



Short Communication

Investigating the relationship between optimism and stress responses: A biopsychosocial perspective

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ABSTRACT

We investigated the relationship between optimism and psychological, behavioral, and psychophysiological stress responses. We expected that optimism would relate to challenge appraisals, more positive and less negative affect, better performance, and challenge physiological patterns. 153 participants reported their stressor appraisals and state affect regarding an impending stressor. Performance and cardiovascular reactivity were measured during the stressor. We replicated past research showing that challenge appraisals predict more positive and less negative affect, better performance, and cardiovascular reactivity. We extend past research showing that optimism predicts challenge appraisals and less negative affect, but not positive affect, performance, or cardiovascular reactivity. This research revealed some psychological benefits of optimism for acute stressors, which have also been found for chronic stressors.

1. Introduction

People respond differently to stress – some become distressed and overwhelmed while others thrive. Individual differences may partly explain why some are more resilient to stress than others (Lazarus, 1999). One such variable is optimism, or the tendency to have positive expectations about the future (Scheier, Carver, & Bridges, 1994), including imminent stressors (Chang, Yu, & Hirsch, 2013). We examined the relationship between optimism and stress responses from a biopsychosocial perspective, which has found that appraisals influence affective, behavioral, and physiological stress responses. Challenge appraisals predominate when people believe that situational demands are commensurate with available resources to meet demands, whereas threat appraisals denote that demands outweigh resources. Appraisals initiate the stress process and set the stage for individual differences such as optimism to moderate stress responses (Lazarus, 1999; Lazarus & Folkman, 1984). We hypothesized that optimism predicts challenge appraisals and related affective, behavioral, and physiological outcomes.

Optimists believe that good rather than bad things will happen in the future. Optimism is characterized by having positive expectancies, which enhance motivation and persistence (Carver & Scheier, 2014; Carver, Scheier, & Segerstrom, 2010). College success requires

motivation and persistence, and optimists have higher academic performance and a greater likelihood of graduating, which is mediated by greater motivation and less distress (Nes, Evans, & Segerstrom, 2009). Compared to those low in optimism who tend to disengage, optimists effortfully pursue goals (Carver & Scheier, 2014) and persist even on insoluble anagrams (Nes, Segerstrom, & Sephton, 2005). Optimism is also related to long-term engagement in health behaviors including exercise, healthy diet, and less smoking (Giltay, Geleijnse, Zitman, Buijsse, & Kromhout, 2007). Proactive behaviors such as seeking medical care and a second opinion mediate the link between optimism and slower HIV disease progression (Ironson et al., 2005). Some benefits of optimism may be due to its association with persistence and proactive engagement.

Expectancies are important determinants of how people interact with potential stressors (Lazarus & Folkman, 1984). The positive expectancies of optimism facilitate an approach orientation that directs attention and energy toward the source of distress, whereas low optimism facilitates inward attention and withdrawal (Scheier, Weintraub, & Carver, 1986; Suls & Fletcher, 1985). Optimism predicts greater attention to and recall of threatening health information (Aspinwall & Brunhart, 1996), and less distress and greater engagement with social and recreational activities after breast cancer surgery (Carver, Lehman, & Antoni, 2003). Optimism is related to approach-oriented affect,¹

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¹ Optimism is an approach-oriented trait. Anger is an approach-oriented negative valence state (Carver & Harmon-Jones, 2009). Optimism is negatively related to anger suppression, loud anger expression, and trait anger (Ausbrooks, Thomas, & Williams, 1995), but is unrelated to anger reactivity (Hart & Hittner, 1995). Optimism is not associated with every type of anger, though both can be conceptualized as having an approach, or outward focused, orientation.

specifically to positive affect before tumor biopsy (a time of uncertainty) and affect maintenance regardless of diagnosis (Stanton & Snider, 1993). Optimism predicted less distress among couples undergoing fertility treatment, even when outcomes were unsuccessful (Litt, Tennen, Affleck, & Klock, 1992). The positive outcome expectancies and approach orientation associated with optimism may be associated with stress outcomes.

Traits should predict different types of appraisals and their concomitants (Lazarus, 1999). Optimism overlaps with some personality traits (see McCrae & Costa, 1987), which have been linked to stress outcomes (see McCrae & Costa, 1987). Optimism is a composite of neuroticism (Scheier et al., 1994; Sharpe, Martin, & Roth, 2011), extraversion (Marshall, Wortman, Kusulas, Hervig, & Vickers Jr, 1992; Sharpe et al., 2011), conscientiousness, and agreeableness (Sharpe et al., 2011). Optimism shares the greatest variance with affective traits – neuroticism and extraversion (Marshall et al., 1992; Sharpe et al., 2011). Neuroticism is the tendency to experience negative affect (distress, anxiety) and mistrust. Neuroticism increases stress reactivity (Suls, 2001), focuses attention to aversive aspects of stressors (Craske, 1999), and is related to greater threat appraisals, negative affect, and worse performance during a vocal math stressor (Schneider, 2004; Schneider, Rench, Lyons, & Riffle, 2011). Extraversion is the tendency toward positive affectivity, but is unrelated to stress outcomes (Schneider et al., 2011). Positive affectivity is not sufficient, but when coupled with positive expectancies and motivated engagement a link to stress outcomes may exist. One component of optimism is conscientiousness, the tendency to be dutiful, hardworking, and persistent, but it is unrelated to stress outcomes. Agreeableness is the tendency to be trusting, sympathetic, and cooperative and is associated with challenge appraisals (Schneider, 2004). Neuroticism and agreeableness are associated with stress outcomes including appraisals, but extraversion and conscientiousness are not.

The relationship between optimism and appraisals has yet to be examined from a biopsychosocial perspective. Challenge appraisals are growth-oriented expectancies of mastery or gain in response to an impending stressor (Lazarus & Folkman, 1984). Optimists have positive expectancies and should envision the potential for mastery or gain when interacting with potential stressors. Optimists should have higher challenge appraisals. Indeed, breast cancer patients reported higher challenge appraisals about their diagnosis, compared to threat or harm/loss appraisals (Schou, Ekeberg, & Ruland, 2005). The present study investigated the relationship between optimism and biopsychosocial stress responses.

The transactional theory of stress suggests that primary and secondary appraisals combine to initiate the stress process (Lazarus, 1999; Lazarus & Folkman, 1984). Primary appraisals arise from beliefs, values, and goals, and are evaluations of the personal relevance/demands of a situation. Initially, the theory suggested that people held *challenge* appraisals when encounters were evaluated as having potential for gain or mastery, but *threat* appraisals when stressors held the potential for harm. *Secondary* appraisals were evaluations of the resources (e.g., material, coping) available to manage stressor demands. The interplay of primary and secondary appraisals determine stress outcomes (see Lazarus, 1999).

Tomaka and colleagues examined this interaction of primary and secondary appraisals on stress outcomes (3 studies, *Ns* 53–72; Tomaka, Blascovich, Kelsey, & Leitten, 1993). After learning about an upcoming math stressor, participants rated how threatening the task would be (primary) and their ability to cope (secondary). The ratings were placed into a ratio (primary/secondary) and a median split of the ratio created challenge and threat groups. Across experiments, the challenge group performed better (more responses, fewer errors) than the threat group. Although both groups were physiologically mobilized, the challenge group had increased cardiac output (CO: amount of blood pumped over time) and decreased total peripheral resistance (TPR). Across studies the challenge groups performed better and had salubrious physiological

patterns.

The transactional theory also suggested that different appraisals evoke different emotional responses. Using a biopsychosocial approach, Schneider (2004) found the challenge group experienced more positive and less negative affect than the threat group, and replicated the challenge and threat hemodynamic patterns. Further, a psychophysiological index revealed increased negative affect in the threat group over time. A robust literature shows that relative to threat groups, challenge groups have higher positive and less negative affect (Schneider, 2004, 2008), learn better (Flinn et al., 2016; Gildea, Schneider, & Shebilske, 2007), and have greater cardiac (vs. vascular) reactivity (Kelsey et al., 1999; Schneider, 2008; Schneider et al., 2011; Tomaka, Blascovich, Kibler, & Ernst, 1997). These challenge patterns reflect an approach orientation (Schneider, 2004; Schneider, Rivers, & Lyons, 2009).

This research investigated the relationship between optimism and stress outcomes, expecting that those high in optimism would have challenge appraisals, more positive and less negative affect, better performance, and challenge physiology (greater CO, less TPR), compared to those low in optimism. First, we examined the relationship between appraisals and stress outcomes to replicate past research. We expected challenge appraisals to predict more positive and less negative affect, better performance, and challenge physiology. Then we examined the relationship of optimism with stress outcomes.

2. Method

2.1. Participants

Undergraduates ($N = 153$; age: $M = 20$, $SD = 4.4$) from a public Midwestern university participated for partial course credit. Most were women ($n = 110$, 72%), Caucasian ($n = 96$, 63%), then African American ($n = 42$, 28%) and other ($n = 13$, 8%).

2.2. Measures

Dispositional optimism was measured with the LOT-R (Scheier et al., 1994; $\alpha = .73$). A sample item is, “Overall, I expect more good things to happen to me than bad.” A median split resulted in high or low optimism groups.

Appraisals were assessed with the Stressor Appraisal Scale (SAS), which was developed from appraisal and psychophysiological theories (Schneider, 2008). Primary appraisals were assessed with two items: “How threatening...” and “How demanding...” “do you think the upcoming task will be?” Secondary appraisals were assessed with two items: “How able are you to cope with this task?” and “How well do you think you will perform this task?” The primary and secondary items were averaged separately, and the averages put into a ratio (primary/secondary) where higher scores denoted threat. A median split created challenge (low ratio) and threat (high ratio) groups. SAS-derived appraisal groups reflect biopsychosocial challenge/threat motivational states, whether using conceptual or median splits.²

The PANAS (Watson, Clark, & Tellegen, 1988) assessed state affect. Participants rated current feelings using 10 positive and 10 negative items. Positive items include attentive, interested, excited ($\alpha = .90$). Negative items include distressed, upset, irritable ($\alpha = .83$).

An impedance cardiograph and continuous blood pressure monitor assessed cardiovascular hemodynamics. The impedance cardiograph (ZKG: Model HIC-2000, Instrumentation for Medicine) utilizes an alternating current, passed through two outer electrodes, while two inner recording electrodes measure the surface potential (proportional to impedance) across the thoracic cylinder. A blood pressure cuff placed

² Research has examined a conceptual split where those with ratios less than one are sorted in the challenge group and ratios greater than one are in the threat group. The findings for stress outcomes are similar whether median or conceptual splits are used (Schneider, 2004, 2008; Tomaka et al., 1993).

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