



Personality, counterfactual thinking, and negative emotional reactivity



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ABSTRACT

Objectives: People differ substantially in their emotional responses to negative stimuli. Separate lines of research have reported that individual differences and mental simulations contribute to emotional symptoms. Here, we explore the independent and interrelated contribution of personality traits and counterfactual thoughts to the intensity, duration, and overproduction of negative emotions.

Method: A sample of mixed-level athletes ($n = 243$) completed questionnaire assessments in relation to their most recent unsuccessful competition.

Results: We found that personality dimensions (extraversion, neuroticism, and openness) relate to the direction and magnitude of person counterfactuals. We also found that personality dimensions (neuroticism, extraversion, openness, and agreeableness) and the direction of counterfactual thoughts (upward or downward) relate to the intensity, duration, and/or overproduction of negative emotions. Lastly, we found that personality and counterfactual thoughts had independent rather than interrelated contributions to the experience of unpleasant emotions.

Conclusions: These findings carry important theoretical and practical implications with regard to identifying individuals susceptible to experiencing elevated emotional symptoms in response to short-term stressors.

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People differ substantially in the degree to which they develop negative emotional symptoms in response to stressful conditions. For example, following an argument with a colleague, or an unsuccessful competition, some people will experience elevated symptoms of anger or embarrassment while others will show no meaningful changes or even reductions in negative emotions (Osinsky, Lösch, Hennig, Alexander, & MacLeod, 2012). In cases of elevated emotional symptoms people are more susceptible to a variety of adverse mental and physical health outcomes. In particular, emotional stressors can trigger pathophysiological effects including cardiac electrical instability, myocardial ischemia, and in extreme cases can have severe health consequences such as increased myocardial infarction, stroke rate, and mortality (Schwartz et al., 2012; Steptoe & Brydon, 2009). Given the negative correlates and consequences of heightened emotional reactivity, it is important to identify factors that contribute to emotional symptoms. Here, we explore the independent and interrelated contribution of personality traits and counterfactual thoughts to the intensity, duration, and overproduction of negative emotions.

Personality and acute emotional reactivity

Over the past two decades researchers have uncovered a great deal of information about the heritability, temporal stability, and structure of human personality. Most researchers now accept that there are five basic dimensions to the structure of personality (John, Naumann, & Soto, 2008). The five dimensions are extraversion, neuroticism, openness, agreeableness, and conscientiousness. Extraversion assesses the quantity and intensity of interpersonal interactions, neuroticism assesses susceptibility to emotional instability, openness assesses the tendency to seek out new and exciting experiences, agreeableness assesses concern for cooperation and social harmony, and conscientiousness assesses organisation and goal-directed behaviour (McCrae & Costa, 2008). These five dimensions predict a variety of health, leisure, and performance outcomes (Ozer & Benet-Martínez, 2006).

Multiple lines of research demonstrate that components of personality align with the temperament of positive and negative emotionality (Hampson, 2012). For example, Costa and McCrae (1980) observed that people with low levels of neuroticism and high levels of extraversion are happier than people with high levels of neuroticism and low levels of extraversion. Comprehensive meta-analyses have since demonstrated that all five dimensions of

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personality are associated with emotional temperament (DeNeve & Cooper, 1998; Steel, Schmidt, & Shultz, 2008). In particular, positive emotionality (a combination of positive affect, happiness and life satisfaction) is negatively correlated with neuroticism, and positively correlated with extraversion, openness, and conscientiousness. Negative emotionality, on the other hand, is positively correlated with neuroticism, and negatively correlated with extraversion, agreeableness, and conscientiousness. In addition to association studies of person temperaments, researchers have also explored the role of personality in emotional reactivity to situational outcomes. Studies have shown that individuals with high levels of extraversion react to positive situations with greater positive emotional responses and individuals with high levels of neuroticism react to negative situations with greater negative emotional responses (see, for example, Howell & Rodzon, 2011; Lucas & Baird, 2004).

Evidence for a link between personality and emotional reactivity is also available from studies documenting cardiovascular responses to stress. People classified as having Type D personality characteristics (the combination of negative affectivity and social inhibition) show greater cardiac output (Nyklíček, Vorselaars, & Denollet, 2011), blood pressure reactivity (Habra, Linden, Anderson, & Weinberg, 2003), and heart rate reactivity (Martin et al., 2010) during experimentally induced stress. Further, people with high levels of neuroticism or low levels of extraversion show greater cardiac output, blood pressure reactivity, and heart rate reactivity when faced with mental or emotional stressors (Hughes, Howard, James, & Higgins, 2011; Jonassaint et al., 2009). These findings suggest that people with particular personality characteristics are more susceptible to experience stress in response to difficult or challenging environmental circumstances.

The research findings linking neuroticism and extraversion to emotional reactivity are robust (Canli, 2004). However, the structure of these relationships is open to further investigation. It is possible that people with particular personality characteristics are more susceptible to experience particular emotions (in response to negative outcomes) irrespective of situation specific thought processes. Indeed, emotional temperament is a central feature of both extraversion and neuroticism (McCrae & Costa, 2008) and the most common observed characteristic of negative emotionality is a greater sensitivity to negative events (Hampson, 2012). In this instance, we can expect the same dimensions of personality that predict emotional temperament to predict situational emotional reactivity. On the other hand, people with particular personality characteristics may respond to outcomes with greater emotional reactivity because they engage in cognitive biases in the processing of emotional stimuli (Canli, 2004). Thus, individual differences in emotional reactivity could be due to personality contributions to other (cognitive) processes that influence emotions. This is possible given that personality can affect the way people think about and respond to negative outcomes.

Personality and counterfactual thinking

Following negative outcomes it is not uncommon for people to reflect on how things could have been different. Counterfactual thoughts (as they are known) are mental representations of alternatives to past events, actions, or states (Byrne, 2007; Roese, 1997). They can involve thoughts about how things could have gone better (upward counterfactual thinking) or thoughts about how things could have gone worse (downward counterfactual thinking). Counterfactual thoughts may also be understood with respect to their *content*, *structure*, and *object of reference*. Counterfactual thoughts can add elements to a situation (additive), remove elements from a situation (subtractive), or replace elements with

different elements (substitutional); counterfactual thoughts can also focus on actions taken by oneself (self-referent), actions taken by others (other-referent), or actions taken by nobody (non-referent). Counterfactual reasoning develops early in childhood (around age 2), is common across nations and cultures, and may be an essential property of human intelligence (Epstude & Roese, 2008). It has been established that people tend to imagine alternatives to actions rather than inactions, events within their control rather than beyond their control, and socially unacceptable events rather than socially acceptable events (Byrne, 2007). Critically, counterfactual thoughts are more common following negative events (than positive events) and tend to focus on how things could have gone better (Epstude & Roese, 2008).

The functions that mental simulations might serve suggest several ways that people might differ in their tendency to engage in counterfactual thinking. Counterfactual thoughts are deeply connected to goals and emotions (Epstude & Roese, 2008; Roese, 1997) and personality characteristics that correspond to these functions are likely to have an important role in counterfactual generation. In particular, traits such as optimism and self-esteem are routinely identified as key psychological characteristics of mental simulations over time (Kasimatis & Wells, 1995; Sanna, Carter, & Small, 2006). There is evidence that people with high self-esteem or greater levels of optimism tend to generate more downward counterfactuals, and people with low self-esteem or greater levels of pessimism tend to generate more upward counterfactuals (Roese & Olson, 1993; Sanna, 1996). In addition to optimism and self-esteem effects, other components of personality such as impulsivity (Schmidt & Van der Linden, 2009), depressive symptoms (Markman & Miller, 2006), and perfectionism (Sirois, Monforton, & Simpson, 2010) have each been linked to the direction, magnitude and/or content of counterfactual thoughts. Specifically, more impulsive persons (greater levels of urgency) show a greater occurrence of counterfactual generation, individuals with more severe depressive symptoms show a greater occurrence of upward counterfactuals (in addition to more uncontrollable and less reasonable counterfactuals), and maladaptive perfectionists show a greater occurrence of upward counterfactuals (in addition to more controllable, subtractive and less specific counterfactuals).

The available data suggest that components of personality have an important role in mental simulations. However, the exclusive focus on narrow traits makes it difficult to ascertain the overall contribution of cardinal traits to counterfactual thoughts. Sanna (2000) proposed that in addition to narrow traits such as optimism and self-esteem, broad traits that correspond to the experience of positive and negative emotions could also have an important role in counterfactual generation. Since all five dimensions of personality have demonstrated an affective component (Steel et al., 2008) we might expect all five dimensions (and extraversion and neuroticism in particular) to have a role in counterfactual thinking. However, as far as we know, broad dimensions of personality have never been considered in this regard.

Counterfactual thinking and acute emotional reactivity

Mental simulations are central to human thinking and emotion (Epstude & Roese, 2008). Not only do negative emotions trigger the activation of counterfactual thoughts (Roese, 1997), but counterfactual thoughts can amplify emotional responses to positive and negative outcomes (Kahneman & Miller, 1986; Roese, 1997). This has been demonstrated in several research investigations. For example, in a study of the 1992 Summer Olympics, bronze medalists were rated as displaying greater levels of satisfaction than silver medalists (Medvec, Madey, & Gilovich, 1995). The authors report that bronze medalists tend to be happier because the most

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