The Effects of Personality Traits, Depression and Social Support on Stress Responses to a Strenuous Fire-Fighting Exercise

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Introduction

People in extreme, threatening situations show increases in both subjective (self-reported) and physiological (e.g. cortisol) levels of stress (Robinson et al., 2008). There is evidence that a number of psychosocial factors could be involved in determining the magnitude of such a stress response examined three factors – personality traits, depression and social support. Previous research has demonstrated that those with certain personality traits may be more vulnerable to stress reactivity (Pentley & Tomaka, 2002). It has also been indicated that social support may mediate stress reactivity in the presence of an acute stressor (Lepore et al., 1993; Patterson, 2003), whilst depression may elevate stress reactivity, as it is known to be linked to hyperactivity of the hypothalamic-pituitary-adrenal axis, a mechanism involved in the physiological stress response (with activation ultimately stimulating the secretion of cortisol) (Pariente & Lightman, 2008).

Previous research has often been carried out in the laboratory. The present study took a more ecologically valid approach, investigating whether these psychosocial factors have any impact upon stress responses when individuals are exposed to an acute, naturalistic stressor – in this case a fire-fighting task.

Method

Participants: Fifty three healthy participants (9 female) took part in a fire-fighter training session.

Training: Participants entered a mock-up of a ship’s galley in full turn-out gear. The galley was heated to temperatures between 60°C and 130°C and filled with thick black smoke. Participants completed a 60 min search and rescue exercise. The training was considered to be both physically and psychologically demanding.

Materials and Procedure: Salivary cortisol and stress and arousal levels (Stress and Arousal Checklist) were measured at three time-points (T1: immediately before, T2: immediately after; T3: 20 minutes post). Depressive symptoms were measured using the Centre for Epidemiologic Studies Depression Scale (CES-D), and four personality traits (neuroticism, extraversion, conscientiousness and agreeableness) using items from the International Personality Item Pool. Levels of social support were measured using the Social Support Network Inventory (SSNI), a measure which contains five subscales of support (availability, practical, reciprocal, emotional and event-related).

Arousal: Exposure to fire-training had a significant main effect upon arousal (F(2,100)=11.67, p<.001), which was significantly elevated at T2 (MD=2.37, p<.001) and T3 (MD=1.43, p<.05). Levels of depression, social support and personality traits had no significant effect upon self-report arousal.

Results

No differences in stress responses were found between the three participant groups on the availability, practical, reciprocity or event related subscales. However, in the emotional social support subscale (ESS) there was a significant difference between the three groups (F(2,47)=3.65, p<.05). Those with low levels of ESS reported being significantly more stressed than those with medium or high levels (MD=3.35, p<.05; MD=3.35, p<.05) at T1, and this trend continued at T2 and T3, although not at a statistically significant level.

Using a tertiary split, participants were divided into three groups (low, medium, high) on depression scores from the CES-D. Level of depression had a significant main effect on stress levels (F(2,48)=5.01, p<.05), with participants who had both medium and high levels of depression displaying significantly higher stress levels at T2: (MD=3.33, p<.05) and (MD=3.72, p<.01), respectively.

Conclusions

Individual personality traits appeared to have no effect upon stress responses to the fire-fighter training session. Higher levels of emotional social support were found to mediate anticipatory subjective stress, although this finding was not mirrored by the physiological data.

Higher levels of depression were found to elevate subjective stress responses to fire-fighting, although again this finding was not mirrored in the physiological data.

In individuals who work in physically threatening environments, levels of perceived stress could be lowered by ensuring that adequate emotional social support is available. Similarly, screening for depression/depressive symptoms could be carried out to identify individuals who may require extra support.

References


