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Cardiovascular Reactivity in High-, and Low - Trait Anxious Individuals During Social Stress Induction

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AIM

In two previous studies we report that subjective ratings of state anxiety in healthy individuals co-vary positively with vagally mediated high frequency heart rate variability (HF-HRV), during base line recording before an experimental task, and during social stress induction. In this pilot study cardiovascular regulation was examined during a stressful task in high-, and low trait anxious individuals.

METHOD

35 healthy men were divided in to one high- and one low-anxiety group based on the median split of the results of the Spielberger Trait Anxiety Inventory (M = 39.9, SD = 8.5, resp. M = 26.2, SD = 3.3, p < .001). Both groups were confronted with a virtual version of the Tier Social Stress Test (V-TSST), involving two tasks: to hold a speech, and to complete a mathematical task in front of a committee. Heart rate (HR), high frequency HR variability (HF-HRV, related to vagal activity), T-wave amplitude (TWA, inversely related to sympathetic activity) and respiration were assessed before, during, and after the V-TSST.

RESULTS

Main effects showed that during stress HR increased [F(7, 231) = 63.98, p < .001, $\eta^2 = .66$], TWA decreased [F(7, 231) = 33.69, p < .001, $\eta^2 = .51$]. Regarding HF-HRV an interaction with trait anxiety was found [F(7, 231) = 2.83, p = .047, $\eta^2 = .08$; cubic F(1, 33) = 5.51, p = .025, $\eta^2 = .14$], indicating slightly higher magnitudes during stress for the high anxious group, but lower magnitudes for the low anxious group.

DISCUSSION

Both anxious groups responded with increased HR and sympathetic activity (decreased TWA) during V-TSST. However, the high anxious group showed higher HF-HRV during stress than the low anxious group. Tentatively, the participants with higher trait anxiety activate the vagal system to inhibit the sympathetic system to adequately cope with the stressful situation in order to complete the tasks successfully. It is important, however, to note that the high anxious group doesn't represent a clinical sample. Clinical anxiety is generally associated with reduced HF-HRV suggested partly being related to poor emotional and attentional control. Healthy individuals with moderate increases in trait anxiety, on the other hand, would likely have a well functioning vagal system to engage in attention demanding and stressful tasks.

