FlashReport

General attainability beliefs moderate the motivational effects of counterfactual thinking

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A B S T R A C T

Previous research has demonstrated that upward counterfactuals generated in response to less than optimal outcomes on repeatable tasks are more motivating than are downward counterfactuals. In the present work, however, it was hypothesized that upward counterfactuals should only be motivating to the extent that one believes that improvement is generally attainable. By contrast, it was hypothesized that upward counterfactuals should actually diminish motivation and downward counterfactuals should enhance motivation to the extent that one believes that improvement is generally unattainable. In support of these hypotheses, the results of two studies indicated that incremental theorists (who believe that intelligence-related abilities are malleable) displayed greater motivation and enhanced performance in response to upward as compared to downward counterfactuals, whereas entity theorists (who believe that intelligence-related abilities are fixed) displayed greater motivation and enhanced performance in response to downward as compared to upward counterfactuals.

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Introduction

When people receive performance feedback, the manner in which they evaluate whether the feedback reflects that they are doing well often involves the use of comparison processes. One such comparison process – counterfactual thinking – involves the mental simulation of standard information. These counterfactual standards sometimes reflect imagined better realities (*upward* counterfactuals) and sometimes reflect imagined worse realities (*downward* counterfactuals) (e.g., Markman, Gavanski, Sherman, & McMullen, 1993; Roese, 1994).

In performance domains, it is often concluded that upward counterfactuals are more motivating than downward counterfactuals. Upward counterfactuals have been shown to elicit intentions to perform success-facilitating behaviors, enhance task persistence, and improve performance to a greater extent than downward counterfactuals (e.g., Markman, McMullen, & Elizaga, 2008). A critical assumption underlying these findings is that upward counterfactuals serve to initiate behavioral regulation, whereas downward counterfactuals primarily function to improve affect (e.g., Epstude & Roese, 2008; Markman & McMullen, 2003; Summerville & Roese, 2008). Specifically, diminished outcome satisfaction typically elicited by upward counterfactuals is thought to signal that a goal has not been attained and thereby enhances improvement motivation, whereas enhanced outcome satisfaction typically elicited by downward counterfactuals is thought to signal that a goal has been attained and thereby diminishes improvement motivation (e.g., Zeelenberg, 1999).

Attainability

Epstude and Roese (2008) suggested that the "master moderator" of the upward counterfactual-motivation-performance link might be opportunity perceptions. According to them, the preparative function of upward counterfactuals can best be capitalized upon when opportunities for future action exist, whereas when such opportunities are unavailable the affective function of downward counterfactuals is beneficial. We argue, however, that to maximize the preparative benefits of counterfactual thinking, individuals need to not only perceive that they have a future improvement *opportunity*, but also that improvement, itself, is *attainable* (Lockwood & Kunda, 1997). Building upon research demonstrating that upward counterfactuals increase felt preparation among individuals with high, but not low, self-efficacy (e.g. Nasco & Marsh, 1999; Sanna, 1997), we predict that if one has an opportunity to improve upon the past and believes that improvement is possible, then upward counterfactuals should serve a preparative function. However, if one has an opportunity to address a similar problem again, yet does not believe that improvement is possible, the derogated outcome evaluations elicited by upward counterfactuals should result in diminished rather than enhanced motivation. Moreover, we propose that when general attainability beliefs are low, downward counterfactuals should lead to greater task motivation than upward counterfactuals. Because considering how worse possible outcomes could have occurred typically allows individuals to evaluate their outcomes more positively, downward counterfactuals should inspire greater effort than should upward counterfactuals (e.g., Fredrickson, 1998).

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Implicit theories of intelligence

Individuals differ in their lay theories about the malleability of traits. Among the best documented are beliefs about the possibility of improving upon intelligence and related abilities (see Dweck, 2000). Some individuals endorse an *incremental* theory of intelligence, believing that intelligence is malleable, whereas others endorse an *entity* theory of intelligence, believing it to be fixed.

Implicit theories of intelligence influence a variety of reactions to negative performance. For instance, incremental theorists attribute poor performance to lack of effort, whereas entity theorists attribute poor performance to lack of ability (e.g., Butler, 2000). Additionally, incremental theorists commonly display relatively adaptive reactions to negative feedback, viewing it as an opportunity for mastery, whereas entity theorists are often threatened and discouraged by it (Zhao, Dweck, & Mueller, 1998). Finally, incremental theorists are more willing than entity theorists to engage in remedial action following poor performance (Hong, Chiu, Dweck, Lin, & Wan, 1999).

Incremental and entity theorists also respond differently to comparison information. Lockwood and Kunda (1997) demonstrated that exposure to an academic superstar enhanced self-evaluations for incremental theorists, presumably because they believed that similar success was attainable for themselves, but diminished self-evaluations for entity theorists, presumably because they believed that such success was unattainable (see also Blanton & Stapel, 2008). Furthermore, Nussbaum and Dweck (2008) found that incremental theorists were more likely to seek upward social comparisons than were entity theorists, thereby allowing the former to recover self-esteem, while entity theorists recovered self-esteem through exposure to downward social comparisons.

The present research

Our goal is to highlight the important moderating role of general attainability beliefs in the motivational consequences of upward and downward counterfactuals. In light of incremental and entity theorists' differing beliefs regarding the malleability of intelligence, we propose that incremental and entity theorists respond differently to upward and downward counterfactuals. Because incremental theorists perceive that performance improvement is attainable, and upward counterfactuals highlight a need for improvement, thoughts of how performance could have been better should translate into self-improvement motivation. Thus, upward counterfactuals generated about poor performance outcomes should be more motivating for incremental theorists than downward counterfactuals.

However, because entity theorists believe that their intelligence-related abilities are fixed, upward counterfactuals should not be motivating. In light of past research indicating that entity theorists tend to withdraw effort following poor performance outcomes (e.g., Plaks & Stecher, 2007), we hypothesize that upward counterfactuals should encourage less willingness to engage in remedial action than should downward counterfactuals. Moreover, for entity theorists, downward counterfactuals should be better suited than upward counterfactuals to encourage a willingness to expend greater effort following a negative outcome.

Two studies were conducted to test these hypotheses. Participants either imagined (Study 1) or received (Study 2) negative feedback on a test of verbal intelligence and subsequently imagined or received negative feedback on a task related to verbal intelligence. Participants then generated either upward or downward counterfactuals about their performance before they either rated their motivation to engage in remedial action (Study 1) or performed a second task (Study 2).

Study 1

Method

Participants

Seventy-nine[1] undergraduate students participated in exchange for partial course credit.

Procedure

The study was described as an investigation of the implications of using one's imagination. In order to establish a common baseline, all participants first imagined that they had received a score of 56% on a test of verbal intelligence, a score that ostensibly indicates "poor verbal intelligence," and then rated their reaction to this feedback (i.e., *disappointed*, *relaxed*, *tense*, and *discouraged*) on scales ranging from 1 ("not at all") to 9 ("extremely").

Participants then imagined performing another task diagnostic of their verbal intelligence. This task was described as comprising two separate trials with an option of completing a tutorial in between. Participants imagined that they had received a score of 59% on the first trial (once again indicating "poor performance"). Next, participants assigned to the *upward* condition were asked to "imagine how your performance on the first task could have been better," whereas participants assigned to the *downward* condition were asked to "imagine how your performance on the first task could have been worse." Participants then once again rated their reaction to the performance feedback, and indicated how motivated they felt about the task after receiving feedback (1 = "not at all"; 9 = "extremely").

Next, participants rated how useful they believed a tutorial would be for helping them prepare for a second trial (1 = "very little"; 9 = "a lot"), after which they completed Dweck's (2000) Theories of Intelligence Scale.

Results and discussion

All analyses were conducted using participants' mean intelligence theory scores as a continuous variable ($M = 3.91$, $SD = 1.10$). Counterfactual direction (1 = "upward"; 2 = "downward"), mean intelligence theory scores, and their interaction were regressed on participants' self-reported motivation for the second trial. As depicted in Fig. 1, the predicted Direction X Theory interaction emerged, $\beta = -1.271$, $p = .004$, and further tests revealed that the slopes for both incremental and entity theorists were significantly different from zero [incremental: $\beta = -1.42$, $t(76) = -2.16$, $p = .03$; entity: $\beta = 1.38$, $t(76) = 2.10$, $p = .04$]. As predicted, entity theorists reported greater motivation after generating downward (vs. upward) counterfactuals, whereas the reverse was true of incremental theorists. Further, upward counterfactuals were more motivating for incremental than entity theorists, whereas the reverse was true for downward counterfactuals [upward: $\beta = 0.65$, $t(76) = 1.98$, $p = .05$; downward: $\beta = -.62$, $t(76) = -2.27$, $p = .03$]

A parallel analysis predicting perceived tutorial usefulness also revealed a significant Direction X Theory interaction, $\beta = -1.272$, $p = .003$ (see Fig. 2), and tests once again revealed that the slopes for both incremental and entity theorists were significantly different from zero [incremental: $\beta = -1.13$, $t(76) = -2.06$, $p = .04$; entity $\beta = 1.29$, $t(76) = 2.37$, $p = .02$]. As predicted, entity theorists expected the tutorial to be more useful after generating downward (vs. upward) counterfactuals, whereas the reverse was true for

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[1] Because our participant population contained only 25% entity theorists and we did not preselect participants, we were forced to collect data until we obtained our *a priori* goal of 20 participants per cell. The final sample included 238 participants, of which we included the first 20 in each cell of the design. Additional analyses performed on a new group of 40 incremental theorists that were randomly sampled from the full sample displayed an identical data pattern.
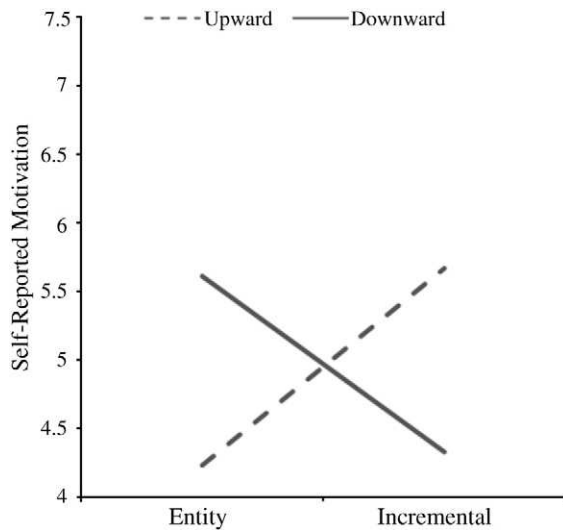
Fig. 1. Mean self-reported motivation as a function of counterfactual direction and implicit intelligence theory (Study 1).
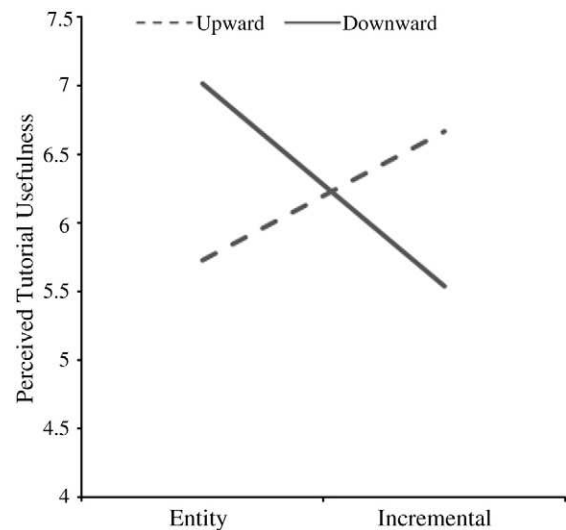

Fig. 2. Mean perceived usefulness of tutorial as a function of counterfactual direction and implicit intelligence theory (Study 1).

incremental theorists. Further, downward counterfactuals elicited greater perceptions of usefulness for entity than incremental theorists, whereas the difference for upward counterfactuals did not reach significance [downward: $\beta = -.67$, $t(76) = -2.96$, $p < .01$; upward: $\beta = .42$, $t(76) = 1.57$, $p = .12$]

No significant main effects or interactions were found on the measures of affective reaction (all $ts < 1.94$, all $ps > .06$), indicating that the influence of counterfactual direction was specific to participants' self-reported motivation rather than mood[2].

Study 2

The results of Study 1 provide evidence that general attainability beliefs moderate the motivational effects of upward and downward counterfactuals. However, the use of imagined scenarios does not allow for an examination of the influence of counterfactual direction on behavior. Further, implicit theories were assessed after the manipulation. Study 2 addressed these limitations by examining the moderating role of general attainability beliefs in an actual performance domain, and assessing implicit theories prior to the manipulation.

Method

Participants

During a mass prescreening, undergraduate psychology students completed Dweck's (2000) Theories of Intelligence Scale. In order to ensure that participants were truly incremental or entity theorists, and following the procedure used by Blanton and Stapel (2008), only participants who scored within the bottom third of the scale ($M = 1$–2.6; entity) or top third of the scale ($M = 4.4$–6; incremental) were invited to participate in the study ($N = 106$). The data from 15 participants were excluded for failing to follow instructions, resulting in the inclusion of 91 participants in the final sample.

Procedure

Participants were informed that they had been selected to participate based on their verbal intelligence scores assessed during the mass

pretesting period. All participants received feedback indicating that they had scored in the 46th percentile of students at their university, which indicated "moderately poor verbal intelligence." Participants then completed the reaction measures used in Study 1.

Next, participants were told that they would complete two separate trials of an anagram task for which "performance depends highly on one's verbal intelligence." Each trial included ten 5-letter anagrams (Shah, Higgins, & Friedman, 1998), and participants were told that each anagram contained between zero and four solutions (e.g., IPSIL contained the solutions SPILL and PILLS). After completing the first trial, all participants received false feedback indicating that they had placed in the 47th percentile among students from their university, again indicating "moderately poor verbal intelligence."

Participants then generated either *upward* or *downward* counterfactuals about their first trial performance, and rated their reaction to their performance. Next, participants completed the second anagram trial.

Results and discussion

To test our hypotheses, the number of correct anagram solutions for the first anagram trial was subtracted from the number of solutions found on the second trial to yield a difference score for each participant. These difference scores were then submitted to a 2 (*Theory*: incremental vs. entity) X 2 (*Counterfactual*: upward vs. downward) ANOVA[3] which revealed a significant interaction, $F(1, 81) = 5.40$, $p = .03$ (see Fig. 3). Levene's test was significant, $F(3, 81) = 3.12$, $p = .03$, thus equal variances were not assumed. As predicted, entity theorists who generated downward counterfactuals showed greater anagram improvement than did entity theorists who generated upward counterfactuals, $t(25.94) = 2.39$, $p = .03$, and greater improvement than incremental theorists who generated downward counterfactuals, $t(36.14) = 2.19$, $p = .04$. Incremental theorists improved more than entity theorists following upward counterfactuals, $t(36.14) = 2.19$, $p = .04$. Although not significant, incremental theorists who generated upward counterfactuals also improved somewhat more ($M = 1.06$) than did incremental theorists who generated downward counterfactuals ($M = -0.16$), $t(46.06) = 1.42$, $p = .16$. There were no significant main

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[2] Although we can only speculate about the null effect of counterfactual direction on affective reactions across both studies, we suspect that providing initial baseline verbal intelligence feedback indicating "poor verbal intelligence" may have dampened emotional reactions to counterfactuals generated in response to task feedback that also indicated "poor performance."

[3] A 2 (*Theory*) X 2 (*Direction*) X 2 (*Trial*: 1 vs. 2) mixed ANOVA with repeated measures on the final variable was also conducted on anagram performance, and this analysis yielded a significant 3-way interaction, $F(1, 81) = 5.40$, $p = .03$.
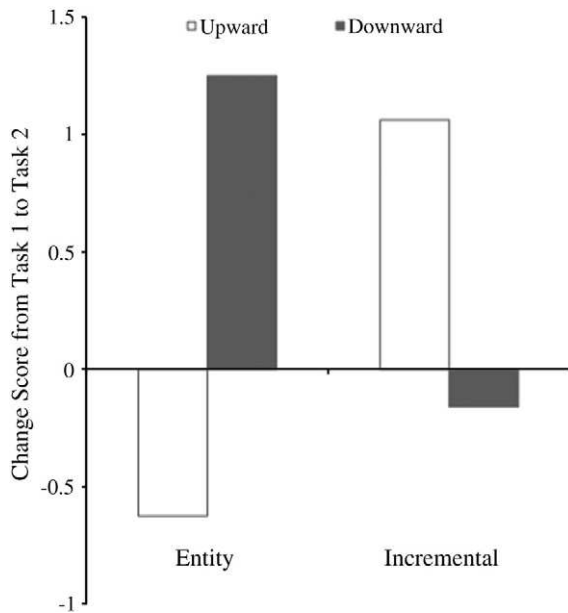
Fig. 3. Mean performance improvement as a function of counterfactual direction and implicit intelligence theory (Study 2).

or interaction effects on reactions to the initial intelligence test feedback or to trial 1 performance, all $Fs<3.75$, all $ps>.06$.

General discussion

The present research indicates that general attainability beliefs are an important moderator of the influence of counterfactual direction on motivation and behavior. Incremental theorists showed the typical pattern of improved motivation and performance following upward (vs. downward) counterfactuals, whereas entity theorists displayed enhanced motivation and performance following downward (vs. upward) counterfactuals.

Despite the wealth of previous work suggesting that downward counterfactuals elicit lower levels of task motivation than upward counterfactuals, this work suggests that this may only be true when one holds fairly strong attainability beliefs. When attainability beliefs are weaker, downward counterfactuals may be better suited to enhance motivation and performance. Extending previous research that demonstrated how upward counterfactuals increase felt preparation for those with high, but not low, self-efficacy (Nasco & Marsh, 1999; Sanna, 1997), the present work suggests that downward counterfactuals are more motivating than upward counterfactuals under certain conditions. Thus, in order to have a fully nuanced theory of functional counterfactual thinking, attainability beliefs should be considered.

We examined implicit theories of intelligence as a proxy for attainability beliefs because prior research has shown how differently people react to performance feedback as a function of these beliefs. However, because we did not directly manipulate attainability beliefs,

it is possible that another construct related to implicit theories may have influenced our results. Future research should examine other individual or contextual variables related to beliefs about improvement attainability such as self-esteem, depression, pessimism, or locus of control (e.g., Major, Testa, & Blysma, 1991; Markman & Miller, 2006; Markman & Weary, 1996; Sanna, 1996; Roese & Olson, 1993, 1995).

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