



Anxiety Disorders  
18 (2004) 341–356

JOURNAL  
OF  
**Anxiety  
Disorders**

## Balance dysfunction in childhood anxiety: findings and theoretical approach

Orit Erez<sup>a</sup>, Carlos R. Gordon<sup>b</sup>, Jonathan Sever<sup>c</sup>,  
Avi Sadeh<sup>a</sup>, Matti Mintz<sup>a,\*</sup>

<sup>a</sup>*Psychobiology Research Unit, Department of Psychology, Tel-Aviv University,  
Tel-Aviv 69978, Israel*

<sup>b</sup>*Department of Neurology, Meir Hospital, Kefar Saba, Israel*

<sup>c</sup>*Geha Psychiatric Hospital, Petah-Tikva, Israel*

Received 10 April 2002; received in revised form 23 August 2002; accepted 30 October 2002

---

### Abstract

A recent special issue of the *Journal of Anxiety Disorders*, reviewed the experimental and clinical findings related to comorbidity of balance disorders and anxiety [J. Anxiety Disord. 15 (2001) 1.]. The studies mentioned in that issue were based mostly on adult subjects but prevalence of balance disorders in childhood anxiety is yet to be established. We have tested a small sample of children diagnosed for general or separation anxiety disorder and a control group of normal children. Extensive neurological examination revealed no clinically relevant vestibular impairment. Nevertheless, detailed questionnaires and balance tests confirmed an excessive sensitivity of anxiety disordered children to balance-challenging situations. Moreover, balance-challenging tasks triggered more balance mistakes and slower performance in anxiety versus control children. These findings support the notion of subclinical balance disorder in childhood anxiety. Results are discussed in terms of the two-stage theory of learning, which predicts that anxiety disorder may be an offshoot of lasting balance dysfunction.

© 2002 Elsevier Science Inc. All rights reserved.

*Keywords:* Childhood anxiety; Vestibular impairment; Balance disorder; Balance tasks; Two-stage theory of learning; Classical conditioning; Emotional conditioning; Motor conditioning

---

\* Corresponding author. Tel.: +972-3-640-8625; fax: +972-3-640-9547.

E-mail address: mintz@freud.tau.ac.il (M. Mintz).

## 1. Introduction

Decades of research has established the essential involvement of the brain limbic system in emotional behavior. The amygdala is a very well attended component of the limbic system. Divergent outputs to other limbic and extra-limbic systems make the amygdala a key component in the initiation of coherent emotional responses (Davis, 1992; Davis & Whalen, 2001). Afferents from the thalamus enable the amygdala to evaluate the emotional valence of aversive cues, while considering only the crude features of these cues and thus bypassing the processing of high cognitive structures (LeDoux, 1993). Involvement of the amygdala in anxiety disorders has long been suspected. Both under and over-expression of fear and anxiety were, respectively reported after induction of lesion or the stimulation of the amygdala (Aggleton, 1993; Chapman et al., 1954; Gloor, 1992). Combined with recent neuroimaging findings (Birbaumer et al., 1998; Rauch et al., 2000), there is sufficient evidence that limbic/amygdaloid pathology is causally involved in anxiety disorders.

An alternative view holds that limbic malfunction is not a necessary prerequisite for anxiety disorders. Rather, anxiety may reflect an excessive response of the normal limbic system interacting with abnormally functioning extra-limbic structures. This view is consistent with frequently reported comorbidity of anxiety with neurological disorders, such as dizziness, vertigo, imbalance, and vestibular dysfunction (Sklare, Konrad, Maser, & Jacob, 2001). To mention a few examples from recent extensive review, fear and emotional displeasure are frequently associated with incidents of acute vertigo and motion sickness (see review by Balaban & Thayer, 2001). Patients with even mild vertiginous symptoms score high on the State-Trait Anxiety Scale (Alvord, 1991). Dizziness and vestibular dysfunction prevail in panic disorder patients during and between panic attacks (Jacob, Furman, & Balaban, 1996a; Jacob, Furman, Durrant, & Turner, 1996c; Sklare, Stein, Pikus, & Uhde, 1990). Balance dysfunction is related to agoraphobic avoidance in panic disorder patients (Jacob et al., 1996c), while vestibular dysfunction is related to height phobia (in Jacob, Redfern, & Furman, 1995). These observations are not only confined to clinical samples, as correlation between dizziness and anxiety was also confirmed in community surveys (see Yardley et al., 2001). A possible interpretation of these frequent associations is that anxiety is a byproduct of an interaction between a normal limbic system and malfunctioning balance systems.

Interaction with a malfunctioning balance system may bear particularly harsh consequences during childhood. Balance-challenging situations trigger fear responses, which are constructive in future avoidance of similarly dangerous situations (Balaban & Jacob, 2001; Yardley, Todd, Lacoudraye-Harter, & Ingham, 1992). Avoidance of balance threats may be an effective strategy for adults, as it often requires only a minor modification of their life style. An avoidance strategy seems to be less effective in children, whose environment features frequent and varied balance threats, ranging from mildly challenging situations, such as

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات