Chapter 4
Empirical Research on the Relationship Between Personality and Evoked Brain Potentials

ABSTRACT

In this section, research aim, problems and hypothesis with the methods and determined research results will be presented. This correlational design research that has been run on a sample of N=54 students in Croatia will be described. The main findings regarding the relationship between personality traits extraversion and evoked brain potentials will be presented. Personality traits that were explored are: extraversion, neuroticism, psychoticism, social desirability, addiction, criminality, empathy, impulsivity, adventurousness, strength of excitation, strength of inhibition, mobility, and depression. Latencies and amplitudes in two trials were investigated for the following evoked brain potentials: N1, P2, N2, P3, and Slow wave activity. Visual oddball paradigm was used for evoking brain activity measured on two occipital and two parietal electrodes. Results on controlled variables, such as: age, sight characteristics, coffee drinking, smoking, taking medications, alcohol and drug consumption, and body exercise, are introduced as well. The correlation analyses revealed a significant relationship between personality traits and evoked brain potentials, especially trait adventurousness and social desirability, due to a too simple and monotonous visual task that was use. The determined findings from the PCA factor analysis with Varimax rotation determined 15 factors that explained 79,611% of the total variance. Series of Hierarchical regression analyses for each personality trait individually revealed, as it was expected, certain visual evoked potentials as significant predictors.

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RESEARCH AIM, PROBLEMS AND HYPOTHESES

Research Aim

The main objective of this study (Tatalović Vorkapić, 2010) was to examine whether there is a possibility of predicting different personality traits operationalized within Eysenck’s dimensional personality typology and Pavlov’s central nervous system properties theory by means of latency and amplitude of evoked brain potentials (N1, P1, N2, P3 and SW).

Research Problems

The following research problems were derived from the aforementioned aim:

1. To present descriptive parameters and correlation relationships of all explored personality traits and recorded evoked potentials (N1, P1, N2, P3, and SW), as well as related behavioral variables (age, vision, drinking coffee, smoking, taking medicine, drinking alcohol, taking illegal drugs, and sports activities) and recorded evoked potentials (N1, P1, N2, P3, and SW).

2. To analyze the validity of personality measurements and evoked brain potentials, as well as the general characteristics of the application of the exploratory factor analysis with the aim of determining the main components in explaining the variance of human personality, evoked potentials, and behavioral variables (age, vision, drinking coffee, smoking, taking medicine, drinking alcohol, taking illegal drugs, and sports activities).

3. To examine the possibility of prediction of Eysenck’s personality dimensions (extraversion, neuroticism, psychoticism, social desirability), Pavlov’s CNS properties (strength of excitation, strength of inhibition, mobility), and other personality traits (addiction, criminality, empathy, impulsivity, adventurousness, depression) by latencies of the recorded evoked potentials (N1, P1, N2, P3, and SW) and their amplitude in the first and second recording trials.

Research Hypotheses

Regarding the stated research problems, the following research hypotheses could be defined:
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