



The effect of self-criticism on working memory in females following success and failure

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ABSTRACT

Maladaptive self-criticism has been associated with diminished goal-progress. The present study examined the impact of failure and success experiences on performance on working memory measures, in order to gauge goal-directed performance. Participants with varying levels of self-criticism completed a baseline working memory task, a randomly assigned success or failure feedback manipulation on a separate task, followed by a second working memory measure. Results demonstrated varying feedback-dependent test-retest performance across levels of self-criticism. While low self-critics did not differ in test-retest scores across feedback conditions, failure resulted in a decrease of performance in moderate self-critics, and an increased performance in high self-critics. Conversely, after success, moderate self-critics displayed an increase, while high self-critics displayed a decrease in performance at retest. Findings shed light on varying perceptions and responses to failure versus success across levels of self-criticism, which has important implications for factors that impact motivation and goal-directed performance.

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1. Introduction

Self-assessment and monitoring are reflexive psychological behaviors that may provoke self-criticism, which when carried out in a healthy manner can evoke the desire to change the criticized aspects, paving the way toward adaptive life outcomes that include the ability to set and pursue desired goals. In some individuals, however, self-criticism becomes heightened and relentless, and forms a personality trait. Although this maladaptive form of self-definition is multifaceted and can be conceptualized and measured in different ways (e.g., Gilbert, Clarke, Hempel, Miles, & Irons, 2004; Thompson & Zuroff, 2004), the underlying presence of harsh and negative self-judgment and self-evaluation remain the foundation for this construct. High self-critics have been shown to not only express more contempt and disgust for the self in their critical content compared to controls, but also display lower levels of self-resilience in response to their self-criticisms, marked by lower assertiveness, and higher levels of submissiveness, sadness, and shame (Whelton & Greenberg, 2005).

The self-critical personality style has been characterized as having strong needs for achievement, a constant engagement in harsh self-scrutiny and evaluation, and a chronic fear of being disapproved of and criticized (e.g., Mongrain & Zuroff, 1995). The self-critics' achievement-oriented style is embedded in avoiding feelings of inferiority and loss of self-esteem (Shahar, Henrich, Blatt, Ryan, & Little, 2003),

and a preoccupation with personal mistakes and failures, rendering individuals high in self-criticism particularly sensitive to failure-related events. In line with high self-critics' particular vulnerability to stress involving failure in the achievement domain (e.g., Gruen, Silva, Ehrlich, Schweitzer, & Friedhoff, 1997), a number of previous studies pertaining to self-criticism have been conducted in the context of actual or imagined (i.e., recall of previously experienced) failure (e.g., Gilbert, Baldwin, Irons, Baccus, & Palmer, 2006; Gruen et al., 1997; Mendelson & Gruen, 2005; Whelton & Greenberg, 2005).

It is curious to note that despite high self-critic's heightened focus on achievement-related goals, previous research has repeatedly shown a significant negative association between self-criticism and goal-progress, across a variety of domains (e.g., Powers, Koestner, & Zuroff, 2007; Powers, Milyavskaya, & Koestner, 2012). The mechanisms by which high self-criticism compromises goal-progress and functioning are currently speculative due to the scarcity of empirical data. Theoretical reasons for this negative association include the self-critic's pre-occupation with potential failure and critical evaluation, which may impede effective implementation planning via procrastination and lowered sense of goal self-efficacy (Powers et al., 2007; Powers et al., 2012). It is also noteworthy that all previous studies investigating this association have relied on *self-report measures* of perceived progress, rather than objective rating. Relying on subjective self-report rating may pose as a limitation due to self-critic's potential negative bias in self-perception (Powers et al., 2012), method variance, and inability for real-time assessment of how various factors contribute to goal-directed performance. Our objective was to address this gap by utilizing methodology specifically tailored to directly gauging goal-directed

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performance across levels of self-criticism, in order to uncover variables involved in this negative association.

Goal-directed performance in the achievement domain was operationalized as comparative performance on two strongly correlated WM tasks (Unsworth, Heitz, Schrock, & Engle, 2005). The effect of feedback type on goal-directed performance was examined by interleaving a success or a failure experience between the two WM tasks, in order to assess feedback's influence on the second WM task compared to the first/baseline. Feedback – conceptualized as the “consequence” of performance – was assessed in relation to goal-progress, as it is one of the most powerful influences on achievement (Hattie & Timperley, 2007), and essential for tracking goal-progress by providing goal-related information on successful and failed actions, which allow individuals to adjust in effort, direction and strategy as needed (Locke & Latham, 1990).

1.1. Overview and predictions

Previous findings (Gruen et al., 1997; Mendelson & Gruen, 2005) have shown that negative feedback on a performance-based task results in increased stress in individuals high in self-criticism, with no mitigating effect of success. Blatt and Homann (1992)'s review of the self-critical personality style indicates that due to excessive concern with personal failure, high self-critics try to maximize control over their environment to reduce the probability of failing, while deriving 'little lasting satisfaction' from their achievements. The lowered satisfaction may be regarding duration or absolute level, or a combination of both. Given failure's impact, in the failure condition, we predicted that participants endorsing high levels of self-criticism would improve from their baseline WM score (Test 1) on their post-failure WM (Test 2) score in order to reduce the probability of undergoing yet another failure experience. Based on the relatively tempered effect of success on high self-critics, for the success condition we hypothesized either no difference or a possible reduction in post-manipulation WM performance, compared to baseline levels. This prediction is based on the unbalanced response of high self-critics to failure versus success. The success feedback was predicted to contribute to diminished effort on the second WM test, which would lead to either a constant or a decreased WM performance in high self-critics, compared to baseline levels.

Participants low in self-criticism were expected to remain constant in their WM performance, regardless of a failure or success feedback, as a lowered self-criticizing tendency or personality style suggests that self-definition or worth are not contingent on performance feedback.

Our primary objective was to assess the immediate effect of feedback on goal-directed performance of individuals who qualitatively differ in trait self-criticism, therefore high versus low levels of self-criticism were selected based on scoring in the upper and lower 25th percentile of the self-criticism measure used. The performance of individuals that fell in the middle of this spectrum were included in the analyses, however no predictions were formulated for the performance of “moderate”/middle of the spectrum self-critics, as they were not expected to display a clear pattern of results.

2. Method

2.1. Participants

Participants were 218 female undergraduate university students of traditional college age. Previous studies have found sex differences in emotional processing, in the domains of perception, reactivity, regulation, and experience (Whittle, Yücel, Yap, & Allen, 2011). Given the potential for differential impact of the failure and success manipulation across the sexes, a female-only sample was selected. Participants were fluent English speakers, as a language sensitive success/failure manipulation was used. Exclusion criteria were: as per WM span task standard procedure, falling below 80% accuracy criterion on the math and

sentence operations of the first and second WM tasks, respectively (10 excluded for WM Test 1, and 9 excluded for WM Test 2), and as elaborated on in Section 2.2.5. of the present paper, a mismatch between participants' actual achieved score on the feedback-manipulation task and the purported condition-specific feedback, which occurred when too few problems were solved in the Success condition (6 excluded), or too many solved in the Failure condition (1 excluded).

2.2. Measures

2.2.1. Global rumination scale (GRS)

A 10-item measure ($\alpha = 0.64$) of trait rumination assessing the extent to which an individual dwells on problems and concerns. The GRS demonstrates good test-retest reliability and discriminant validity (McIntosh, Harlow, & Martin, 1995).

2.2.2. Levels of self-criticism (LOSC; Thompson & Zuroff, 2004)

A 22-item measure ($\alpha = 0.86$), assessing two facets of self-criticism: comparative self-criticism (CSC) and internalized self-criticism (ISC). The CSC consists of 12 items, and it is defined as a negative perspective of the self as compared to others, who are seen as superior and hostile, or critical. The ISC facet, consisting of 10 items, is defined as a negative perspective of the self as compared to internal, personal standards, which does not involve comparing oneself to others, but viewing oneself as deficient. The overall LOSC score was a sum of the ISC and the CSC sub-scales. The 22 LOSC items are assessed using a 7-point Likert scale, with a maximum score of 154. In the present study, participant scores ranged from 50 to 141. To examine extremes of this trait, the top and bottom 25th percentile scorers were selected to represent high versus low self-critics: scores of 50–77 were considered *low* and 100–141 were considered *high*. Participants scoring in the middle of this spectrum (scoring 78–99) were considered moderate/middle self-critics.

2.2.3. Center for epidemiologic studies depression scale (CES-D)

A 20-item measure ($\alpha = 0.90$) of depressive symptomatology in non-clinical populations, with high internal consistency and validity across a wide range of demographic characteristics (Radloff, 1977).

2.2.4. Positive and negative affect schedule (PANAS; Watson, Clark, & Tellegen, 1988)

A 20-item measure of affect, half of which assess positive (e.g., interested, proud) affective states ($\alpha = 0.86$ for baseline; $\alpha = 0.92$ for post-manipulation) and half assess negative (e.g., ashamed, irritable) affective states ($\alpha = 0.84$ for baseline; $\alpha = 0.86$ for post-manipulation). It has been found to be a reliable and valid measure of mood (Watson et al., 1988).

2.2.5. Compound remote associates test (CRA test; Bowden & Jung-Beeman, 2003)

The CRA, introduced as the “Creative Intelligence Test,” was used to provide success or failure feedback based on manipulating the difficulty level of the task. Normative data was used to select 16 CRA items on the basis of difficulty for the Failure (14 difficult and 2 easy items) and the Success condition (14 easy and 2 difficult; Bowden & Jung-Beeman, 2003), with a 5-min time-limit for the test. The efficacy of the feedback manipulation depended on obtained scores falling in the 0–7 range for the Failure condition and in the 10–16 range for the Success condition. Feedback veracity was achieved through participants self-scoring their own test, and having their scores match the purported computerized condition-specific feedback, which assigned score ranges 0–7 as below average, 8–9 as average, and 10–16 as above average. This feedback also indicated that compared to other university students, the participant scored “above average” and placed in the “top 12%” for the Success condition, and “below average” and placed in the “bottom 23%” for the

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