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The Trier Social Stress Test in the Black Box
:: INDUCING SOCIAL STRESS IN A VIRTUAL ENVIRONMENT ::

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AIM
The Trier Social Stress Test (TSST) is a widely used protocol to induce stress with corresponding profound endocrine and cardiovascular responses. Briefly, a speech and an arithmetic task are performed in front of three hired actors. This study aimed to examine if a Virtual Reality (VR) version of TSST would provoke physiological responses comparable to real life TSST.

METHOD
Participants: 11 healthy young males.
VR equipment: a CAVE™ system with three rear projected walls (4 x 3 m), and one floor projection together with head tracking and stereoscopy.
Heart rate (HR), T-wave amplitude (TWA, SNS activity), and high frequency heart rate variability (HF-HRV, PNS activity), were estimated during baseline, preparation, speech, mental arithmetics, and rest after TSST during 40 minutes.

RESULTS
During stress:
- HR increased $F(8, 80) = 31.82$, $p < .0001$, $\eta^2 = 76$, $\varepsilon = 39$,
- TWA decreased $F(8, 80) = 19.24$, $p < .0001$, $\eta^2 = 66$, $\varepsilon = 26$,
- HF-HRV n.s.

DISCUSSION
HR increased during preparation, speech and arithmetics with about 10 BPM resembling many of the real life TSST studies. Decreased TWA ( inversely related to SNS activity), and no effect of HF-HRV, during the stress conditions imply that HR increase was mainly an effect of increased sympathetic activity. The results suggest that VR technology is a promising tool to induce stress that is easy to administrate and replicate, without the cost of hired actors.