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Personality and Individual Differences 43 (2007) 143–154

PERSONALITY AND
INDIVIDUAL DIFFERENCES

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Sensitivity to punishment as a moderator of the relationship between self-efficacy and cardiovascular reactivity

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Received 2 March 2006; received in revised form 15 November 2006; accepted 21 November 2006

Available online 11 January 2007

Abstract

Eighty students volunteered to participate in an experiment in which the effect of self-efficacy on blood pressure (BP) and heart rate (HR) reactivity was tested. The subjects were asked to solve fifteen mathematical problems after having been randomly assigned to one of two experimental conditions of self-efficacy manipulation (high versus low) in the context of a negative incentive value (a loud noise) contingent upon failing to properly perform the task. Self-efficacy manipulation was based on the different performance challenge to be attained in order to avoid the negative incentive. The subjects' sensitivity to punishment was also evaluated by using the SPSRQ scale. The results showed an interaction between self-efficacy and sensitivity to punishment on systolic blood pressure and HR, but only a main effect of self-efficacy

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on diastolic BP was found. Self-efficacy tended to be negatively related to cardiovascular reactivity when the sensitivity to punishment was high, but positively when the sensitivity to punishment was low. The results are discussed in relation to the different motivational orientations (avoiding harm vs. achieving a goal) probably aroused by high and low sensitivity to punishment.

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Keywords: Self-efficacy; Perceived control; Sensitivity to punishment; Blood pressure; Heart rate; Social cognitive theory; Gray's model

1. Introduction

The main constructs of Bandura's self-efficacy theory are *self-efficacy* and *outcome expectancies* (Bandura, 1977). Self-efficacy refers to the control that a person expects to exert over the generation and execution of his or her own behaviour, so it is a specific belief about competence. The outcome expectancies construct refers to the anticipated consequences of behaviour, and is therefore a set of context-specific beliefs about reinforcement contingencies.

Bandura (1982, 1986) predicts that when a person copes with a situation that implies the avoidance of an aversive consequence, and he or she does not perceive him/herself as capable of performing the behaviour required (low self-efficacy), he or she will experience anxiety; this affective reaction will increase in proportion to the importance of the consequences (namely, the incentive value).

Taking into account the predictions derived from self-efficacy theory, and as an extension of psychophysiological research started by Bandura and other researchers in the 1980s (Bandura, Reese, & Adams, 1982; Bandura, Taylor, Williams, Mefford, & Barchas, 1985; Barrios, 1983; Biran & Wilson, 1981; Feltz, 1982; Feltz & Mugno, 1983; Wiedefeld et al., 1990), we analyzed the joint effect of self-efficacy and incentive value on physiological reactivity in a laboratory study (Sanz & Villamarín, 2001). We employed an avoidance experimental paradigm in which the subjects had to reach a certain performance level in a mental arithmetic task in order to avoid an aversive stimulus. Self-efficacy and incentive value were manipulated by verbal persuasion. Results confirmed the main hypothesis, namely, that self-efficacy specially regulates physiological reactivity when incentive value is high (Ruiz & Cid, 1996; Sanz & Villamarín, 2001; Sanz, Villamarín, & Álvarez, 2006a; Sanz, Villamarín, Álvarez, & Limonero, 2006b). Moreover, the evidences suggest a specific regulation for each psychophysiological parameter, but either the neural pathways responsible for such effect or the physiological relevance of this finding remain unclear (Sanz et al., 2006b).

Gray's model of personality proposes two independent neuropsychological systems that regulate motivated behaviours of avoidance and approach, named *behavioural inhibition system* (BIS) and *behavioural activation system* (BAS), respectively. BIS regulates behaviour in response to punishment signals, reward withdrawal, and novel stimuli, resulting in behavioural inhibition, whereas BAS controls behaviour in the face of reward or non-punishment signals, resulting in approach trends (Gray, 1981, 1987).

Gray (1987) has postulated that individual differences in the functioning of BIS and BAS would be related to personality dimensions labelled *anxiety* and *impulsivity*, respectively. These two dimensions are thought to be orthogonal (independent one from the other), and were initially proposed as a rotation of the personality dimensions of Eysenck's theory of personality (Gray, 1981). More particularly, individual differences in sensitivity to punishment cues run from the

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