Physiological Processes During Reading

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Physiological Processes During Reading
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Introduction
Do narrative inconsistencies in text cause sympathetic nervous system activation?

Text Comprehension
- The level of activation, integration, and validation during reading influence comprehension (O’Brien & Cook, 2016)
- Integration processes during reading links newly presented concepts with general world knowledge. Initial linkage is based on how well the pieces of information fit (O’Brien & Cook, 2016)
- Inconsistencies slow down integration and validation, which could arouse the SNS.

Sympathetic Nervous System Arousal
Sympathetic nervous system (SNS) activation indicates stress and might impact how we process information.
- Galvanic Skin Response (GSR) measures the skin’s electrical conductivity, reflecting SNS activation (Albert & Tullis, 2023).
- Heart Rate Variability (HRV) reflects the autonomic balance via variation in time between adjacent heart beats (Shaffer & Ginsberg, 2017).

Hypotheses
H1: Minor narrative inconsistencies increase SNS activation.
- Physiologically, would expect to see an increase in GSR & a decrease in HRV.
- Physiologically, would expect to see no change in GSR & HRV.

Methods
30 college students participated
- 70% female, 30% male
- Mean age = 19.73
- 76.7% White, 6.6% Black, 3.3% Asian, 13.3% declined to answer

Study Procedures
- Connect participants to GSR and ECG electrodes
- Read a series of 37 passages:
  - 9 contained consistencies
  - 9 contained inconsistencies
  - 18 neutral fillers

Data Analysis
- PowerLab Hardware, LabChart software (ADInstruments) and SPSS were used for statistical analysis.
- 35-sec segments for GSR analysis
- 1-min segments for HRV analysis

Results
- Log transformations were performed on the GSR range, HRV RMSSD, and HRV LF:HF ratio, as the distributions were skewed.
- Paired samples t-tests were performed to compare DVs between consistent versus inconsistent target sentences.
- There were no differences in sympathetic nervous system activation when reading inconsistent versus consistent target sentences.

Discussion
- Minor narrative inconsistencies did not impact SNS arousal, making the texts appropriate for examining non-emotional cognitive processes.
- The main challenges with the study include small sample size and short segment lengths measuring physiological parameters.
- Future research can examine whether texts of higher emotional relevance to participants demonstrate different patterns, such as those that relate to personal beliefs or high-stakes topics (exams, diagnoses, etc.)

References