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Cortisol and Cardiovascular Reactivity and Habituation to a Virtual Reality Version of the Trier Social Stress Test

AIM

Previously we have shown that a Virtual Reality (VR) version of the Trier Social Stress Test (VR-TSST) elicits autonomic responses comparable to the real world TSST. Briefly, the TSST involves a speech and performance of a math task in front of an audience. In this pilot study we examined if repeated stress provocations with VR-TSST would result in the characteristic habituation of the cortisol stress response.

METHOD

7 healthy men were confronted with the VR version of TSST twice (one week between sessions). Salivary cortisol, heart rate (HR), high frequency heart rate variability (HF-HRV, parasympathetic activity) and T-wave amplitude (TWA, inversely related to sympathetic activity) was assessed. Data were analyzed with repeated measures ANOVAs, with DAY (first and second) and CONDITION (baseline, preparation, speech, math-task, and following rest) as within group factors.

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RESULTS

Cortisol increased during stress at day 1, but not at day 2: DAY * CONDITION [$F(6, 26) = 4.68, p < .05$], quadratic trend [$F(1, 6) = 6.96, p < .05$]. HR and TWA did not differ between day 1 and 2. Main effects of CONDITION for HR [$F(8,48) = 19.28, p < .0001$] and for TWA [$F(8, 48) = 12.81, p < .005$]. HR increased [cubic trend $F(1, 6) = 36.72, p < .005$]; TWA decreased [cubic trend $F(1, 6) = 14.36, p < .005$]. HF-HRV n.s.

DISCUSSION

Cortisol secretion showed a marked increase during the first stress provocation, but habituated in the second session. HR and TWA reactivity were similar during both sessions, implicating a stable increase in sympathetic activity during VR-TSST. The results closely resemble those obtained in prior studies using the real life TSST. If these results can be replicated with larger samples, the VR-TSST may be used as a simple and standardized tool for social stress induction in experimental settings.

