Personality and Individual Differences 116 (2017) 301–308

Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

The Perceived Stress Reactivity Scale for adolescent athletes

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ARTICLE INFO

Article history:
Received 10 March 2017
Accepted 5 May 2017
Available online xxxx

Keywords:
Stress reactivity
Adolescence
Sport
Coping
Wellbeing

ABSTRACT

Individual differences play a significant role in the outcomes experienced by adolescent athletes, in what is a highly stressful period of their development. Stress reactivity is a stable individual difference underlying the broad variability in responses to stress, which has received very little attention within sport. Conventional physiological measures of reactivity can be time-consuming, costly, and invasive; therefore, this study aimed to adapt a self-report measure of Perceived Stress Reactivity for use with adolescent athletes. 243 adolescent athletes competing in various sports completed the Perceived Stress Reactivity Scale for adolescent athletes (PSRS-AA) along with measures of perceived stress, Big Five personality traits, and subjective well-being. The five-factor, 23 item structure of the original PSRS provided an adequate model fit for the PSRS-AA. There was good internal consistency and test retest reliability for the scale's measure of total reactivity. Total reactivity was positively associated with perceived stress, and negatively associated with emotional stability, extraversion, openness, and life satisfaction. Female adolescent athletes reported significantly higher stress reactivity than males. These findings provide good initial support for the use of PSRS-AA as a valid alternative to physiological measures of stress reactivity in youth sport contexts.

1. Introduction

Adolescent athletes experience a great number of stressors, including competitions, regular social evaluation and criticism, family and peer influences, as well as academic commitments (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001; Nicholls, Holt, Polman, & James, 2005; Reeves, Nicholls, & McKenna, 2009; van Rens, Borkoles, Farrow, Curran, & Polman, 2016). When faced with a stressor, an initial activation of the autonomic nervous system (ANS) and the hypothalamic-pituitary-adrenal (HPA) axis prepares an individual for action and facilitates a process of appraisal and coping responses. Lazarus and Folkman (1987) proposed in their transactional model of stress and coping that the appraisal of a stressor consists of numerous judgments regarding its threat or challenge to the individual, its potential benefit, harm or benignity, and the individual's perceived control. This in turn influences the choice of coping strategy selected. Athletes have been found to use a vast variety of different coping strategies (Nicholls & Polman, 2007). A problem focussed strategy involves directly addressing the source of stress to nullify it whereas an emotion focussed strategy regulates one's own emotions in response to a stressor. Finally, an avoidance focussed strategy aims to physically or psychologically disengage or distance oneself from the source of stress and one's emotional response (Lazarus & Folkman, 1987). Being unable to cope adaptively with these stressors, and thus stem the activation of the ANS and HPA, can lead to athletes experiencing unpleasant emotions (e.g., anxiety, anger, shame, guilt) and reduced satisfaction with their performance (Lazarus, 2000; Nicholls, Polman, & Levy, 2012). Moreover, stress has been cited as a significant cause of both athlete burnout and dropout (Crane & Temple, 2015; Goodger, Gorely, Lavallee, & Harwood, 2007; Smith, 1986).

Lazarus and Folkman (1987) also proposed that numerous personal and situational factors can directly and indirectly influence the stress and coping process (see Fig. 1). For example, gender (Kaiseler, Polman, & Nicholls, 2012b), the Big Five personality traits (Kaiseler, Polman, & Nicholls, 2012a), mental toughness (Kaiseler, Polman, & Nicholls, 2009), and pubertal, cognitive, and emotional maturity (Nicholls, Levy, & Perry, 2015; Nicholls, Perry, Jones, Morley, & Carson, 2013; Nicholls, Polman, Morley, & Taylor, 2009) have all been associated with differences in appraisal and coping responses to stress in athletes. Therefore, individual differences can be examined to predict the likelihood of performance and well-being related outcomes in sport. This is of great importance in youth sport, given the vast number of stressors experienced by adolescent athletes during their development. However, little research within sporting contexts has examined the biological basis underpinning these individual differences, or considered differential sensitivity of the ANS and HPA as an individual difference in and of itself. In other words, individual differences in stress reactivity.

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http://dx.doi.org/10.1016/j.paid.2017.05.008
0191-8869/

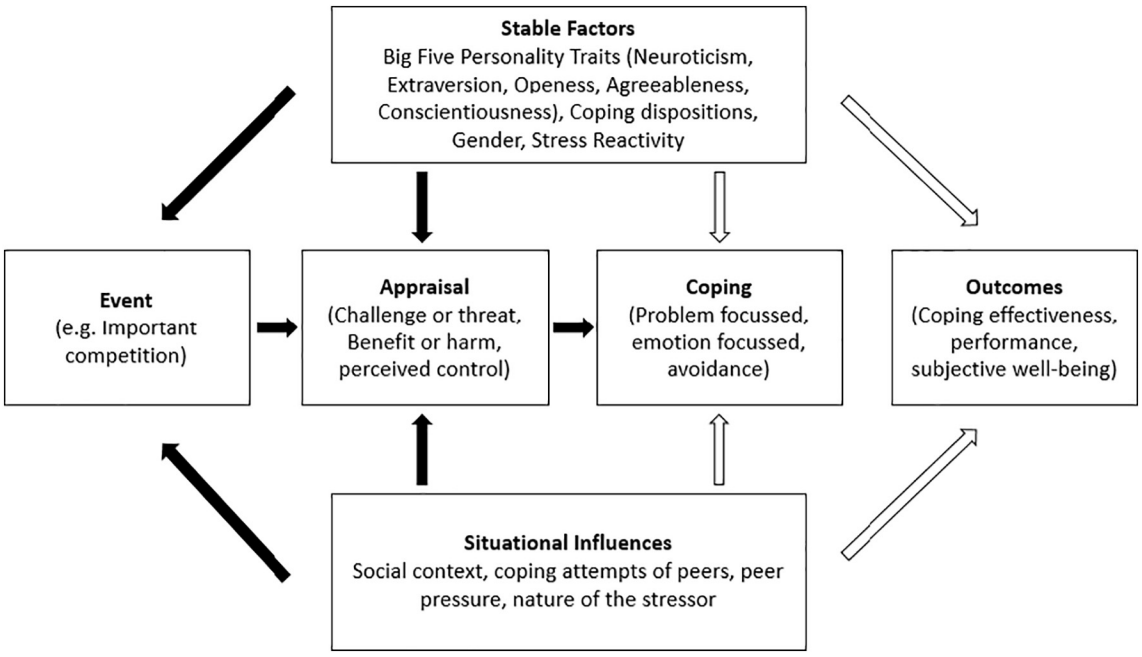

Fig. 1. Conceptual framework illustrating how stable personal and situational factors can directly and indirectly influence the stress and coping process (Kerdijk, van der Kamp, & Polman, 2016).

1.1. Stress reactivity

Eysenck (1967) originally proposed that personality had a biological basis. It was hypothesised that personality traits are a result of differential reactivity to stimulation, with neuroticism and introversion being the result of hyper-reactivity (Eysenck, 1967; Suls & Martin, 2005). Furthermore, gender differences in coping have been attributed to biological variations in reactivity between males and females (Tamres, Janicki, & Helgeson, 2002). More recently, stress reactivity (SR) has been operationalised as an individual difference underlying the broad variability in stress responses (Boyce & Ellis, 2005; Ellis, Essex, & Boyce, 2005; Schlotz, 2013; Schlotz, Hammerfald, Ehlert, & Gaab, 2011; Schlotz, Yim, Zoccola, Jansen, & Schulz, 2011). SR stems from an increased 'biological sensitivity to context' based on an evolutionary-developmental theory (see Boyce & Ellis, 2005). This predisposition is developed from exposure to both support and adversity in early childhood (Ellis et al., 2005). Exposure to acute stress during early childhood up regulates reactivity, increasing the individual's tendency to detect and respond to potential threats. Similarly, exposure to exceptionally high levels of support also creates the same effect, increasing the individual's sensitivity to their environment, and thus SR. Therefore, moderate exposure to stress in environments that are neither universally threatening nor safe, with moderate levels of support, down-regulates reactivity creating a buffering effect between the individual and stressors they experience. In summary, there is a curvilinear relationship between SR and early childhood exposure to stress (Boyce & Ellis, 2005; Ellis et al., 2005).

It has been argued that adolescence (12–22 years; Sullivan, 1953) is also a critical period where SR is developed, with the protracted maturation of the brain increasing sensitivity to stressors (Romeo, 2010). Hyper-reactivity in adolescents has been associated with internalising symptoms (negative emotionality, anxiety, and depression; Allwood, Handwerger, Kivlighan, Granger, & Stroud, 2011; Granger, Weisz, & Kauneckis, 1994; Lopez-Duran et al., 2015). Therefore, SR could have a critical effect on whether adverse outcomes (such as anxiety and depression) are developed by young sportspeople in the face of this vast number of stressors they are known to experience. Adolescence may then be an ideal window of opportunity for providing interventions to young athletes, particularly those who can be identified as having high SR. This therefore raises the question of how SR should be measured in adolescent athletes.

1.2. Measuring stress reactivity

It has been commented that SR would be difficult to measure and assess in athletic contexts (Polman, Clough, & Levy, 2010). To date, SR in adolescents has been examined using various physiological (e.g., heart rate variability, cardiac output, blood pressure, skin conductance) and neuroendocrine measures (e.g., cortisol) in controlled lab-based procedures (Allwood et al., 2011; Colich, Kircanski, Foland-Ross, & Gotlib, 2015; Marceau, Dorn, & Susman, 2012; McLaughlin, Sheridan, Alves, & Mendes, 2014; Paysnick & Burt, 2015). However, in more ecologically-valid athletic situations, differences in an observed stress response may be influenced by several situational factors, not just personal factors related to SR. It may also be difficult to delineate between physiological arousal as a consequence of SR or of the physical demands of sport (Polman et al., 2010). Stressor specificity also affects the validity of one-time lab-based methods of measuring SR as a stable factor (Schlotz, Yim, et al., 2011). For example, HPA reactivity has been associated closer with responses to social stress, while ANS reactivity has been primarily related to arousal and effort (Schlotz, 2013; Schlotz, Yim, et al., 2011). Unless measurements are repeated extensively under different environmentally controlled conditions using multiple measures, which would be costly and time-consuming (Schlotz, Yim, et al., 2011), a self-report measure would be more practical and ecologically valid.

Schlotz, Hammerfald, et al. (2011) and Schlotz, Yim, et al. (2011) developed the Perceived Stress Reactivity Scale (PSRS), a self-report questionnaire which measures a person's typical stress responses to different generalised situations, creating an aggregate score for an individual's 'total stress reactivity'. Perceived SR has been defined as 'a disposition that underlies individual differences in physiological and psychological stress responses' (Schlotz, Hammerfald, et al., 2011; Schlotz, Yim, et al., 2011), p. 81). Scores from the PSRS have already been associated with self-efficacy, neuroticism, chronic stress, perceived stress, depressive symptoms, sleep quality, threat appraisals, and