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Development of a mood rhythm instrument

Introduction: All living organisms are exposed to daily changes in light intensity. Consequently, in the course of the evolution, organisms have developed cellular mechanisms that are sensitive to light and have adapted by organizing their activities in 24-hour cycles determined by sunrise and sunset. In mammals, circadian rhythms are generated by an internal clock located in the suprachiasmatic nucleus (SCN) of the hypothalamus, which is a cluster of about 10,000 neurons located at the midline above the optic chiasma. Circadian clocks are typically synchronized to 24h through zeitgebers, such as light, meals, physical activity, and social interactions.

In the central nervous system, the net effect of this complex regulatory circadian system is the rhythmic modulation of neurotransmitters and neuromodulators. This rhythmic modulation affects behavioral and neurobiological functions including mood, learning, memory, motor activity, hormone secretion, temperature, food intake and sleep.

The daily human behavior has mainly been assessed by questionnaires designed to describe individuals' temporal preferences. The most commonly used questionnaires are the Morningness-Eveningness Questionnaire (MEQ) and the Munich ChronoType Questionnaire (MCTQ). More recently, the Biological Rhythms Interview of Assessment in Neuropsychiatry (BRIAN) was developed to assess biological rhythms, including sleep, general activities, eating behavior and social interactions, in mentally ill subjects.

To date we are unaware of any instrument developed to evaluate rhythmicity of mood symptoms. This current report describes the development and validation of a new instrument, the Mood Rhythm Instrument (MRI).

Objective: To describe the development and validation of a new instrument that evaluates rhythmicity of mood-related behaviors and physiological needs.

Methods: A multidisciplinary group formed by Camila Morelato de Souza, Alicia Carissimi, Daniele Costa, Ana Paula Francisco, Madeleine Scop Medeiros, Carlos Augusto Vieira Ilgenfritz, Melissa Alves Braga de Oliveira, Benicio N. Frey and Maria Paz Loayza Hidalgo joined in systematic meetings to plan the construction of the instrument. Clarity of items, its relevance to evaluate mood states and the consistency of the findings in relation to the available evidence on the biological basis of mood disorders were investigated. The internal consistency of the questionnaire was evaluated through Cronbach's alpha. This study was performed according to international ethical guidelines (ethics committee approval number: 15-0266 GPPG/HCPA).

Results: All of the items proposed in a first version were well rated in terms of their clarity. The items more frequently rated as "rhythmic" were related to the somatic symptoms of mood. Their acrophases were more frequent in the morning. The items associated with affective symptoms of mood were rated as less rhythmic and their acrophases occurred more frequently in the afternoon and evening. Males and females behaved more similarly with respect to the somatic than the behavioral-affective items. The second version of the mood rhythm instrument had a Cronbach's alpha of 0.74.

Conclusion: This proposed mood rhythm instrument should be able to detect individuals' rhythms of behavioral and physiological measures associated with mood states.