



Better out than in: The influence of anger regulation on physical performance

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ABSTRACT

We examined the influence of individual differences in anger regulation as potential moderators of the anger–performance relationship. Extending Lazarus's (1991, 2000a) cognitive–motivational–relational theory of emotion, we investigated the influence of trait anger and the anger regulation styles of anger-in and anger-out on the performance of a physical task. As hypothesized, trait anger and anger-out were positively associated with anger-derived performance enhancement on a peak force task; anger-in significantly inhibited the trait anger–performance relationship. Results are discussed in relation to Lazarus's cognitive–motivational–relational theory and future research directions are offered.

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1. Introduction

Research examining emotion regulation suggests that individuals want to feel emotions that will help them get closer to their performance goals (Tamir, Chiu, & Gross, 2007; Tamir, Mitchell, & Gross, 2008) to such a degree that they may be willing to experience unpleasant emotions to that end (Tamir & Ford, 2009). For example, although anger is generally recognized as an unpleasant emotion, it has been found to be useful for confrontation and the performance of gross muscular tasks (Parrot, 2001; Woodman et al., 2009).

Previous research examining the anger–performance relationship (e.g., Uphill & Jones, 2007; Woodman et al., 2009) has identified Lazarus's (1991, 2000a) cognitive–motivational–relational (CMR) theory of emotion as a particularly useful framework for exploring this relationship. CMR theory proposes that individuals engage in a process of appraisals aimed at evaluating the risk and reward in particular situations. These appraisals culminate in a core relational theme that summarizes the interaction between the individual and the environment (Lazarus, 1991, 2000a). The core relational theme forms the basis of each emotion and is associated with an action tendency reflecting the assessment of the situational stimulus in relation to the individual (Lazarus, 2000a). The core relational theme of anger is, “a demeaning offence against me and mine” (Lazarus, 2000a, p. 242), which links to the associated action tendency of, “a powerful impulse to counterattack in order to gain revenge for an affront or repair a wounded self-esteem”

(Lazarus, 2000a, p. 243). CMR theory suggests that anger's influence on performance will vary depending on the demands of the task. Specifically, if a task requires a “lashing out” motion, then anger may facilitate performance because anger's action tendency and the task demands are closely aligned. Conversely, if the action tendency is not aligned with task demands, anger will likely divert resources away from the task and performance will suffer (Lazarus, 2000b). There is some support for this position (e.g., Robazza & Bortoli, 2007; Woodman et al., 2009).

Although CMR theory is not explicitly concerned with moderators, its theoretical basis allows it to be extended to the investigation of potential moderator variables (e.g., individual differences) that may influence the relationship between specific emotions (e.g., anger) and performance. For example, some personality traits have been found to moderate anger's influence on verbal aggression as well as cognitive and physical performance (Perbandt, 2007; Smits & De Boeck, 2007; Smulders & Meijer, 2008; Woodman et al., 2009).

In particular, trait anger is proposed to have a role in the experience of anger and its influence on performance (Smits, De Boeck, & Vansteelandt, 2004; Spielberger, Jacobs, Russell, & Crane, 1983). Trait anger reflects an individual's tendency toward experiencing anger, and has been reported to influence the frequency and intensity of angry feelings (Spielberger et al., 1983). Moreover, trait anger is associated with an increased frequency of angry feelings and the promotion of anger's action tendency including verbal acts of aggression (Smits et al., 2004). Equally, if a task requires the execution of a lashing out movement (i.e., it is aligned with anger's action tendency), then trait anger should enhance performance (Lazarus, 2000b). This is the first hypothesis of the present study.

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As well as examining the effects of anger on performance (e.g., Hagtvet & Hanin, 2007), recent research has explored individuals' attempts to regulate anger (Smits & De Boeck, 2007). This research has focused on the direction of one's anger; specifically anger-out and anger-in (Averill 1983; Smits & De Boeck, 2007; Smits & Kuppens, 2005; Spielberger, Reheiser, & Sydeman, 1995). Anger-out refers to the predisposition to convey one's anger outward (toward an external target) and corresponds with the release of anger's action tendency (Smits & Kuppens, 2005). Anger-in refers to the predisposition to direct one's anger inward (i.e., "bottle it up") and has been associated with attempts to suppress anger's action tendency (Smits & De Boeck, 2007; Smits et al., 2004). Consequently, on a task that requires the execution of a lashing out motion (i.e., that is aligned to anger's action tendency), anger-out should be associated with enhanced performance on the peak force task and anger-in should be associated with reduced performance. This is the second hypothesis of the present study.

The picture is unlikely to be this simple, however. Indeed, the performance effectiveness of trait anger also is likely to be influenced by the direction of one's anger (Smits & De Boeck, 2007). Given that anger-out is associated with the release of anger's action tendency (Smits & De Boeck, 2007; Smits et al., 2004) it should enhance trait anger-derived performance enhancement. Conversely, as anger-in prevents the expression of anger's action tendency it should have an inhibiting effect on trait anger-derived performance enhancement. This interaction is the final hypothesis of the present study. That is, we expected anger regulation strategies to moderate the trait anger–performance relationship such that anger-out would enhance that relationship and anger-in would suppress that relationship.

2. Method

2.1. Participants

Sixty-one university students (33 men, 28 women; $M_{age} = 20.74$ years, $SD = 1.25$) were recruited for the study via advertisements posted in the university. Institutional ethics approval and signed informed consent was gained prior to participants completing the experimental protocol. Participants did not receive any financial compensation for their participation but were thanked for their contribution to the research.

2.2. Measures

2.2.1. State-Trait Anger Scale

The State-Trait Anger Scale (STAS; Spielberger et al., 1983) comprises 10 trait items (e.g., *I have a fiery temper; I am a hotheaded person*) and 10 state items (e.g., *I am mad; I am furious*); responses are rated on a four-point scale from 1 (*not at all*) to 4 (*very much so*). The STAS was used to measure individuals' predisposition to anger (trait anger) and to assess the effectiveness of the experimental manipulation (state anger). In the present study, the Cronbach alpha coefficient was .87 for the trait anger items and .94 for the state anger items.

2.2.2. Visual Analog Scale

Although we used Lazarus's (2000a) framework, in which emotions are conceptualized as discrete, we also used a two-dimensional Visual Analog Scale (VAS) to assess the degree to which participants experienced anger before undertaking the experimental task. The aim of this assessment was to further verify that the manipulation had been successful in inducing anger. In this way, the VAS data was used simply to collect additional discriminatory information about the success of the anger manipulation (see also

Woodman et al., 2009). We asked participants to plot their current emotional state on a grid (two 200 mm axes each anchored by *Not at all* and *Very much so*), which measured the dimensions of arousal and hedonic tone (pleasantness) orthogonally. The VAS offered a quick and effective measure to ensure that participants were experiencing the appropriate emotional state (either anger or no emotion) before performing the task.

2.2.3. Anger expression

The Self Expression and Control Scale (SECS; Van Elderen, Maes, Komproe, & Van der Kamp, 1997) comprises four subscales that assess participants' anger regulation styles: anger-in (16 items), which reflects the degree of anger being internalized (e.g., *I'm more angry than I show*); anger-out (16 items), which reflects the degree of anger being directed outward (e.g., *I say nasty things*); and two control-anger subscales that assess attempts to control internalized and externalized anger. Responses are rated on a four-point Likert scale from 1 (*almost never*) to 4 (*almost always*). We used only the anger-in and anger-out subscales in the present study; the Cronbach alphas were .86 for anger-in and .86 for anger-out.

2.2.4. Performance

Participants completed a gross muscular peak force task on a Kin Com Muscle Testing adjustable dynamometer (model 125E+ Chattecx Corporation) as a measure of performance. Participants executed the task by kicking as fast and as hard as possible for a period of 5 s. The task was performed twice with a 10-s recovery between the two trials. Peak force (Nm) was recorded on the isometric extension of the right leg; the mean of the two trials was used in subsequent analyses.

2.3. Experimental manipulation

2.3.1. Imagery scripts

To elicit physiological, cognitive and somatic activation consistent with the appropriate emotional state (i.e., anger and emotion-neutral), we used imagery scripts containing vivid detail regarding stimuli, response and meaning propositions (cf. Cumming, Olphin, & Law, 2007; Lang 1977, 1979) adapted from Kavanagh and Hausfeld's (1986) study of mood and performance. Specifically, the emotion script for anger was based on Lazarus's (1991, 2000a) core relational theme associated with anger. The emotion-neutral script outlined the process of brushing one's teeth (cf. Kavanagh & Hausfeld, 1986). The delivery of the imagery scripts was standardized by recording the scripts onto an audio Compact Disc that was played back to the participants.¹ The duration of each of the imagery scripts was 1 min and 30 s (cf. Woodman et al., 2009).

2.4. Procedure

Participants were informed that the research was an examination of peak force performance under different conditions before being presented with instructions on how to complete the task. After providing written informed consent and demographic information, participants completed the trait section of the STAS, and the SECS. Participants were then seated securely on the apparatus to restrict ancillary movement and to ensure that only the appropriate muscles were used in the execution of the task. Once participants had confirmed that they were seated comfortably and were ready to perform the task, they completed a warm-up trial to familiarize themselves with the task. We then presented the corresponding imagery script (i.e., anger or emotion-neutral). As soon as the imagery script was finished, participants indicated how they

¹ A copy of all scripts is available from the first author on request.

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