

Achievement or approach?

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



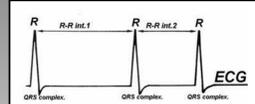
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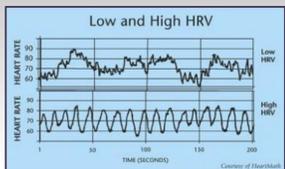
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Introduction

• **Heart rate variability (HRV):** beat-to-beat (R-R) variations in heart rate¹



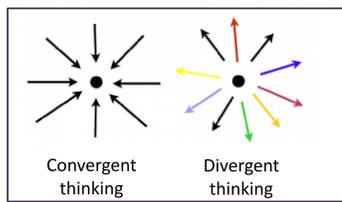
• HRV as a measure of **neurocardiac function**: sympathovagal balance, psychological resiliency, behavioral flexibility and cognitive load¹



• HRV associated with
 ✓ physical & psychological functioning
 ✓ Stress & performance¹

• Guilford's pioneer **psychometric approach** to creativity studies²

• **Divergent thinking** as a reliable indicator of creative potential³



Results

1. Univariate ANOVA

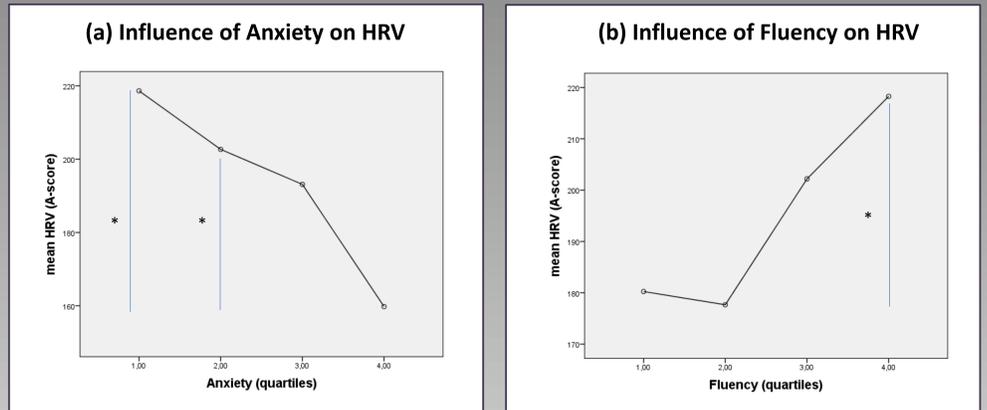


Fig.1. The influence of (a) trait Anxiety and (b) Fluency in divergent thinking on psychophysiological stress (HRV). Results of univariate ANOVA analysis: (a) $F(3,58)=3.24$, $p=.029$; (b) $F(3,58)=1.89$, $p=.141$.

2. Multivariate ANOVA

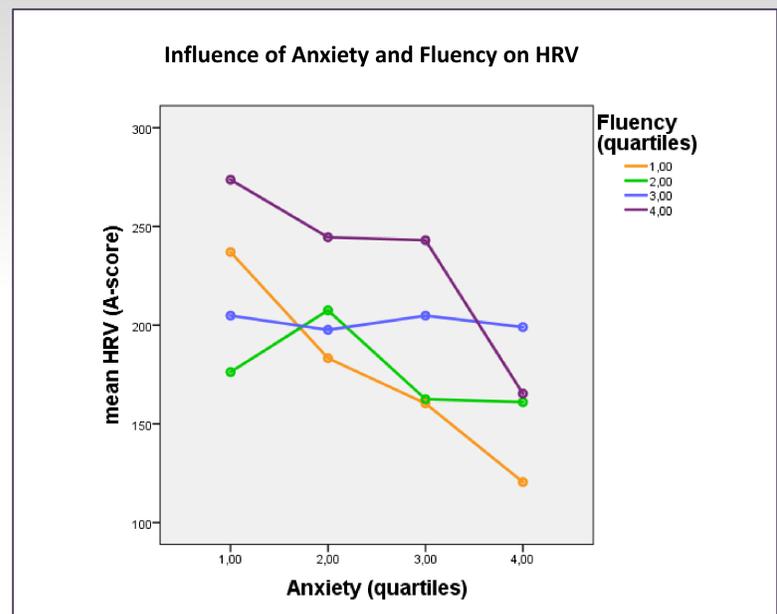


Fig.2. The influence of trait Anxiety and Fluency in divergent thinking on psychophysiological stress (HRV). Results of multivariate ANOVA analysis: Anxiety $F(3,46)=3.00$, $p=.040$; Fluency $F(3,46)=3.64$, $p=.019$; interaction Anxiety* Fluency $F(9,46)=1.04$, $p=.422$.

Aim of Study / Hypothesis

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

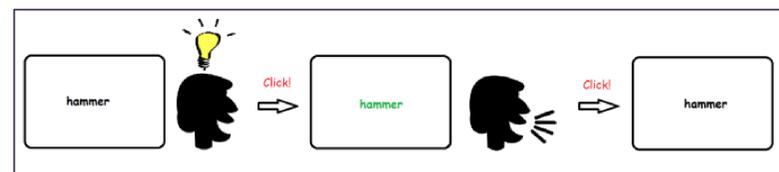
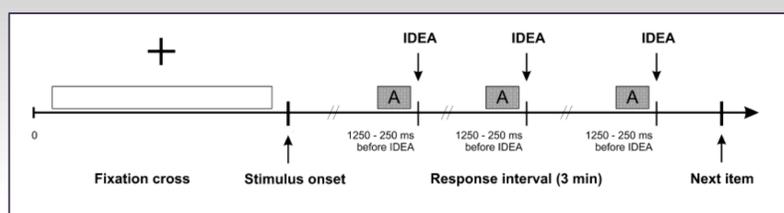
Method

Participants:

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

Procedure:

- Psychometric evaluation of **trait anxiety** (Spielberger's STAI-T)
- Resting period (10 min)
- 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)

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).

Acknowledgements

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Literature

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Coherence & Achivement score

- Coherence ratio** = Peak Power / (Total Power - Peak Power) Averaged in 64-sec intervals every 5 sec.
- A-score** = sum of coherence ratio across time

