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Impact of values clarification on cortisol reactivity to an acute stressor

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ABSTRACT

The present study investigated whether a brief values clarification intervention impacted neuroendocrine stress reactivity in a standardized social stress task, and whether psychological variables, such as experiential avoidance and consistency with living personal values, predicted that reactivity. Participants were 98 healthy undergraduates who were randomized to receive values clarification or a control activity, followed by the Trier Social Stress Test (TSST; Kirschbaum, Pirke, & Hellhammer, 1993), a standardized social stressor. Individuals who received the values intervention demonstrated significantly lower cortisol. Contrary to hypotheses, experiential avoidance appeared to be a significant negative predictor of baseline cortisol, and in a subset of participants in the values condition ($N=34$), use of values during the stress task was a significant positive predictor of stress reactivity. These results indicate that values clarification, but not values utilization, may be an effective method of mitigating stress reactivity in acutely stressful contexts.

1. Introduction

Even as cultures around the world develop and conditions improve, there are environments and contexts where chronic, ongoing stress cannot be avoided. War, poverty, chronic or terminal illness, and countless other stressors can contribute to the unrelenting, ongoing experience of subjective stress. This stress can also have harmful effects on the nervous, immune, cardiovascular, and metabolic systems (McEwen, 1998), as well as the longevity of cells (Epel et al., 2004). To counteract these effects, there has recently been a focus on psychological mechanisms that serve stress-buffering functions, and behavioral and environmental factors that may bring about adaptive responses to stressful stimuli.

The body's physiological reaction to a stressor prepares the organism for action through subtle changes in systemic and brain physiology. This response is initiated with the activation of the hypothalamic–pituitary–adrenal axis (HPAA), the key neuroendocrine mechanism of the stress response. This response allows the adrenal-derived glucocorticoid, cortisol, to act on stress-related functions on metabolism (e.g., gluconeogenesis), immunity (e.g., suppression of inflammation) and cognitive and emotional reactions (e.g., memory facilitation and stress reactivity). With normal or transient stress, this is adaptive, but in the face of chronic, ongoing stress, the response has obvious health risks, such as hyperglycemia, immune dysregulation, and psychological disturbances, such as anxiety and depression (McCowen, Malhotra, & Bistrain, 2001; Reiche, Morimoto, & Nunes, 2005; McEwen, 2003).

Paradoxically, direct attempts to reduce the experience of stress may actually lead to an increase in subjective distress and stress responding. Gross (1998) found that suppression of emotional responding when exposed to a disgust-inducing film led to greater sympathetic nervous system activation. In addition, avoidance responding has been linked to a number of negative psychological and physical effects in humans across the lifespan (e.g., Hayes et al., 2004; Hayes, Wilson, Gifford, Follette & Strosahl, 1996; Andrew & Dulin, 2007).

One alternative approach to stress is to bring responding under the control of factors related to meaningfulness, purpose in life, or personal values. As opposed to the negative effects of suppression, greater purpose in life has been associated with lower rates of a number of physiological and neurological disorders, as well as with all-cause mortality, even when health, psychological, and income factors are controlled (Boyle, Buchman, Barnes, & Bennett, 2010; Boyle, Barnes, Buchman, & Bennett, 2009).

The modifiable nature of a sense of purpose in life has led to the development of interventions that seek to enhance personal resources through the exploration of personal values. Values have been defined cross-culturally as verbally-mediated representations of motivations (Sagiv & Schwartz, 2000) and may serve a variety of other functions, including self-affirmation (Steele, 1988), clarifying intrinsic motivation (Ryan & Deci, 2000), or providing information about contingencies of behavior change (Leigland, 2005).

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Conceptualized within a functional, contextual framework, values can provide a structure for behavior change that involves moving toward verbally-mediated positive reinforcers (i.e., "tracking") rather than away from negatively-evaluated psychological experiences (i.e., "experiential avoidance"). In the context of an unrelenting stressor, values may provide a verbal prompt for tracking responses by providing a verbally-mediated discriminative stimulus for approach, versus avoidance, responding.

The clarification of personal values is an important component of acceptance-based interventions, most notably Acceptance and Commitment Therapy (ACT; Hayes, Wilson, & Stroshal, 2011). ACT is a third wave behavior therapy which focuses on an increase in values-related behaviors and the reduction of problematic avoidance responses to negatively-evaluated experiences in the treatment of a wide variety of psychological and health behavior problems (see Ruiz (2012) and Swain, Hancock, Hainsworth, and Bowman (2013) for recent reviews). Within an ACT context, values are defined as, "freely chosen, verbally-constructed consequences of ongoing, dynamic, evolving patterns of activity, which establish predominant reinforcers for that activity that are intrinsic in engagement in the valued pattern itself" (Wilson & Dufrene, 2009, p. 64). Acceptance-based behavioral therapies such as ACT urge clients to clearly define their personal values and engage in them despite the possibility of uncomfortable feelings such as painful thoughts or emotions.

Values assessment interventions are used in both clinical and research work in ACT to prompt tracking behavior rather than experiential avoidance in difficult contexts. However, little research has been conducted on the effects of different types of values interventions on psychological and physiological outcomes related to stress, and that which has been done has largely focused on the use of values clarification to increase "positive" emotions such as self-esteem or optimism in a stressful context, or to reduce "negative" emotions such as anxiety.

Creswell et al. (2005) investigated the impact of writing about one's most important personal value, compared to a less-important value, on neuroendocrine stress reactivity. They found that writing about a more meaningful personal value did not significantly reduce self-reported stress, but did significantly reduce neuroendorcrine stress reactivity, as measured by salivary cortisol, following the Trier Social Stress Test (TSST; Kirschbaum et al., 1993), a standardized social stressor. This mitigation of stress reactivity was largely understood by the authors as related to self-affirmation, and they reported a moderating effect of higher "self-resources" such as high self-esteem and optimism.

Czech, Katz, and Orsillo (2011) expanded on this study by investigating whether a 20-min values articulation writing task about an important personal value would decrease self-reported anticipatory anxiety in response to a speech task similar to that employed by Creswell et al. (2005). It was hypothesized that the values writing task would decrease self-reported anxiety in response to the task, and that self-esteem, psychological flexibility, and living personal values would serve as moderators to this response. They found that engaging in values writing tasks did not significantly lower self-reported anticipatory anxiety or anxious responses to a stress task, and that only self-esteem served as a significant moderator.

The studies conducted by Creswell et al. (2005) and Czech et al. (2011) provide an interesting set of findings on which to further explore. While the values intervention examined in Creswell and colleagues' study clearly impacted neuroendocrine stress responding, its clinical relevance was more limited. The intervention examined in Czech and colleagues' study, on the other hand, was more clinically relevant, but writing for 20 min about a deeply held value may have inadvertently generated more short-term stress for participants. Additionally, the Czech study did not provide direct comparison of a more clinically-relevant values assessment to the Creswell study, given the lack of cortisol testing and their use of a modified form of the TSST procedure which may have impacted findings.

In order to better understand these processes and to expand on these studies, the present study sought to examine the effect of a brief, clinically-relevant values clarification intervention on cortisol following a standardized stressor. Of particular focus was the question of whether defining one's values right before entering a stressful situation may account for changes in stress reactivity by orienting participants toward a positively-reinforcing course of action, rather than a negatively-reinforcing experiential avoidance response in the face of a social stressor. We hypothesized that compared to a control condition, individuals who receive a brief values-clarification task prior to the TSST would demonstrate lower cortisol. Additionally, we hypothesized that values adherence and experiential avoidance would serve as predictors of baseline levels of stress reactivity. Finally, we hypothesized that use of values during the social stressor would result in lower cortisol during the task.

2. Methods

2.1. Participants

Participants were healthy undergraduate psychology students recruited through a university course in the United States ($n=98$). They were ethnically diverse, with 34.7% Asian-American, 28.6% Caucasian, 22.4% Hispanic, and 14.3% other racial background. The sample was 60.8% female and had a Mean age of 22.3 (SD=5.88). Exclusion criteria included self-reported health conditions known to influence cortisol (e.g., thyroid problems) and use of over the counter or prescription medication. Participants were asked to avoid alcohol for 24 h, caffeine, food, tobacco, or strenuous exercise for 2 h, and any liquid for one hour prior to participation.

2.2. Procedure

Upon arrival, participants were seated in a waiting room and after 5 min were asked to give a saliva sample. Specifically, they were instructed to place a Salimetrics cotton swab in their mouth, moving it around for 2 min and then insert the cotton swab into a tube without touching it with their hands. Participants were then randomly assigned to one of two writing tasks before being exposed to a standardized social stressor. Salivary cortisol samples were taken at 20 min prior to exposure to the stressor, 10 min after exposure to the stressor, 30 min after exposure to the stressor, and 45 min after exposure to the stressor.

2.2.1. Trier Social Stress Test (TSST)

Following the randomized intervention (see below), stress was induced using the Trier Social Stress Test (TSST; Kirschbaum, Pirke, & Hellhammer, 1993). The task began with the introduction of the participant to a room in which there is a conspicuously placed video camera and a panel of judges who are described as experts that would be evaluating their non-verbal behavior. The participant was informed they would be given 10 min to prepare a five minute speech in which they would attempt to convince the panel that they are an ideal applicant for their fictional dream job. The participant was then led to a separate room to prepare for their speech. After 10 min of preparation the participant was returned to the room with the judges where they delivered their speech. They were given no verbal or non-verbal feedback about their performance and the judges were trained to remain as expressionless as possible. Following the speech, they were asked to verbally