

People differ in the time of day when they functioning best, both mentally and physically. To describe these differences we use the concept of chronotype or, in other words, morningness-eveningness dimension. Researches on the phenomenon of chronotype are carried out by representatives of various fields, including psychology and biology, as this research area is somewhat on the border of these two fields of science. The course of human daily activity is related to the functioning of the mechanism of the biological clock that regulates various processes in the body in a 24-hours circadian rhythm.

Research shows that individual differences in diurnal preferences are associated with a number of psychological and social consequences that distinguish “morning” from “evening” people. The main differences between morning chronotypes’ (M-types) and evening chronotypes’ (E-types) functioning are associated with the timing of sleep and waking up: M-types prefer to wake up and go to bed earlier than E-types. M-types achieve the highest mental and physical effectiveness and best mood around late morning and midday, while E-types achieve it in the evening hours. However, due to the morning orientation of the social clock (e.g., work, school schedule), E-types often experience its misalignment with their biological clock and are often forced to operate outside their natural “time zone” of functioning. Such as operating at a non-optimal time of day is associated with negative consequences, both at the affective and cognitive levels.

At the cognitive level, people who have to operate at times of day incongruent with their chronotype often manifest diminished alertness, lower reasoning ability, and delayed of their reaction times. They may show poorer educational achievement and an increased tendency to consume various types of stimulants, such as drinking caffeine, alcohol, or smoking cigarettes. The most frequent explanation for these behaviours is the phenomenon of “social jetlag”. The term refers to a misalignment of biological and social clocks i.e., the situation when people are forced to operate outside of their natural “time zone” of functioning due to social demands. Social jetlag may be associated with the risk of developing future affective disorders such as anxiety disorders or depression. Although much more frequent among E-types, the effect may also occur among M-types (e.g., working in a position that requires performing a job in the evenings).

For all these reasons, a particularly important task for researchers of the chronotype is to identify factors that would act as buffers against the abovementioned negative consequences of functioning at a time incongruent with one’s chronotype. Research indicates that M- and E-types differ in terms of some personality and temperament traits as well as intelligence levels. Among these features, I will look for variables that attenuate the negative effects of functioning at a non-optimal time of day. Research in the field of neuroscience also provides evidence that chronotype may be important for our brain activity patterns. Despite some reports on the relationships between chronotype and other psychological and neuronal variables, there is still a lack of research that would accurately indicate the mechanism moderating these associations.

The proposed project includes a questionnaire study and a neuroimaging study (using magnetic resonance imaging; MRI). The first study will involve 100 individuals with extreme morning and 100 individuals with extreme evening chronotype. This study will comprise a series of tests and questionnaires. The second study will involve 50 subjects from the first study (25 individuals with morning and 25 with evening chronotype). This part will comprise two MRI/fMRI sessions, one in the morning and one in the evening hours, on another workday.

The planned study aims to answer questions about the interplay between chronotype, brain structure and activity, and individual differences. Moreover, it will allow determining what psychological features may be a protective factor in coping with the emotional and cognitive consequences of functioning in the time of day incongruent with one’s chronotype. Identifying the factors that influence the changes in brain connections may contribute to broadening the knowledge about individual predispositions of neuronal changes at different times of the day.

The results of planned research, besides their obvious importance for the development of chronopsychological research, can bring us closer to answers to socially important questions and provide a starting point for the development of social interventions and programs that would help people experiencing discrepancies between biological and social clock. In addition, popularizing the knowledge that people can be more effective and productive at times of the day according to their chronotype may contribute to a change in the perception of evening people, for whom night-time preferences tend to stigmatize and perceive them as lazy and unproductive. Perhaps it will also contribute to a greater social sensitivity to the needs of people with an evening chronotype (e.g., in more flexible educational and occupational schedules).