Available online at www.sciencedirect.com
ScienceDirect
Personality and Individual Differences 43 (2007) 1541–1551
PERSONALITY AND INDIVIDUAL DIFFERENCES
www.elsevier.com/locate/paid

Shyness is a necessary but not sufficient condition for high salivary cortisol in typically developing 10 year-old children

Louis A. Schmidt [a,*], Diane L. Santesso [b], Jay Schulkin [c,d], Sidney J. Segalowitz [b]

[a] *Department of Psychology, Neuroscience and Behaviour, McMaster University, Hamilton, Ontario, Canada*
[b] *Department of Psychology, Brock University, St. Catharines, Ontario, Canada*
[c] *Clinical Neuroendocrinology Branch, NIMH, NIH, Bethesda, MD, USA*
[d] *Department of Physiology and Biophysics, Georgetown University, School of Medicine, Washington, DC, USA*

Received 18 December 2006; received in revised form 19 March 2007; accepted 16 April 2007
Available online 8 June 2007

Abstract

Previous research has noted both high and low baseline cortisol levels in anxious personality styles. We examined the relations among shyness, baseline salivary cortisol, and resting heart rate in a non-clinical sample of 10-year-old children. As predicted, shyness was positively correlated with baseline salivary cortisol and resting heart rate, replicating and extending earlier work with preschool age children to middle childhood. However, post-hoc analyses revealed that the scatterplot of shyness and salivary cortisol was significantly triangular in shape, indicating that shyness was a necessary, but not sufficient, condition for high salivary cortisol at age 10. For children high in shyness, salivary cortisol levels ranged from low to high; for children low in shyness, salivary cortisol levels were low. This triangular pattern was not found for the association between shyness and resting heart rate, suggesting different roles of neuroendocrine and autonomic measures in relation to shyness. The potential roles of cortisol in the maintenance of shyness developmentally are discussed as are the broader implications for clarifying prior inconsistent results on the relation between temperament and cortisol in humans. The use of triangular data analytic strategies for interpreting relations between psychological variables and identification of risk and protective factors is also discussed.
© 2007 Elsevier Ltd. All rights reserved.

* Corresponding author. Tel.: +1 905 525 9140x23028; fax: +1 905 529 6225.
E-mail address: schmidtl@mcmaster.ca (L.A. Schmidt).

0191-8869/$ - see front matter © 2007 Elsevier Ltd. All rights reserved.
doi:10.1016/j.paid.2007.04.011

Keywords: Shyness; Salivary cortisol; Heart rate; Children

1. Introduction

The search for psychophysiological and neuroendocrine correlates of temperamental shyness in children has received much attention over the last two decades. Kagan (1994) noted that 10 to 15% of typically developing toddlers who exhibited extreme fear and wariness in response to novelty were likely to be shy and timid as preschoolers. These children he termed "behaviorally inhibited" and noted that this temperamental profile was modestly preserved throughout the early school age years and predictive of psychopathology in late childhood (Kagan & Snidman, 1999). Kagan speculated that the origins of temperamental shyness were linked to individual differences in the excitability of forebrain limbic circuits (particularly the amygdala and its central nucleus) involved in fear regulation. Most recently, Kagan's group found empirical support for this idea (Schwartz, Wright, Shin, Kagan, & Rauch, 2003). Young adults, who some 20 years earlier were classified as behaviorally inhibited toddlers, exhibited increased amygdalar activity as reflected in fMRI measures in response to novel faces.

Kagan and his colleagues earlier noted that temperamentally shy and behaviorally inhibited children exhibited higher morning basal cortisol levels and higher and more stable heart rates compared with uninhibited children (Kagan, Reznick, & Snidman, 1987, 1988). We replicated the morning basal cortisol finding in temperamentally shy preschoolers at age four (Schmidt et al., 1997) and noted increased cortisol reactivity in shy children at age seven in response to self-presentation (Schmidt et al., 1999b). However, we did not find high morning basal cortisol levels at age seven in temperamentally shy children (Schmidt, Fox, Schulkin, & Gold, 1999a).

Other researchers have noted elevated adrenocortical activity in infants whose temperamental dispositions may predict temperamental shyness in early childhood. For example, Gunnar and her colleagues reported that human infants who remained temperamentally distressed from 9 to 13 months of age exhibited increases in adrenocortical activity during the presentation of laboratory vignettes (Gunnar, Mangelsdorf, Larson, & Hertsgaard, 1989). Gunnar's group also noted that behaviorally inhibited children who were in insecure attachment relationships exhibited greater increases in salivary cortisol during fear-eliciting conditions compared with uninhibited and securely attached children (Nachmias, Gunnar, Mangelsdorf, Parritz, & Buss, 1996). More recently, Gunnar and her colleagues found high cortisol levels among 6- to 12-year old children who spent more than 8 months of deprivation in Romanian orphanages in their first years of life compared with early adopted children and Canadian children (Gunnar, Morison, Chisholm, & Schuder, 2001).

Despite these numerous findings reviewed above, the relation between high cortisol and stress-anxiety profiles is inconsistent. Cortisol appears to play different roles in a number of temperament styles and even within anxiety profiles. For example, high cortisol levels have been linked to the other end of the temperament spectrum (see Gunnar, 1994, for a review). High cortisol levels have been observed in dominant, assertive, and socially competent children during the pre-

دریافت فوری ← متن کامل مقاله

ISIArticles
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