

## Psychological and Somatic Stress-Personality Interactions

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### Abstract

Several aspects of stress and personality profiles are considered, including personal attributes, trauma, burnout, adverse childhood conditions, affective disorders and type D personality. In each of the studies and cases considered the interactions of stress and personality may be either detrimental, generally the case, yet in certain aspects allowed development, as a function of whether or not individuals were in possession of 'redeeming' personality attributes such as character properties or coping capacity. Emotion dysregulation is a core feature of neuropsychiatric disorder with increased emotional reactivity to negative, positive, and neutral events/stimuli accompanied by lower high-frequency heart rate variability associated with disorder co-morbidity.

**Keywords:** Stress; Chronic somatic health; Trauma severity

### Mini Review

Although the presence of provocative, stressful environments and situations are associated with both acute and chronic somatic health issues, such as diarrhea and other expressions of illness, it has been demonstrated that the relative impact of these types stressors may be regulated by the animals, e.g. Rhesus macaques, personality and psychological attributes [1]. Taking into account the large number of linked factors for posttraumatic stress disorder (PTSD), personality factors, e.g. neuroticism, extroversion, openness to experience, agreeableness, and conscientiousness, as well as serving in the Army, service-rank, trauma severity, presence of perceived threat, peritraumatic dissociation, recent life stress, and social support, personality factors, burnout and baseline PTSD avoidance symptoms, higher baseline psychological inflexibility predicted unique variance in 1-year PTSD symptom severity [2]. Burnout portends serious health problems among nurses, whereby individuals presenting a 'risk' certain personality seem more susceptible to job-related burnout, with self-efficacy presenting an important predictor of job-related burnout. Consequently, it was shown that Stress, self-efficacy and introvert unstable personality were the top three factors predictive for job-related burnout, with moderates the effect of stress on burnout among nurses with extroversion or neuroticism personality [3]. Stress-reduction, incremented self-efficacy, and more social support all alleviated job-related burnout, with the provision of social support for unstable personality. Salivary  $\alpha$ -amylase offers a biomarker for stress and sympathetic nervous system activity; in a study involving acute stress and tridimensional personality, it was observed that salivary  $\alpha$ -amylase levels during the post-stress testing period and the recovery period of the high reward-dependence group, high on temperament, were markedly higher than in the low-reward-dependence group, low on temperament, concurrent with high levels for the high novelty-seeking group, also high on temperament, compared with the low novelty-seeking group [4]. Recent and past evidence implies that individuals' lifestyles consisting of intermittent bio-energetic challenges, such as physical exercise, dietary energy restriction and selective diets, may insure the likelihood that the brain-body interaction will function optimally with limitations upon the occurrences of disease states throughout the life cycle. Conversely, it is not always taken into account that as adverse environments go that childhood malnutrition constitutes a major, traumatic chronic stress condition. Thus, both childhood malnutrition and maltreatment are associated with mental health problems that can persist throughout the lifespan. In this regard, In the 47-year longitudinal Barbados Nutrition

Study, it was observed that enhanced scores for paranoid, schizoid, avoidant, and dependent personality disorders among those individuals who had been malnourished were evident accompanied by elevated scores for paranoid, schizoid, schizotypal, and avoidant personality disorders among those with greater levels of childhood maltreatment scores. Taken together, the consensus was that those individuals who had been exposed, during their early years to both types of adversity, presented even greater scores for personality disorders [5].

Adverse neurodevelopmental environments, e.g. early social isolation, increase anxiety-like behavior, reduce social behavior, elevate cellular apoptosis, synaptic protein loss, myelination defect and microglial activation in the hippocampus and medial prefrontal cortex; all these developments abolish brain and brain plasticity thereby rendering individuals susceptible to the destructive demands of the environment. For example, the exposure of mice to stressors, i.e. chronic mild unpredictable stress, prior to administration of a neurotoxin, such as the DA denervating effects of the neurotoxin, MPTP, to mice, induced low levels of motor behavior associated with greater anxiety states accompanied by the most extenuating enhancement of neuro-inflammatory processes and other markers of stress thereby accelerating the Parkinsonian neurodegenerative advance in laboratory mice (cf. Archer and Rapp Ricciardi, submitted). Adverse, unpredictable and harsh environments (social) demonstrate to induce fast life history (abnegational) coping strategies, described by early maturation, greater numbers of number of sexual partners lesser attachments, and less parenting of offspring. Unpredictability and harshness affect not only dispositional social and emotional functioning, but tend to promote also the development of personality characteristics associated with greater levels of instability, fluctuation and capriciousness in social relationships and more self-interested/self-centred behavior, all of which relate to malevolent personality features and the "Dark-Triad" [6]. Childhood trauma and complex traumatic

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stress are associated with dysregulated affect, aspects of borderline personality disorder, psychoform dissociation and various forms of anxiety and disorders of extreme stress [7]. It should be noted that Burnout was found to be associated with borderline personality traits even controlling for neuroticism and history of depressive disorders [8]. Chronic stress reduces the density of protective microglia, rendered increasingly dysfunctional and overexpressing pro-inflammatory cytokines, in several brain regions [9]. The incidents that marked presence of physical aggression were associated positively with the nursing staff's symptoms of burnout whereas stress management skills, which provide a subscale of emotional intelligence, but not personality measures themselves, exerted a moderating effect upon this relationship. Concurrently, the skin conductance estimations were unrelated to these symptoms of burnout. Interestingly, the relationship between aggression and symptoms of burnout was greatest among those members of staff presenting the highest number of stress management skills [10]. Chronic and/or repetitive exposure to stress leads eventually to long-lasting or permanent deficits in neurobiological functioning and cognitive-affective behavioural expression [11]. In a comparison of male and female laboratory rats, it has been observed that, regardless of the specific chronic stress regimen and conditions, male rats showed greater vulnerability to the somatic effects of chronic stressors, whereas female rats expressed greater susceptibility to the neuroendocrine and behavioral alterations involved [12]. Exposure to early-life stress, such as maternal separation, provokes long-term alterations and impediments in brain and behavior, and may aggravate the outcome of neurological insults [13]; thus, prolonged maternal/caregiver separation stress promotes neurobehavioral hyperarousal, alterations in hypothalamic-pituitary-adrenal (HPA) axis expressions and alterations to hippocampal and prefrontal cortical neurobiology over multiple neurotransmitter systems (Table 1) [14-17]. Currently, there remains a paucity of research aimed at a better understanding of the nature and influences of prenatal maternal stress as occasioned through disaster and catastrophe. Applying a subsample of 318 mother-child dyads drawn from the Stress in Pregnancy Study, temperament was measured at 6, 12, 18, and 24 months of age [18]. It was found that both that both objective stress exposure and subjective stress reaction in-utero predicted the developmental trajectories of temperament, e.g. higher levels of high-Intensity pleasure, approach, perceptual sensitivity and fearfulness, but lower cuddliness and duration of orientation at the 6-months stage during early childhood.

The traumatized survivors of natural catastrophes or terrorism, disposed of loved one or friend, present the psychological, physical, daily behavioural, and physiological components that form the extensive reporting of PTSD, depression, anxiety, negative affectivity, deteriorated mental health, adverse physical health symptoms, alcohol consumption, family conflicts, and fear, despite their own personal survival. In the present account, the concatenation of stress (whether acute, chronic, traumatic and non-traumatic), affective status and neurodegenerative

disruptions, including pro-inflammatory neuronal-glial-regional events, as well as metabolic and cardiovascular perturbation that underlie the influences of stress, presents several convergent and divergent mechanisms, not least instigating disorders, traumas and negative affectiveness. In a laboratory study of personality and acute psychological stress, assessed by a combination of cardiovascular reactivity, hypothalamic-pituitary-adrenal axis reactivity, and subjective affect, induced in the laboratory setting [19], it was observed that higher levels of trait neuroticism were associated with lower levels of heart rate stress reactivity, cortisol stress response and subjective controllability, and a greater decline in levels of positive affect. Those individuals expressing higher levels of extraversion expressed lesser cortisol activation to stress and less increase of negative affect; further, greater openness scores were associated with lower levels of the cortisol stress response. Taken together, it is evident that neuroticism, extraversion and openness present major attributes associated with the stress response whereas different aspects of personality traits are associated with different aspects of the stress response. There exists a reasonably high risk that high levels of stress, especially chronic, are accompanied by myocardial ischemia, facilitating rupture with type D personality associated with coronary heart disease [20]. The etiopathogenesis of psychological health problems, such as depression, anxiety, and posttraumatic stress, is associated with several expressions of heart and risk-factors accruing to self-destructive personal profiles. The capability of expressing and regulating affectivity (positive or negative), age and lifespan parameters, and gender type are predicted to facilitate in the identification of symptoms for depression, anxiety, and posttraumatic stress among individuals presenting cardiac/cardiovascular diseases. For example, the expression of a type D personality, and presence and quality, or absence, of social support among patients presenting forms of heart disease must be taken into consideration [21]. Finally, in two studies type D personality, stress and coping behaviour interrelationships were analysed: in the first, heightened levels of perceived stress, the particular selection of coping strategies, whether more emotional and avoidance coping types, and individuals' perceptions of their self-effectiveness were linked to Type D, and, in the second, 32 participants completed a rugby league circuit-training task and were assessed on pre-performance anxiety, post-performance affect and coping [22]. In the first place, Type D was related to a deterioration of performance, as expressed by reduced distance run and a greater number of errors, decreases in pre-performance self-confidence and greater use of maladaptive resignation/withdrawal coping behaviors [23]. These results imply that Type D is associated with maladaptive coping and reduced performance.

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Personality/Adversity	Neurodevelopmental	Acute	Chronic
<b>Affective</b>	Self-destructive	High Affective	Self-destructive
<b>TCI-Temperament</b>	Harm avoidance	Reward dependent	Harm avoidance
<b>Type D</b>	Self-destructive	Self-destructive	Self-destructive
<b>Neuroticism</b>	Stress-vulnerability	Anxiety	Burnout
<b>Introvert-unstable</b>	Somatic-vulnerability	HPA-hypersensitivity	Greater vulnerability

**Note:** TCI=Temperament-Character Inventory; HPA=Hypothalamus-Pituitary-Axis.

**Table 1:** Predicted outcomes arising from certain Personality types and common stress features among self-reported, clinical and laboratory investigations.

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