Childhood Anxiety Disorders: Associations with Heart Rate Variability and Heart Rate

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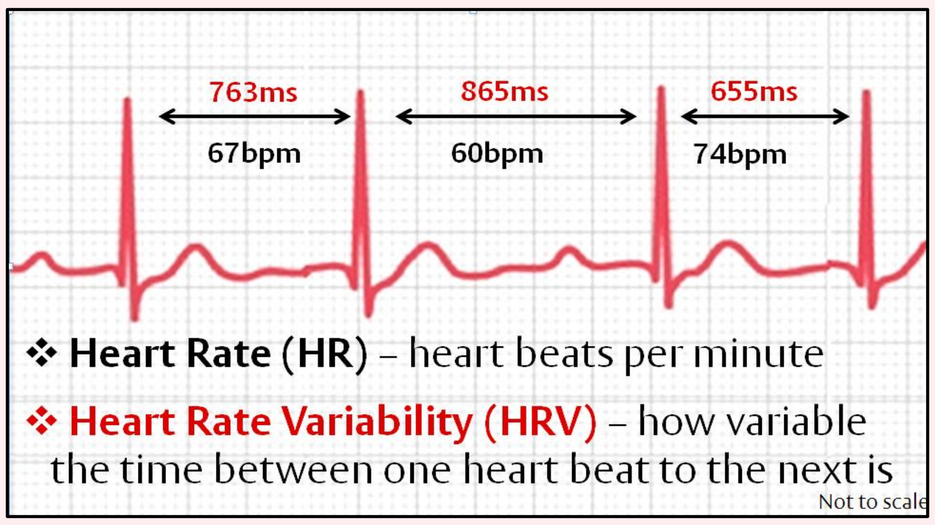
Background

- The human heart does not beat like a steady clock



→ At rest the heart beats slower but less regularly (HR is lower whereas HRV is higher) – this means the parasympathetic nervous system is active

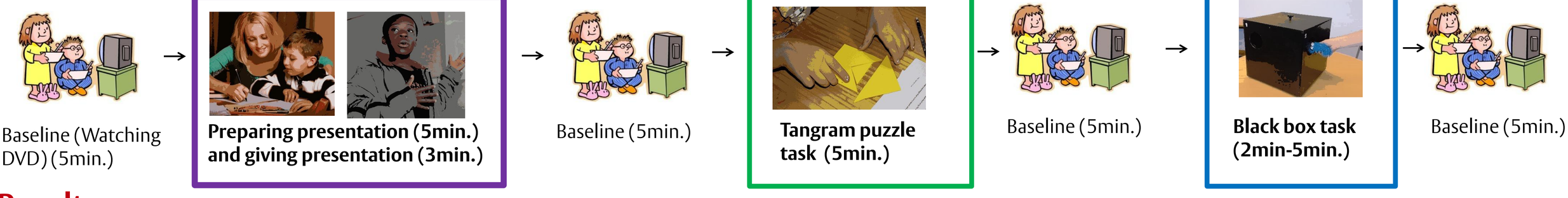
→ In response to stress the heart beats faster but more regularly (HR is higher whereas HRV is lower) - this indicates an active sympathetic nervous system

Introduction

The clinical presentation of anxiety includes physiological reactions to a stressor. Research has shown that anxious adults show no differences in sympathetic activity (e.g. heart rate (HR)) while showing decreased parasympathetic activity at rest and in response to stress (e.g. heart rate variability (HRV)) compared to controls[1]. Findings of one study suggest that this might also occur in anxious children, but the methodology used (CO2 inhalation) meant findings were confounded by changes in respiration[2]. This study aimed to establish whether clinically anxious children differ in HRV and HR in stress and non-stress conditions compared to controls.

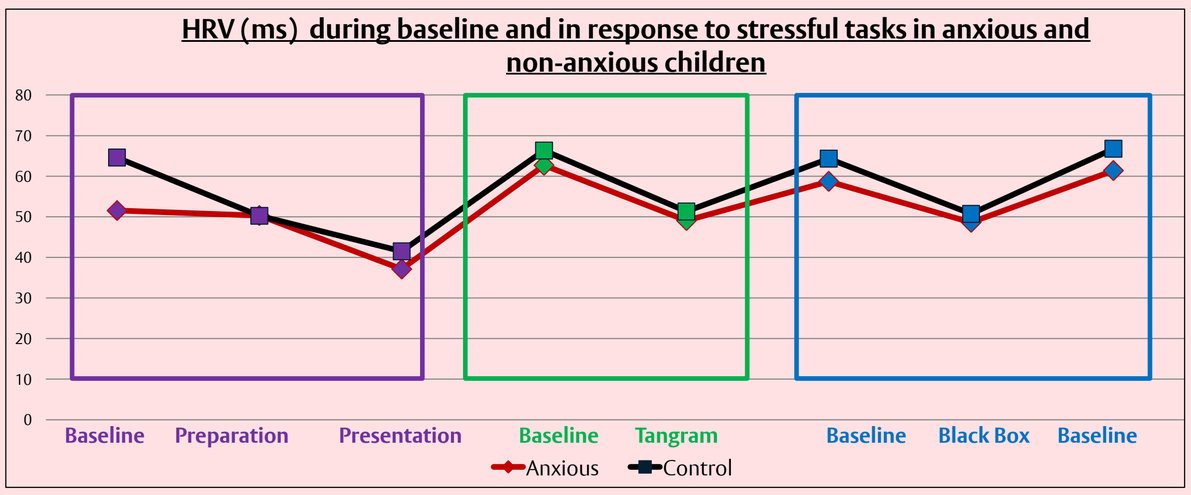
Method

HR and HRV were measured using Actiheart heart rate monitors and software (Version 4) during stress and non-stress conditions in 25 clinically anxious and 25 non- anxious, age- and gender- matched, 7-12 year olds.



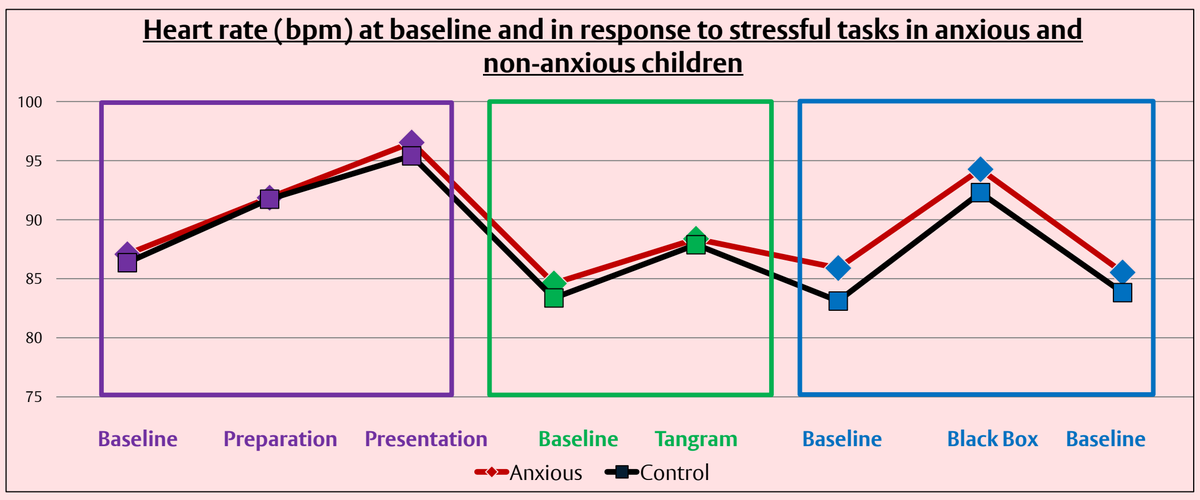
Results

Heart Rate Variability



- Significant main effect of task, such that HRV decreases in response to stressful tasks and increases during rest – regardless of group

Heart Rate



- Significant main effect of tasks, such that HR increases in response to stress and decreases during non-stress conditions – regardless of group

Discussion

The results suggest that anxious and non-anxious children do not differ in their parasympathetic and sympathetic activity, as measured by HRV and HR at baseline and in response to stress. This shows that anxious children show a different pattern of physiology compared to anxious adults who evidence diminished parasympathetic activity[1]. The findings of this study suggest that reduced HRV might therefore be the result of chronically maintained anxiety rather than a causal factor in its development.

Contact information

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References · 1. Lyonfields, J., Borkovec, T., & Thayer, J. (1995). Vagal tone in generalized anxiety disorder and the effects of aversive imagery and worrisome thinking. *Behavior Therapy*, 26(3), 457-466. **2.** Monk, C., Kovelenko, P., Ellmann, L.M., Sloan, R.P., Bagiella, E. et al. (2001). Enhanced stress reactivity in paediatric anxiety disorders: implications for future cardiovascular health. *International Journal of Neuropsychopharmacology*, 4, 199-206.

Acknowledgments · Berkshire Child Anxiety Clinic