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Personality and Individual Differences 40 (2006) 587–597

PERSONALITY AND
INDIVIDUAL DIFFERENCES

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Is the relationship between intelligence and trait Neuroticism mediated by test anxiety?

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Received 30 November 2004; received in revised form 30 June 2005; accepted 16 August 2005

Available online 3 October 2005

Abstract

The aim of the present study was to investigate the relationship between trait Neuroticism, state anxiety and intelligence. A total of 213 participants (divided into high-anxiety and low-anxiety groups) completed the Raven's Progressive Matrices and the Traits Personality Questionnaire 5 (the shortened version of a Greek Big Five measure-TPQue). Correlational analysis showed that trait Neurotics were more likely to be affected by test anxiety and by induced anxiety, and that the high-anxiety group scored lower on the intelligence test than the low-anxiety group. Neuroticism was significantly correlated with intelligence for the high-anxiety group but not for the low-anxiety group, although these correlations were not significantly different. Furthermore, when test anxiety was partialled out, Neuroticism did not significantly correlate with intelligence. These results support the majority of the hypotheses, indicating that the relationship between intelligence and trait Neuroticism is mediated by test anxiety.

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Keywords: Fluid intelligence; Personality; Neuroticism; Anxiety; Raven's Progressive Matrices; TPQue5

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1. Introduction

The majority of the investigations published since 1980, which have looked at how the constructs of intelligence and personality are interrelated, have mostly focused on personality as conceived and measured by the Five-Factor Model, proposed by Costa and McCrae (1985). The most consistent findings within this line of research are that intelligence is *negatively* correlated with Neuroticism (Ackerman & Heggestad, 1997; Furnham, Forde, & Cotter, 1998; Kyllonen, 1997; Zeidner & Matthews, 2000) and Conscientiousness (Furnham, Chamorro-Premuzic, & Moutafi, 2005; Moutafi, Furnham, & Crump, 2003; Moutafi, Furnham, & Paltiel, 2004, 2005), *positively* correlated with Openness to Experience (Austin et al., 2002; Brand, 1994; Chamorro-Premuzic, Moutafi, & Furnham, 2005; McCrae, 1994; Moutafi et al., 2003; Moutafi et al., 2005; Zeidner & Matthews, 2000) and both positively and negatively correlated with Extraversion (Ackerman & Heggestad, 1997; Austin et al., 2002; Furnham et al., 1998; Lynn, Hampson, & Magee, 1984; Moutafi et al., 2003, 2005) depending mostly on the testing conditions. The aim of this study is to further investigate the nature of the relationship between intelligence and Neuroticism.

Neuroticism reflects a tendency to experience negative emotions, like anxiety and depression (Busato, Prins, Elshout, & Hamaker, 2000). The six sub-facets of Neuroticism, according to Costa and McCrae (1992) are Anxiety, Anger-hostility, Depression, Self-consciousness, Impulsiveness and Vulnerability. High scorers tend to be sensitive, emotional, worrying, moody, frequently depressed, often sleep badly and may suffer from various psychosomatic disorders (Eysenck & Eysenck, 1975). Low scorers tend to be secure, hardy and generally relaxed even under stressful conditions. It has been proposed that individual differences in Neuroticism have a biological basis (Eysenck, 1967), more specifically that they are due to differences in the functioning of the limbic system (Stough, Donaldson, Scarlata, & Ciorciari, 2001).

Among the first studies which reported a negative correlation between intelligence and Neuroticism was an early study by Callard and Goodfellow (1962), and their finding has been replicated many times since then (Dobson, 2000). In a large meta-analysis of 135 studies, performed by Ackerman and Heggestad (1997), Neuroticism was reported to modestly negatively correlate with general intelligence (g), with a magnitude of $r = -.15$, and Kyllonen (1997) also reported a correlation of $r = -.23$ with g and $r = -.20$ with verbal ability. Studies have further shown that Neuroticism is a negative predictor of g (Chamorro-Premuzic et al., 2005; Moutafi et al., 2003).

It has been suggested that Neuroticism is negatively correlated with intelligence mostly due to the anxiety component of Neuroticism (Zeidner, 1998; Zeidner & Matthews, 2000). It is important here to distinguish between trait and state anxiety. Trait anxiety is an individual's stable, cross-situation, predisposition to respond with worry, tension and physiological arousal across a variety of conditions. State anxiety is a transitory emotional state; it is a particular level of anxiety which is experienced in a particular situation and is associated with heightened activity of the autonomic nervous system (Spielberger, 1972; Zeidner & Matthews, 2000). It is therefore essential to distinguish whether intelligence is directly related to Neuroticism (due to its trait anxiety component), or whether intelligence is instead related to state (test) anxiety, indicating that the relationship between intelligence and Neuroticism is not direct, but is actually mediated by state anxiety affecting intelligence test performance. These two suggestions, of how intelligence is related to Neuroticism, are pictorially represented in Fig. 1.

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