HRV-BIOFEEDBACK: the effects of session count on psychophysiological functioning – preliminary results

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Introduction

- **Biofeedback**: control of unconscious physiology with the help of biosensors and computers
- **Heart rate variability (HRV)**: beat-to-beat variations in heart rate
  - A measure of neurocardiac function that reflects sympathovagal balance, psychological resiliency and behavioral flexibility
  - High HRV associated with
    - good physical and psychological health,
    - well-being and
    - improved performance
- **HRV-biofeedback**: paced breathing at ~0.1 Hz creates resonance (coherence) between heart rate fluctuations resulting from:
  - baroreflex (BRX)
  - respiratory sinus arrhythmia (RSA)

Aim of the Study/Hypothesis

- Experimentally establish an efficient HRV-BFB training protocol.
- 20 HRV-BFB sessions (in 4 weeks) should provide additional increase in HRV above 10 session (in 2 weeks).

HRV-BFB Methodology

1. Participants:
   - Experimental group: 18 (13 completed, 15 female), age M = 20.4, SD = 2.1
   - Control group: 9 (8 completed, 4 female), age M = 23.20, SD = 2.5

2. HRV-BFB training protocol:
   - Slow breathing at individual resonant frequency: av. 6 breaths/min (0.1 Hz)
   - Abdominal (diaphragmatic) breathing, inhalation through the nose, prolonged pursed-lips exhalation
   - 20-min sessions with emWave6 (Institute of HeartMath)
   - 2 blocks of 10 sessions
   - Each block completed within 2 weeks
   - Positive emotions facilitate coherence

Results

1. **Linear indices: time-domain**
2. **Linear indices: frequency-domain**
3. **Non-linear indices**

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Conclusions

- HRV-biofeedback training successfully alters HRV
- Change of most parameters was observed already after 10 sessions (2 weeks)
- Additional 10 sessions (2 weeks) of the intervention improvement parameters related to the BRX, while other values slightly dropped, however, remained still significantly elevated from baseline (except for TINN).

Literature