Achievement or approach?
Is psychophysiological stress upon divergent thinking related to task performance or to trait anxiety?

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Introduction

- Heart rate variability (HRV): beat-to-beat (R-R) variations in heart rate
- HRV as a measure of neurocardiac function: sympathovagal balance, psychological resiliency, behavioral flexibility and cognitive load
- Guilford’s pioneer psychometric approach to creativity studies
- Divergent thinking as a reliable indicator of creative potential

Aim of Study / Hypothesis

Experimentally investigate whether psychophysiological stress upon divergent thinking task (represented by HRV) reflects trait anxiety and performance upon the task.

Method

Participants:
N = 62 healthy volunteers (38 female), age M = 21.89, SD = 2.76

Procedure:
1. Psychometric evaluation of trait anxiety (Spielberger’s STAI-T)
2. Resting period (10 min)
3. Computerized version of Guilford’s Alternative Uses Task (AUT):
   - List as many alternative uses for the item presented as you can think of in 3 minutes
   - 5 items (umbrella, shoe, soap, pen, brick)
   - Fluency (number of ideas) as measure of performance

4. Co-registration of HRV with emWave® (HearthMath, USA)

Results

1. Univariate ANOVA

(a) Influence of Anxiety on HRV

(b) Influence of Fluency on HRV

Fig. 1. The influence of (a) anxiety and (b) fluency in divergent thinking on psychophysiological stress (HRV). Results of univariate ANOVA analysis: (a) F(3, 58) = 3.24, p = .029; (b) F(3, 58) = 1.89, p = .141.

2. Multivariate ANOVA

Influence of Anxiety and Fluency on HRV

Fig. 2. The influence of trait Anxiety and Fluency in divergent thinking on psychophysiological stress (HRV). Results of multivariate ANOVA analysis: Anxiety F(3, 46) = 3.00, p = .040; Fluency F(3, 46) = 3.64, p = .019; interaction Anxiety x Fluency F(9, 46) = 1.04, p = .422.

Conclusions

- Both state anxiety and performance upon a divergent thinking task influence psychophysiological stress experienced during the task.
- State anxiety and performance act on HRV independently of each other.
- HRV is a good marker of psychophysiological stress experienced upon task, reflecting both psychological constitution (approach) and level of performance (achievement).

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Literature