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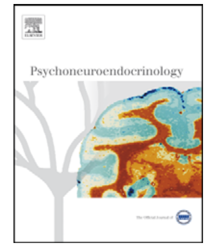

Emotion regulation and cortisol reactivity to a social-evaluative speech task

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Summary
Background: Previous laboratory studies have found a relationship between experimentally manipulated emotion regulation strategies such as suppression and reappraisal and cardiovascular reactivity. However, these studies have not examined trait forms of these strategies and cortisol responses. The aim of the present study is to investigate the relationship between trait suppression, reappraisal, and cortisol reactivity to a social-evaluative speech task.
Methods: Participants completed the Emotion Regulation Questionnaire [ERQ; Gross, J.J., John, O.P., 2003. Individual differences in two emotion regulation processes: implications for affect, relationships, and well-being. J. Pers. Soc. Psychol. 85, 348—362] to assess trait suppression and reappraisal and were asked to complete a speech task in front of an evaluative audience. They provided five saliva samples throughout the duration of the session to assess cortisol response patterns.
Results: Consistent with hypotheses, trait suppression predicted exaggerated cortisol responses to the speech task, with those scoring higher on suppression exhibiting greater cortisol reactivity. High levels of trait reappraisal also predicted exaggerated cortisol reactivity to the speech task.
Conclusions: Findings suggest that certain emotion regulation strategies such as suppression and reappraisal predict heightened cortisol reactivity to an acute stressor. Future studies should examine the psychological mechanisms through which these emotion regulation strategies affect cortisol response patterns.

1. Introduction

Stressful situations can give rise to negative emotions (Lazarus and Folkman, 1984; Ekman, 1999), and in turn, these emotions can affect physiological functioning. Thus, the characteristic ways in which individuals regulate their emotions — or manage which emotions are experienced, when they are experienced, and how they are expressed (Gross, 1998) — could have implications for physiological reactivity (Gross and Levenson, 1997). In the current study, we test whether trait forms of the emotion regulation strategies suppression and reappraisal predict cortisol reactivity to a social-evaluative laboratory stressor.

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There are many different emotion regulation strategies. Some are response-focused and involve activities done to control emotions once they are already underway. One response-focused emotion regulation strategy is suppression, in which ongoing emotional expression is inhibited in order to regulate emotion (Gross, 1998). When one is already experiencing anxiety while studying for an exam, trying not to talk about the emotion would be an example of emotional suppression. Other strategies, such as reappraisal, are antecedent-focused, meaning cognitions or behaviors are altered before emotions have arisen or emotional responses have occurred. Reframing or thinking about a stressful or emotional situation in a different way is an example of reappraisal.

Previous research has linked these emotion regulation strategies with physiological reactivity. In a seminal study on suppression and physiological responses, Gross and Levenson (1993) asked participants to watch a film depicting an arm amputation to elicit the emotion of disgust. Participants were randomly assigned to one of two conditions. In the control condition, participants were instructed to clear their minds and watch the film freely, while in the suppression condition participants were asked to hide their feelings in such a way that a person watching the participant would not know how the participant was feeling or reacting to the film clip. Physiologically, participants in the suppression condition had greater increases in skin conductance, greater decreases in finger pulse amplitude, and shorter pulse transmission times to the finger. This suggests that, in general, there was greater sympathetic nervous system activation in participants who were asked to suppress their responses to the film clip compared to those in the control condition. This same pattern of heightened cardiovascular or sympathetic nervous system (SNS) activity has been observed in other studies which have elicited other emotions, including sadness (Gross and Levenson, 1997) or embarrassment (Harris, 2001).

The literature has shown a consistent pattern of findings in which instructing participants to suppress emotion leads to heightened physiological responding. However, other emotion regulation strategies may be associated with different patterns of physiological changes. For example, researchers have hypothesized that reappraisal would lead to decreased physiological activity (e.g., Gross and John, 2003). To test this premise, experimental studies have manipulated reappraisal by asking participants to change the way they think about a situation to modify its emotional impact. For example, Gross (1998) asked participants to watch a film on the treatment of burn victims. Those randomly assigned to the reappraisal group were instructed to watch the film in such a way that "they would feel nothing.'' Although it has been theorized that reappraisal would be associated with decreased physiological reactivity (e.g., Gross and John, 2003; John and Gross, 2004), the results have been somewhat mixed. Some studies have found no differences in physiological parameters (e.g., finger pulse amplitude and skin conductance) between those instructed to reappraise a situation and those in a control condition (Steptoe and Vogele, 1986; Gross, 1998). Other studies have found reappraisal to be associated with increases in cardiovascular parameters such as greater cardiac output, ventricular contractility, and respiratory sinus arrhythmia (Butler et al., 2006; Mauss et al., 2007). These mixed and somewhat contradictory results signal a need to continue to examine the effects of this antecedent-focused emotion regulation strategy and its relationship to physiological parameters.

While the majority of previous research has manipulated suppression and/or reappraisal, there is some evidence that trait forms of emotion regulation strategies could also be linked with physiological outcomes. For example, one recent study assessed the effects of spontaneous emotion regulation on emotion reports and physiology. Egloff et al. (2006) asked participants to generate arguments for and give a speech on a controversial topic (i.e., physician-assisted suicide). After the speech task, participants were asked to rate the extent they used suppression and reappraisal as tactics to regulate their emotions. As hypothesized, the use of suppression was associated with increases in SNS activation; suppression was positively associated with skin conductance and negatively associated with finger temperature and finger pulse amplitude. However, reappraisal was not associated with any of the physiological parameters. Therefore, this study provides evidence that naturally occurring suppression techniques may be associated with heightened SNS reactivity, which is consistent with the effects of manipulating suppression on physiological outcomes. The spontaneous emotion regulation strategies participants utilized in this study may be capturing trait tendencies to use these specific strategies, suggesting that trait forms of suppression (and perhaps reappraisal) would also have physiological correlates.

In another investigation on trait emotion regulation, Mauss et al. (2007) placed participants who rated high and low in reappraisal (as measured by the ERQ; Gross and John, 2003) in an anger-provoking stressor situation. Participants were asked to complete a math task in front of a confederate who induced anger by making continuous comments to the participant. Those high on trait reappraisal showed greater cardiac output and ventricular contractility and less total peripheral resistance, which could reflect a relatively adaptive response of the sympathetic nervous system (Mauss et al., 2007). Taken together, these studies indicate that trait forms of suppression and reappraisal could be associated with physiological reactivity to stressful and/or emotional situations.

Much of the previous research on suppression and reappraisal has examined cardiovascular or autonomic indices such as respiratory sinus arrhythmia, electrodermal responding, blood pressure, finger pulse amplitude, finger temperature, and pulse transit time (Gross and Levenson, 1993, 1997; Butler et al., 2006; Egloff et al., 2006). While studies have assessed the effects of cognitive interventions that could impact emotional regulation on endocrine responses (e.g., Abelson et al., 2005), to our knowledge, no study to date has directly examined trait emotion regulation strategies and cortisol reactivity to a stressor. It is important to study other peripheral systems such as the hypothalamic-pituitary-adrenocortical (HPA) axis, which regulates the release of cortisol. Studies have shown that cardiovascular and cortisol responses are not always elicited in concert. For example, some contexts are capable of increasing cardiovascular parameters—but not cortisol (e.g., Gruenewald et al., 2004). Given that patterns of cortisol and cardiovascular reactivity can sometimes diverge, it is not clear whether suppression and reappraisal would show a similar relationship to cortisol reactivity as has been observed with autonomic outcomes.