

A Longitudinal Exploratory Study of Neurophysiological Reactions Among Young Adults During Psychometric Testing

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Introduction

Traditional psychometric tests have been criticized over the years due to reliance on subjective self-reports (Sandi, 2013).

Recall biases, response styles, and social desirability (Camerini & Schulz, 2018) may limit the validity and reliability of results (Bhandari & Wagner, 2006).

Research Gap

Lack of technology and innovative approach capable of capturing both self-report data and neurophysiological measurements concurrently (Arnone et al., 2011; Patrick et al., 2019).

Hypothesis

Hy₁

There is a correlation between participants' self-reported psychological states and heightened HRV, elevated GSR, and altered eye-tracking patterns, indicating synchronization between subjective experiences and objective neurophysiological manifestations.

Hy₂

We assume that the timing of questionnaire responses aligns with changes in the neurophysiological measure that will be observed between participants' declarative responses and the corresponding neurophysiological markers, suggesting a temporal relationship.

Methodology

Population
Target: N=10

a. Inclusion criteria:

- 18-30 years old young adults without significant physical illnesses or medical conditions (epilepsy, heart disease, etc.) and psychological or psychiatric conditions
- Proficiency in the French language

b. Exclusion criteria:

- Substance, caffeine, nicotine, and alcohol dependence

Measures:

1. Psychometric Tests:

a. Phobia Questionnaire (PHQ)- 15-item questionnaire used to measure a person's avoidance of particular object or situation as a factor of fear (Marks, 1979).

b. Fear Questionnaire (FQ)- 24-item scale used to assess the degree of avoidance of phobias (Cottraux et al., 1987).

c. Adverse Childhood Experiences Questionnaire (ACEs)- 10-item measure used to measure childhood trauma (Felitti et al., 1998).

*Note: The psychometric tests were validated in the French population with at least one thousand participants.

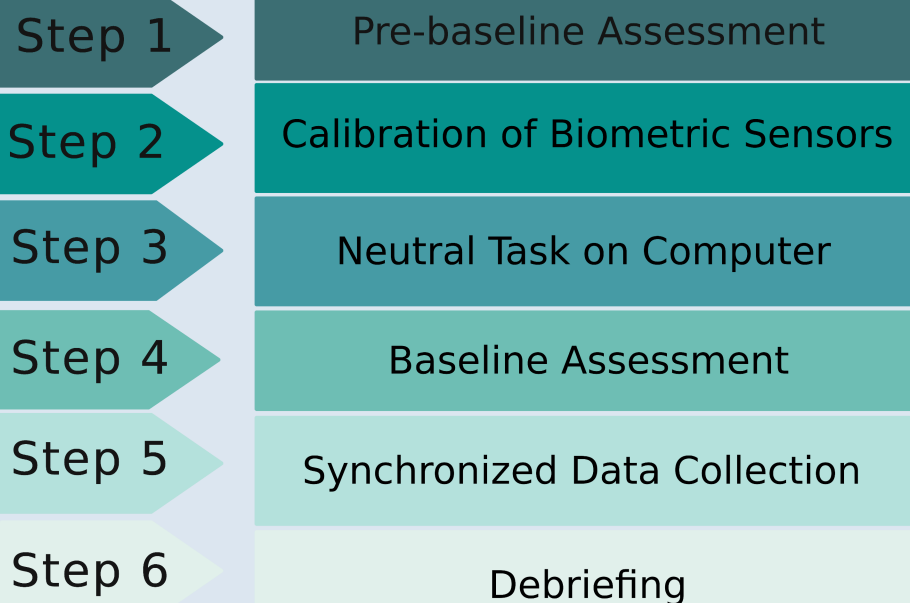
2. Biometric Sensors:

- a. Heart Rate Variability (HRV)
- b. Galvanic Skin Response (GSR)
- c. Eye-tracking
- d. Typing speed monitoring (Thales platform)

Instruments

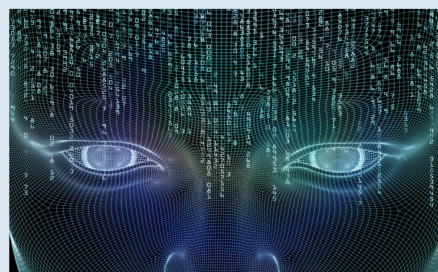


Data Collection Protocols

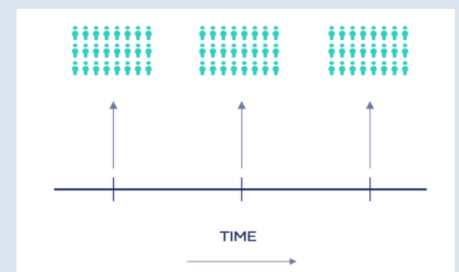


Ethics: For approval of the Research Ethics Committee (CER)

Data Analysis



Machine Learning & Longitudinal Analysis



Expected Results

- Integrating self-report data and neurophysiological measurements in a new measurement system improves the accuracy and reliability of assessing psychological constructs.
- ML algorithms may lead to the successful prediction of psychological states.

References

