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## Heart-beat perception, panic/somatic symptoms and anxiety sensitivity in children

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### Abstract

There is considerable evidence implicating heart-beat perception (HBP) accuracy and anxiety sensitivity (AS) in the development of panic in adults. However, to date there have been no studies exploring the association between HBP, AS and childhood panic/somatic symptoms. Seventy-nine children aged 8 to 11 years completed a mental tracking paradigm (Psychophysiology 18 (1981) 483) to assess HBP, the Children's Anxiety Sensitivity Index (J Clin Child Psychol 20 (1991) 162) and the Screen for Childhood Anxiety Related Emotional Disorders (J Am Acad Child Adolesc Psych 38 (1999) 1230). Those with good HBP ( $n = 7$ , 9%) had significantly higher panic/somatic symptoms ( $t = -1.71$ ,  $P < 0.05$ ), and AS ( $t = -2.16$ ,  $P < 0.02$ ) than those with poor HBP. There were no effects of age, sex or BMI on HBP. Those with high levels of panic/somatic symptoms were seven times more likely to have good HBP and had AS scores 1 S.D. higher than the remainder of the sample. Multivariate analyses revealed that these two phenotypes had independent associations with high panic/somatic symptoms. These results extend the literature on HBP and panic and suggest that in children, as in adults, increased panic/somatic symptoms are associated with enhanced ability to perceive internal physiological cues, and fear of such sensations.

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*Keywords:* Heart beat perception (HBP); Children; Anxiety sensitivity (AS); Panic symptoms; Somatic symptoms

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## 1. Introduction

Two key features of panic disorder (PD) are sudden bodily sensations such as a pounding or racing heart, and the interpretation of these sensations as harmful or dangerous (Clark, 1986; Ehlers, 1991). This has led to the development of psychological models of PD which emphasise catastrophic interpretations of bodily sensations, and suggest that panic attacks are triggered by internal cues which are interpreted as threatening resulting in anxiety (e.g. Clark, 1986, 1988; Clark & Ehlers, 1993; McNally, 1999). Such theories have led to experimental research exploring individual differences in the perception of bodily cues (interoception), specifically good heart-beat perception (HBP) (Ehlers, Margraf, & Roth, 1988), and fear of anxiety sensations or anxiety sensitivity (AS; Reiss, 1986), as potential phenotype factors for development of PD.

A variety of designs has been utilised to explore heart-beat perception in relation to panic and associated presentations, but the most reliably replicable results have been obtained using the mental tracking paradigm (Schandry, 1981). In this task individuals are asked to count silently to themselves the heart beats they feel during a discrete period of time. Using this technique, PD patients have been found to be better at counting their heart beats without taking their pulse than normal controls (Harbauer-Raum, 1987 described in Ehlers & Breuer, 1996), individuals with infrequent panic attacks (Ehlers and Breuer, 1992 study 2; Van der Does, Antony, Ehlers, & Barsky, 2000), simple phobia (Ehlers and Breuer, 1992 study 2), depression (Ehlers and Breuer, 1992 study 2; Van der Does, Willem, Van Dyck & Spinhoven, 1997), or palpitations, but not PD (Van der Does et al., 2000), although some studies have not found the expected group differences (Hartl, 1992, described in Ehlers and Breuer, 1992; Antony et al., 1995; Barsky, Cleary, Sarnie, & Ruskin, 1994; Van der Does et al., 1997). Finally, longitudinal studies have demonstrated that good HBP at initial assessment is related to maintenance of PD in treated patients, recurrence of panic attacks in initially remitted patients and maintenance of panic attacks in untreated frequent panickers (Ehlers, 1995). Previous studies indicate that males and those of lower BMI have better HBP (Ehlers and Breuer, 1992), although these factors do not generally account for the group differences seen (Jones, 1994). To our knowledge no studies have yet explored the relationship between heartbeat perception and panic symptoms in a child population.

Anxiety sensitivity (AS) is the fear of anxiety sensations such as pounding heart, breathlessness and nausea, due to beliefs that these sensations have harmful or dangerous consequences (AS; Reiss, 1986). AS has been examined in numerous studies of anxiety in general, and panic disorder in particular (see Cox, Borger, & Enns, 1999 for a review of the empirical literature). AS is conceptually and empirically distinct from more general tendencies to experience anxiety in many situations reflected in scales of trait anxiety (McNally, 1999). High AS scores are associated with onset and maintenance of PD (Ehlers, 1995; Maller and Reiss, 1992; Schmidt, Lerew, & Jackson, 1997, 1999; see also review by Schmidt, 1999). Furthermore, AS level has been found to discriminate between individuals with PD and other anxiety disorders, with the exception of post-traumatic stress disorder (Taylor, Koch, & McNally, 1992). Specifically, it appears that it is fear of rapid heart rate in particular, and also dizziness, feeling short of breath and feeling shaky that best discriminate PD from the other anxiety disorders (Taylor, Koch & McNally, 1992; Hazen, Walker, & Stein, 1994; Apfeldorf, Shear, Leon, & Portera, 1994). Interestingly, AS in adults has also been shown to be associated with accurate HBP in both non-clinical (Sturges and Goetsch, 1996, though only after an arithmetical stress test), and clinical (Van der Does et al., 1997, 2000)

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