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Neuroticism, stress, and coping in the context of an anagram-solving task

Mark E. Boyes^{a,b,*}, Davina J. French^{a,c}

^a School of Psychology, University of Western Australia, Australia

^b Department of Social Policy and Social Work, University of Oxford, United Kingdom

^c Centre for Mental Health Research, Australian National University, Canberra, ACT 0200, Australia

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ABSTRACT

Research examining the relationship between neuroticism and coping has been limited by reliance on dispositional coping measures and/or retrospective reporting with long time-lags. The current experiment evaluated an anagram-solving task as a laboratory-stressor with which to examine neuroticism-related differences in situational coping. One hundred and twenty-four participants (with neuroticism scores in the top or bottom quartiles) were assigned to one of two conditions across which anagram difficulty and level of controllability were manipulated. Individuals in the high-stress condition solved fewer anagrams, appraised the task more negatively, reported lower mood and self-esteem, and engaged in more emotion-focused and less task-focused coping than individuals in the mild-stress condition. High-neuroticism participants engaged in more emotion-focused and avoidance coping than low-neuroticism participants regardless of which condition they were assigned to. In the mild-stress condition, high-neuroticism participants engaged in less task-focused coping than low-neuroticism participants. No neuroticism-related difference in task-focused coping was obtained in the high-stress condition. It is concluded that (1) the anagram-solving task is a promising laboratory-stressor with which to examine individual differences in appraisal and coping, and (2) neuroticism is associated with task-focused, emotion-focused, and avoidance coping in the context of this task, which overcomes limitations of previous research in this area.

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1. Introduction

Coping can be defined as cognitive and behavioural efforts to manage demands that are appraised as taxing the resources of the person (Lazarus & Folkman, 1984). An important feature of this perspective is that the coping process unfolds in an interplay between the person and the stressful situation (O'Brien & DeLongis, 1996). This has led researchers to explore the role of personality-related variables in the coping process (Vollrath & Torgersen, 2000). In particular, neuroticism has received much attention (Watson & Hubbard, 1996) and is the focus of this experiment.

Neuroticism is a personality-trait associated with an increased likelihood of experiencing negative emotions such as anxiety and depression (Costa & McCrae, 1987). Neuroticism is associated with subjective reports of stress-symptoms, the occurrence of stressful life-events (Magnus, Diener, Fujita, & Pavot, 1993), and has been linked with both appraisals of stressful situations and coping in

* Corresponding author at: Department of Social Policy and Social Work, University of Oxford, Barnett House, 32 Wellington Square, Oxford OX1 2ER, United Kingdom.

E-mail address: mark.boyes@socres.ox.ac.uk (M.E. Boyes).

the context of these situations. High-neuroticism individuals are thought to appraise ambiguous situations in a negative or threatening manner, and are therefore more likely to see threats where others do not (Costa & McCrae, 1987; Schneider, 2004). Additionally, research examining coping strategy use reports that neuroticism is positively correlated with maladaptive emotion-focused and avoidant coping strategies, such as disengagement, wishful-thinking, escape-avoidance, and emotional-venting. Neuroticism is negatively associated with more effective and direct coping strategies, often referred to as problem/task-focused coping (Bouchard, 2003; McCrae & Costa, 1986; O'Brien & DeLongis, 1996).

Although the relationships between neuroticism, appraisal, and coping have been widely replicated, and are consistent with a personality-type characterized as prone to experiencing negative emotions, these findings have important methodological limitations. Researchers typically use one of two methodologies to measure coping: (1) participants are asked how they *generally* cope with stressful situations; or (2) participants are asked to recall coping efforts in relation to the most stressful event experienced up to the last year (David & Suls, 1999). Indeed, over 80% of papers published between 1980 and 2004 used dispositional or retrospective methodologies to measure coping (Connor-Smith & Flachsbart,

2007). These methodologies may overestimate the relationships between personality-traits and coping in the context of any given stressful situation (David & Suls, 1999).

It has therefore been argued that examining neuroticism, appraisal, and coping in the context of specific stressors, where reporting time-lags can be minimised, would allow firmer conclusions regarding relationships between personality, appraisal, and coping to be made (Bolger, 1990). Furthermore, neuroticism-related differences in coping may best be identified through the use of experimental stressors, as presenting the same objective stressor to all participants minimises confounds and allows for immediate self-reports of appraisal and coping (Connor-Smith & Flachsbart, 2007). Although the integration of observational and experimental personality research was called for as early as 1966 (Eysenck, 1966), experimental approaches to the study of personality are rare (Revelle & Oehlberg, 2008). The current study aims to use a laboratory-stressor, which can be experimentally manipulated, to examine links between personality, appraisal, and coping behaviour.

Recently, Matthews et al. (2006) reported positive relationships between neuroticism, emotion-focused, and avoidance coping in a number of laboratory-tasks (including rapid information processing, mental arithmetic, and solving impossible anagrams). Neuroticism was also negatively correlated with task-focused coping. These findings are consistent with previous research, and are a promising start in examining the link between neuroticism and coping in the context of laboratory-tasks. Similarly, Endler, Macrodimitris, and Kocovski (2000) used an anagram-solving task in which control was manipulated, to examine stressor appraisals, situation-specific coping, and the goodness-of-fit hypothesis. According to the goodness-of-fit hypothesis stressor controllability influences coping strategy choice (Park, Armeli, & Tennen, 2004). This hypothesis posits that if stressors are controllable individuals will engage in more task/problem-focused coping. If stressors are uncontrollable individuals will engage in more avoidance/emotion-focused coping (Zeidner & Saklofske, 1996). Additionally, using situationally-appropriate coping strategies is argued to be associated with more adaptive outcomes (Park et al., 2004). Using the anagram-solving task Endler et al. (2000) obtained support for the goodness-of-fit hypothesis; however, as yet, this task has not been used to examine personality-related differences in coping.

For a number of reasons an anagram-solving task appears an ideal experimental stressor with which to examine neuroticism-linked differences in appraisal and coping. Firstly, the anagram-solving task represents a controlled stressor in which participants are faced with the same scenario. This should provide clarity in interpreting individual differences in appraisal and coping. Secondly, by responding to measures immediately after completing the anagram-solving task the limitations of dispositional measurement are overcome, and the time-lag associated with previous retrospective coping studies is minimised.

This experiment had two aims. The first aim was to evaluate the utility of the anagram-solving task as an experimental stressor. Anagram difficulty and level of control were manipulated across two experimental conditions. It was predicted that if the anagram-solving task is a good experimental stressor, then when compared with participants in the mild-stress condition, participants allocated to the high-stress condition should appraise the task more negatively, experience a negative affective response (specifically lowered mood and self-esteem, Boyes & French, 2009), and use theoretically predicted coping strategies. Specifically, given the manipulation of control (and in accordance with the goodness-of-fit hypothesis) it was predicted that participants in the high-stress condition would engage in more emotion-focused and avoidance coping, and less task-focused coping, than participants in the mild-stress condition.

The second aim of the experiment was to determine if neuroticism-linked differences in appraisal, affective state, and coping could be obtained in the context of this task. When compared to low-neuroticism participants, high-neuroticism participants were predicted to appraise the anagram-solving task more negatively; report worse mood and lower self-esteem; and engage in less task-focused coping and more emotion-focused and avoidance coping, regardless of which condition they were assigned to. Additionally, personality traits are more likely to be associated with stress reactivity and performance when the demands of the task are sufficiently high to force the individual to allocate compensatory effort and leave fewer resources available for ongoing self-regulatory processes (Hancock & Warm, 1989; Szalma, 2008). Neuroticism was therefore predicted to interact with condition such that neuroticism-linked differences in appraisal, affective state, and coping would be more pronounced in the high-stress condition.

2. Method

2.1. Participants

Two hundred and eighty-seven undergraduate students completed a neuroticism measure and the top and bottom quartiles were invited to participate in the experiment. One hundred and twenty-four participants (73 females; 51 males) took part in the experiment (mean age = 21.45 years). Approximately equal numbers of high-neuroticism ($n = 64$, mean neuroticism score = 26.68) and low-neuroticism ($n = 60$, mean neuroticism score = 10.66) participants were recruited. Participants were randomly allocated to either a mild- ($n = 65$) or high-stress ($n = 59$) condition.

2.2. Materials

2.2.1. Anagrams

Anagrams were sourced from Tresselt and Mayzner (1966), who provide normative solution times for a sample of 134 words and 378 associated anagrams. All anagrams were presented on paper. The study had two experimental conditions. Individuals allocated to the mild-stress condition attempted six anagrams with median solve times of 31 s or less. In an attempt to maximise perceived control participants in this condition were given as long as they required to solve the anagrams, were provided with pen-and-paper to assist them in the task, and could complete the anagrams in any order they wished. Individuals allocated to the high-stress condition attempted six anagrams with median solve times of 120 s or more. In order to minimise perceived control, participants in this condition were given 30 s to solve the anagrams, were not allowed to use pen-and-paper, and had to complete the anagrams in the order provided. All anagrams had only a single correct solution and in high-stress condition participants were shown the solution before proceeding to the next anagram. In the mild-stress condition participants were shown the solutions after completing all anagrams.

2.2.2. Neuroticism

A 10-item neuroticism scale compiled from the International Personality Item Pool (Goldberg et al., 2006) was used to screen potential participants. Items were responded to on a five-point scale (0: *Very inaccurate*; 4: *Very accurate*). The scale has an internal consistency of .86 (Goldberg et al., 2006) and correlates highly with other neuroticism measures (e.g. a correlation of .84 with the NEO-FFI neuroticism subscale; Gow, Whiteman, Pattie, & Deary, 2005).

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