningness and impulsivity has been tested. Impulsivity, as assessed by the EPI, correlated -0.23 ($P<0.05$, $n=113$, including 32 males) both with the Morningness–Eveningness Questionnaire (MEQ) (Horne and Östberg, 1976) and the Subjective Circadian Phase Position Subscale of the Marburger Questionnaire (Moog, 1981), suggesting that the sense and the strength of the relationship might be independent of the circadian questionnaire (Neubauer, 1992). In addition, one study used the MEQ and the Impulsiveness–Venturesomeness–Empathy questionnaire (IVE-7) and reported a correlation of -0.19 ($P<0.05$, $n=111$, including 61 males) with impulsivity and -0.13 (NS) with venturesomeness (Wilson, 1990). Again, these results are equivocal since a significant correlation with Sociability scales has also been reported: e.g. -0.23 ($P<0.05$, $n=74$, including 35 males) with the EPI-Sociability scale (Larsen, 1985). Anyway, these correlational studies do not take gender into consideration and rely on moderate sample sizes.

Therefore, in the first stage of a research program, we tested the hypothesis of a negative relationship between morningness and impulsivity in a large sample of subjects, using specific and psychometrically sound instruments, taking gender into consideration, and without manipulating arousal.

2. Methods

2.1. Subjects

Subjects were University students in Nice, France. They were orally informed that the study concerned circadian rhythms and that they had to anonymously complete self-administered questionnaires. Subjects were volunteers and were not paid for their participation. They filled in the questionnaires in groups during a class session in the early afternoon.