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Development and Validation of the Counterfactual Thinking for Negative Events Scale

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We examined the psychometric properties of the newly created Counterfactual Thinking for Negative Events Scale (CTNES) in two studies involving university undergraduates. In Study 1 ($N = 634$), factor analysis revealed four subscales that correspond with various types of counterfactual thinking: Nonreferent Downward, Other-Referent Upward, Self-Referent Upward, and Nonreferent Upward. The subscales were largely orthogonal and had adequate internal consistency and test–retest reliability. The CTNES subscales were positively correlated with a traditional method of assessing counterfactual thinking and were related as expected to contextual aspects of the negative event, negative affect, and cognitive style. In Study 2 ($N = 208$), we further examined the validity of the scale and demonstrated that the subscales were sensitive to an experimental manipulation concerning the type of negative event participants recalled. Moreover, the CTNES subscales correlated in the expected direction with measures of coping and cognitive style.

Counterfactual thinking involves imagining alternatives to reality and is often linguistically represented as “if only . . .” thoughts. Researchers have suggested that the mental generation of alternatives to reality is a common and perhaps fundamental cognitive process (Miller, Turnbull, & McFarland, 1990). Counterfactual thoughts occur spontaneously as well as in response to experimental manipulations (Sanna & Turley, 1996).

Counterfactual thoughts can vary along several dimensions such as direction, structure, and object of reference (Roese & Olson, 1995b). Regarding direction, counterfactuals can involve an imagined outcome that is either better (upward) or worse (downward) than one’s actual situation. Regarding structure, counterfactual thoughts may add elements to the situation (*additive*: e.g., “If only I had gone to the review session . . .”), remove elements (*subtractive*: e.g., “If only I had refused that last drink . . .”), or replace one element with another (*substitutional*: e.g., “If only I had taken the new job offer rather than staying in my present position . . .”). Counterfactuals can also refer to actions taken by oneself (*self-referent*), someone else (*other-referent*), or nobody (*nonreferent*).

MEASUREMENT OF COUNTERFACTUAL THINKING

Researchers have developed several methods of measuring counterfactual thinking (see Miller et al., 1990, for a review). One approach involves asking participants to list “if only” thoughts after considering a negative event (Roese & Olson, 1993). A second approach involves explicitly prompting participants to list how things could have been better or worse (Roese & Olson, 1995a; Sanna & Turley, 1996). A third approach involves asking participants to “think aloud” as a means of detecting counterfactual thoughts (Markman, Gavanski, Sherman, & McMullen, 1993). A fourth approach involves hav-

ing participants read scenarios and choose which character in the story would experience more of a particular counterfactual emotion such as regret (Gleicher et al., 1990; Landman, 1987; Lundberg & Frost, 1992). A fifth approach involves having participants read vignettes while responding to Likert or semantic-differential scales that assess emotional responses (Boninger, Gleicher, & Strathman, 1994; Macrae, 1992; Macrae & Milne, 1992; Miller & Gunasegaram, 1990; Miller & McFarland, 1986; Turley, Sanna, & Reiter, 1995).

Although the preceding approaches are useful, they have limitations. For instance, when researchers use open-ended questions to elicit counterfactual thoughts, the process of training raters and coding items can be labor intensive. In addition, although this method provides data on the number and type of counterfactuals identified, it provides no information concerning the frequency of each thought. Conceivably, two individuals who identify the same number and type of counterfactual thoughts could experience different outcomes depending on the frequency with which they experience such thoughts. Moreover, participants who have difficulty identifying different types of counterfactual thoughts in response to an open-ended question might do so more easily if provided with prompts. Indeed, the open-ended format often elicits a small number of counterfactuals (e.g., Sanna & Turley, 1996). As noted previously, some assessment methods ask participants to generate counterfactual thoughts in response to artificial scenarios. However, participants might better identify and access counterfactual thoughts when responding to a personally meaningful event. Finally, some assessment methods fail to assess counterfactual thinking directly, focusing instead on its presumed effect (e.g., greater regret). Given these limitations, there is a need for a psychometrically sound measure of counterfactual thinking that is easy to administer and score, that asks participants to reflect on personally meaningful events, and that directly assesses a variety of types of counterfactual thoughts. Our measure is designed to examine counterfactual thoughts in response to past negative events and requires retrospective reflection. Thus, the

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measure would not be appropriate for assessing counterfactuals in response to laboratory induced events requiring immediate reflection.

Correlates of Counterfactual Thinking

To assess the validity of our measure, we examined how it correlated with constructs that have previously been shown to relate to counterfactual thinking. We focused on measures of affect, cognitive style, and coping strategies.

Counterfactuals and affect. Research has consistently shown that counterfactuals are associated with affect (Roese, 1994). For instance, negative affect often activates counterfactual thinking (Roese, 1997). Furthermore, the relationship between affect and counterfactuals is reciprocal, as counterfactuals can trigger affective responses (Roese, 1997; Sanna, 1999). Specifically, upward counterfactuals can elicit negative affect (Davis, Lehman, Wortman, Silver, & Thompson, 1995), whereas downward counterfactuals can elicit positive affect (Roese, 1994).

Counterfactuals and cognitive style. Counterfactual thinking relates to various aspects of cognitive style such as rumination and beliefs about oneself and/or the world. For instance, Kocovski, Endler, Rector, and Flett (2005) found that participants high in social anxiety were more likely to ruminate and also to list more upward counterfactual thoughts than participants low in social anxiety. As explained by Roese (1997), "counterfactual thinking that is not shut down normally but spins repeatedly into unhealthy ruminations may occur in some individuals, but this likely represents a breakdown in a normally functional process of checks and balances, or activation and inhibition" (p. 144).

Counterfactual thinking often relates to views of oneself. For example, Roese and Olson (1993) found that high self-esteem participants were more likely than low self-esteem participants to generate counterfactuals following success, whereas low self-esteem participants were more likely than high self-esteem participants to generate counterfactuals following failure. Sanna, Turley-Ames, and Meier (1999) found that participants' moods moderate the relationship between self-esteem and counterfactuals. Specifically, they found that both high and low self-esteem individuals generated more downward than upward counterfactuals when in good moods. However, when in bad moods, high self-esteem participants generated more downward counterfactuals, whereas low self-esteem participants generated more upward counterfactuals.

Counterfactual thinking also relates to one's view of the world. For instance, optimists (relative to defensive pessimists) are more likely to generate downward counterfactuals in response to negative moods and challenging events (Kasimatis & Wells, 1995; Sanna, 1996, 1998). Sanna, Chang, Carter, and Small (2006) suggested that optimists (similar to people with high self-esteem) may retrospectively restore positive self-views by using self-serving attributions (Norem & Kantor, 1986) and by thinking downward counterfactuals (Sanna, 2000). Thus, it is possible that optimists are better than pessimists at distancing themselves from past failures. Interestingly, counterfactual thinking has not yet been found to relate to locus of control (Eck & Kite, 1997). However, research on how these constructs relate is limited, and the issue merits additional consideration.

Counterfactuals and coping. Research has examined the role of counterfactual thinking in coping efforts (Davis et al., 1995). Upward counterfactuals are presumed to serve a preparative function, enabling individuals to imagine how their situations could have been improved. As stated by Roese (1994), upward counterfactuals "may be taken as schemata for future action, making salient those scripts that are necessary to facilitate success" (p. 806). Roese (1994) demonstrated that the generation of upward counterfactuals following unsatisfactory outcomes can lead to improvements in future performance. Similarly, Hayes-Roth and Hayes-Roth (1979) suggested that mental simulation can help people develop a plan of action in an integrated, efficient manner and to develop contingency plans. Instead of influencing future performance, downward counterfactuals are presumed to regulate affect by providing a contrast that reveals one's actual situation to be better in comparison to the imagined alternative.

STUDY 1

Study 1 Goal and Hypotheses

Our goal in Study 1 was to evaluate the reliability and validity of a new Likert-type measure of counterfactual thinking (Counterfactual Thinking for Negative Events Scale; CTNES). We hypothesized that factor analysis would reveal multiple factors corresponding with different dimensions of counterfactual thinking (e.g., upward/downward, additive/subtractive). Further, we hypothesized that the CTNES would correlate with another method of measuring counterfactual thinking (i.e., listing counterfactuals in response to an open-ended question). We also posited that the CTNES would relate to measures of negative affect and cognitive style, although a priori hypotheses could not be made until the factor structure of the new scale was examined.

Participants

We recruited participants ($N = 634$) from introductory psychology courses at one medium-sized Catholic university and one large public university. The majority of participants were female (67%) and White (86%). Other ethnic groups included Black or African American (4%), Asian, Asian American, or Pacific Islander (4%), Latino(a) (3%), and other (3%). Participants' ages ranged from 18 to 44 years ($M = 18.99$, $SD = 1.98$).

We asked participants to write briefly about a recent event that had a negative impact on them. Some of the most commonly reported negative events included death of a loved one (18%), health problems (17%), and separation from a loved one (14%). Using a scale ranging from 1 (*not at all distressing*) to 5 (*extremely distressing*), participants indicated that they experienced a high level of distress following the negative event ($M = 3.96$, $SD = 1.04$). Participants reported that the negative event had occurred within the past year (78%), between 1 and 3 years (15%), or more than 3 years ago (7%).

STUDY 1 INSTRUMENTS

Counterfactual Thinking Measures

Open-ended counterfactuals. Adapting a procedure for identifying counterfactual thoughts from Roese and Olson (1995b), we asked participants to write about and reflect on

a recent negative event. Participants then had 5 min to list any “if only” thoughts they experienced pertaining to the event.

CTNES. Initially, we created 30 items to assess various aspects of counterfactual thinking described in the literature (e.g., upward–downward, self-referent, other-referent, nonreferent, additive–subtractive) as well as affective components shown to accompany counterfactuals (i.e., sadness, relief). We asked participants to consider the negative event they described earlier and indicate how frequently they experienced various types of counterfactual thoughts using Likert-type items with response possibilities ranging from 1 (*never*) to 5 (*very often*). The initial pool of 30 items was reduced to 16 items following factor analytic results (see Results section and Appendix).

Supplemental items concerning negative event. We constructed several items concerning the context of the negative event using a 5-point Likert-type scale with anchors depending on the question. These included “To what extent do you view [the negative event as being] within your personal control?”; “How likely are you to face a similar situation in the future?”; “In general, I tend to regret missed opportunities more than having taken a chance”; and “In general, I find that I have a lot of ‘if only’ thoughts after I experience negative events.”

Measures of Affect and Cognitive Style

Depression. We measured depression using the Center for Epidemiologic Studies–Depressed Mood Scale (Radloff, 1977). Participants considered how they felt or behaved during the past week on 20 Likert-type items with response possibilities ranging from 1 (*rarely or none of the time*) to 4 (*most or all of the time*). Cronbach’s alpha for this scale was .89.

Rumination. We administered the Dissipation-Rumination Scale (Caprara, 1986) to assess a general tendency to ruminate about events. Participants rated 20 statements using a Likert-type scale ranging from 1 (*completely false for me*) to 6 (*completely true for me*). Cronbach’s alpha for this scale was .84.

Self-esteem. We used the Texas Social Behavior Inventory (Helmreich & Stapp, 1974) to measure self-esteem. Participants rated 16 statements on a Likert-type scale ranging from 1 (*not at all characteristic of me*) to 5 (*very much characteristic of me*). Cronbach’s alpha for this scale was .89.

Optimism–pessimism. We used the Extended Life Orientation Test (Chang, Maydeu-Olivares, & D’Zurilla, 1997) to assess optimism and pessimism. Participants rated 15 statements on a Likert-type scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). The Pessimism subscale consists of nine items and the Optimism subscale consists of six items. Cronbach’s alphas for both subscales were .77.

Procedure

We asked participants to describe a negative event and complete the open-ended measure of counterfactual thinking prior to completion of the remaining measures. Participants completed surveys on two occasions, with approximately 2 weeks between administrations. A total of 634 participants completed the first survey administration, and 337 participants returned to

complete the second survey administration. Students received course credit for participation.

Results

Factor analysis. We conducted a principal components analysis with varimax rotation on the initial pool of 30 items. We eliminated factors with eigenvalues less than 1 or with inadequate Cronbach alphas and retained items if factor loadings were greater than .40. Additionally, we eliminated three items that were conceptually inconsistent with remaining factor items and six items that appeared redundant. Using these criteria, results indicated that a four-factor solution was most appropriate (see Table 1). Each factor included four items, resulting in a 16-item total scale. The first factor (Nonreferent Downward), with loadings ranging from .78 to .87, assesses downward counterfactual thoughts without reference to oneself or others (e.g., “I think about how much worse things could have been”). The second factor (Other-Referent Upward), with loadings ranging from .62 to .87, assesses upward counterfactual thoughts that reference the actions of others [e.g., “If only another person (or other people) had not been so selfish, this whole mess could have

TABLE 1.—Principal components analysis of the CTNES.

Item	Factor			
	1	2	3	4
I think about how much worse things could have been.	.87	.03	-.02	.03
I feel relieved when I think about how much worse things could have been.	.86	-.05	.02	-.11
I count my blessings when I think about how much worse things could have been.	.84	-.05	-.07	-.02
Although what happened was negative, it clearly could have been a lot worse.	.78	.03	.07	-.08
If only another person (or other people) had not been so selfish, this whole mess could have been avoided.	-.04	.87	.02	-.02
If another person (or other people) had not been so inconsiderate, things would have been better.	.02	.86	.04	-.11
If only other people (or another person) would have acted differently, this situation would have never happened.	-.01	.81	-.04	.15
If only another person (or other people) had spoken up at the time, the situation would have turned out better.	.00	.62	.16	.22
I think about how much better things would have been if I had acted differently.	-.02	-.01	.80	.16
I wish I had a time machine so I could just take back something I said or did.	-.06	.04	.74	.21
If only I had listened to my friends and/or family, things would have turned out better.	.01	.06	.73	-.01
I think about how much better things could have been if I had not failed to take action.	.07	.07	.73	.11
I feel sad when I think about how much better things could have been.	-.12	.16	.14	.79
I think about how much better things could have been.	-.10	.20	.21	.76
Although the bad situation was nobody’s fault, I think about how things could have turned out better.	-.09	.12	.28	.75
I cannot stop thinking about how I wish things would have turned out.	.12	-.28	-.08	.66

Note. Items in bold load higher than .40 on the respective factor. CTNES = Counterfactual Thinking for Negative Events Scale. N = 631.

been avoided”]. The third factor (Self-Referent Upward), with loadings ranging from .73 to .80, assesses upward counterfactuals that reference one’s own actions (e.g., “I wish I had a time machine so I could just take back something I said or did”). The fourth factor (Nonreferent Upward), with loadings ranging from .66 to .79, assesses upward counterfactual thoughts without reference to oneself or others (e.g., “Although the bad situation was nobody’s fault, I think about how things could have turned out better”). The four factors, which collectively accounted for 65% of the variance, had eigenvalues ranging from 2.38 to 2.86 (see Table 2). Cronbach alphas across subscales ranged from .75 to .86, and 2-week test–retest reliability ranged from .73 to .84. The factors appear to be orthogonal, as none of the items loaded highly onto more than one factor, and the factor intercorrelations ranged from .02 to .32.

Correlations with open-ended counterfactual measure. We trained two raters to identify and classify types of open-ended counterfactual thoughts that corresponded with the CTNES subscales. Raters were blind to the CTNES scores. Of the protocols, 20% were examined by both raters, yielding interrater reliability estimates from $r = .70$ to $.93$, all $ps < .001$. For all of the analyses in this study, we set the alpha level at .01 to adjust for the sample size and for multiple comparisons. Number of self-referent upward counterfactuals from the open-ended question was positively correlated with the Self-Referent Upward subscale ($r = .37, p < .001$) and was unrelated to the other subscales. Number of other-referent upward counterfactuals was positively correlated with the Other-Referent Upward ($r = .19, p < .001$) and Nonreferent Upward subscales ($r = .15, p < .001$), and negatively correlated with the Self-Referent Upward subscale ($r = -.23, p < .001$). Number of nonreferent downward counterfactuals was positively correlated with the Nonreferent Downward subscale ($r = .13, p < .01$). Number of nonreferent upward counterfactuals was unrelated to the CTNES subscales.

Correlations with affect and cognitive style measures. We computed correlations to examine the relationships between the CTNES subscales and the measures of depression, self-esteem, rumination, optimism, and pessimism (see Table 3). Self-Referent Upward correlated positively with depression, rumination, and pessimism, and negatively with self-esteem and optimism. Nonreferent Upward correlated positively with depression, rumination, and pessimism and negatively with self-

TABLE 2.—CTNES subscale statistics.

Factor	Subscale	Eigenvalue	% Variance	M (SD)	Alpha	Test–Retest
1	Nonreferent Downward	2.86	17.85	10.57 (4.24)	.86	.73*
2	Other-Referent Upward	2.72	16.97	10.64 (4.75)	.82	.84*
3	Self-Referent Upward	2.44	15.24	9.98 (4.10)	.76	.79*
4	Nonreferent Upward	2.38	14.89	12.65 (4.00)	.75	.74*

Note. $N = 631$. CTNES = Counterfactual Thinking for Negative Events Scale. Test–retest correlations were based on a subset of participants for which retest data were available: $n = 337$. * $p < .001$.

TABLE 3.—Correlations between CTNES and affect/cognitive style measures.

	Nonreferent Downward	Other-Referent Upward	Self-Referent Upward	Nonreferent Upward
Depression	-.04	.09	.31**	.33**
Self-Esteem	.06	-.03	-.16**	-.11*
Rumination	-.07	.13*	.19**	.11*
Optimism	.03	-.06	-.20**	-.09
Pessimism	-.04	.06	.23**	.19**

Note. CTNES = Counterfactual Thinking for Negative Events Scale. * $p < .01$. ** $p < .001$.

esteem. Other-Referent Upward correlated positively with rumination. Nonreferent Downward was unrelated to depression or the cognitive style variables.

Correlations with negative event context items. Several negative event context items were correlated with the CTNES subscales. For instance, participants rated the extent to which the negative event was in their personal control. As expected, the only subscale this item related to was Self-Referent Upward ($r = .48, p < .001$). In addition, only Self-Referent Upward was related to an item assessing a tendency to regret missed opportunities ($r = .13, p < .01$). An item measuring perceived likelihood that the negative event would occur again was only related to the Other-Referent Upward subscale ($r = -.22, p < .001$). An item concerning the general tendency to have “if only” thoughts after negative events was correlated with Self-Referent Upward ($r = .31, p < .001$) and Nonreferent Upward ($r = .32, p < .001$).

STUDY 2

Study 2 Goal and Hypotheses

The goal of Study 2 was to further examine the validity of the CTNES. In particular, we wanted to determine if the scale was sensitive to an experimental manipulation concerning the type of negative event participants recalled. We hypothesized that participants directed to recall a negative event in which their own actions significantly contributed to the negative outcome (self-caused condition) would score higher on Self-Referent Upward than the other participants. Similarly, we hypothesized that participants directed to recall a negative event in which the actions of another person (or other persons) significantly contributed to the negative outcome (other-caused condition) would score higher on Other-Referent Upward than the other participants. Finally, we hypothesized that participants directed to recall a negative event that was nobody’s fault (fate condition) would score higher on Nonreferent Upward than the other participants.

We also wanted to examine how the CTNES subscales related to coping strategies and additional measures of cognitive style. We hypothesized that Self-Referent Upward would be positively related to a measure of negative views of self and that Other-Referent Upward would be positively related to a measure of negative views of the world. Despite past research that has shown no relationship between counterfactual thinking and locus of control (e.g., Eck & Kite, 1997), the referential dimension of the CTNES along with our experimental manipulation suggested the utility in revisiting this question. Specifically, we were curious if locus of control would show

any differential relationships between the Self-Referent, Other-Referent, and Nonreferent subscales. Given the exploratory nature of this question, we hypothesized no specific directional relationships among these constructs. With respect to coping strategies, we hypothesized that all of the CTNES subscales would be positively related to logical analysis. Moreover, we hypothesized that Nonreferent Downward would be positively correlated with positive reappraisal.

Participants

We recruited participants ($N = 208$) from introductory psychology courses at a medium-sized Midwestern university. Participants ranged in age from 18 to 38 years ($M = 19.2$, $SD = 1.8$). The majority of participants were female (57%) and White (95%). Other ethnic groups represented in the sample included Black or African American (2%), Latino(a) (.5%), and other (2.5%).

STUDY 2 INSTRUMENTS

Counterfactual Thinking

We used the 16-item (CTNES; see Appendix) to assess counterfactual thinking.

Measures of Cognitive Style

Cognitive Triad Inventory. We used two subscales of the Cognitive Triad Inventory (CTI; Beckham, Leber, Watkins, Boyer, & Cook, 1986) in this study. For both subscales, participants respond to items constructed on a 10-item Likert-type scale with response possibilities ranging from 1 (*totally agree*) to 7 (*totally disagree*). CTI–Self measures the degree to which individuals have negative views of themselves, whereas CTI–World measures the degree to which individuals have negative views of the world. Cronbach's alphas for the CTI–Self and CTI–World subscales were .81 and .76, respectively.

Locus of control. Locus of control was assessed using the Internal–External Locus of Control Scale (Rotter, 1966). Participants considered 23 pairs of statements and indicated which statement they believe to be more true. Kuder–Richardson 20 for this scale was .64.

Measures of Coping Strategies

Coping Responses Inventory (CRI). The CRI (Moos, 1993) is a multidimensional assessment of how individuals cope with stressful events. Participants considered the negative event they recalled earlier and indicated the frequency with which they employed various coping strategies. Each subscale has six items featuring a 4-point Likert-type scale ranging from 1 (*not at all*) to 4 (*fairly often*). This study included two of the cognitive subscales,¹ which assess adaptive strategies to think about the negative event. They consisted of Logical Analysis (e.g., “Think of new ways to deal with the problem”) and Positive Reappraisal (e.g., “Try to see the good side of the situation”). Raw scores were converted into T scores following the procedure outlined in the manual (Moos, 1993). Cronbach's alphas for the subscales ranged from .67 to .72.

¹Two other cognitive subscales, Cognitive Avoidance and Acceptance/Resignation, were excluded from analyses due to poor internal consistency ($\alpha = .63$ and $.56$, respectively).

Procedure

We recruited participants from introductory psychology courses and gave them class credit for participation. As in Study 1, we instructed participants to recall a negative event that they had recently experienced. In Study 2, we randomly assigned participants to one of three event-type conditions. Participants in the self-caused condition considered a negative event in which their own actions significantly contributed to the outcome. Participants in the other-caused condition considered a negative event in which another person's (or other persons') actions significantly contributed to the outcome. Finally, participants in the fate condition considered a negative event that appeared to be nobody's fault. The most common types of negative events listed by participants across conditions included loss of a relationship (31%), argument/fighting (18%), and alcohol-related problem (15%).

Results

Event controllability manipulation. For all analyses, we set the alpha level at .01 to adjust for sample size and multiple comparisons. Analyses of variance (ANOVAs) revealed no differences across condition with respect to recency of the negative event, $F(2, 192) = 2.20$, $p > .05$, or level of distress participants experienced about the negative event, $F(2, 180) = 1.47$, $p > .05$. To assess the validity of our manipulation, a rater blind to condition and study hypotheses classified participants' negative events as primarily self-caused, other caused, or due to fate. The rater almost always correctly identified responses from the self-caused (94%) and other-caused (89%) conditions. The rater was somewhat less accurate identifying responses from the fate condition (72%).

We computed ANOVAs with the CTNES subscales as the dependent variable and condition (self-caused, other caused, fate) as the independent variable (see Table 4). Significant differences in the expected direction were found across condition on the Other-Referent Upward subscale, $F(2, 205) = 15.17$, $p < .001$ ($r_{\text{effect}} = .35$). Post hoc analyses revealed that participants in the other-caused condition scored significantly higher than participants in the self-caused condition and the fate condition. Significant differences in the expected direction were also found across condition on the Self-Referent Upward subscale, $F(2, 204) = 16.80$, $p < .001$ ($r_{\text{effect}} = .33$). Post hoc analyses revealed that participants in the self-caused condition scored

TABLE 4.—Comparisons of CTNES subscale scores across condition (self, other, fate).

Subscale	Self		Other		Fate		F
	M	SD	M	SD	M	SD	
Nonreferent Downward	10.78	4.23	11.55	4.18	11.35	4.19	0.60
Other-Referent Upward	9.51	3.82	12.29	3.80	8.74	4.36	15.17*
Self-Referent Upward	11.86	3.76	9.99	3.65	8.25	3.57	16.80*
Nonreferent Upward	11.65	3.38	11.81	3.91	11.15	4.11	0.58

Note. CTNES = Counterfactual Thinking for Negative Events Scale.
* $p < .001$.

TABLE 5.—Correlations between CTNES subscales and measures of cognitive style/coping.

Scale	CTI-Self	CTI-World	External Locus of Control	CRI Logical Analysis	CRI Positive Reappraisal
Nonreferent Downward	-.05	-.16	-.11	.21	.45**
Other-Referent Upward	.10	.10	.11	.29**	.00
Self-Referent Upward	.25**	.13	.06	.40**	.27**
Nonreferent Upward	.26**	.23*	.08	.40**	.23*

Note. A subset of participants ($n = 143$) completed the coping measures. CTNES = Counterfactual Thinking for Negative Events Scale; CTI = Cognitive Triad Inventory; CRI = Coping Responses Inventory.

* $p < .01$. ** $p < .001$.

significantly higher than participants in the other-caused condition and the fate condition. No significant differences emerged across condition with respect to Nonreferent Downward or Nonreferent Upward subscales.

Correlations with cognitive style measures. We computed Pearson correlations to examine the relationship between the CTNES subscales and cognitive style. As shown in Table 5, the CTI-Self subscale (i.e., higher scores = more negative cognitions about oneself) correlated positively with Self-Referent Upward and Nonreferent Upward. The CTI-World subscale (i.e., higher scores = more negative cognitions about the world) correlated positively with Nonreferent Upward. Locus of control was unrelated to any of the subscales.

Correlations with coping strategies. Pearson correlations were computed to examine the relationship between the CTNES subscales and the subscales of the CRI. As shown in Table 5, the Logical Analysis subscale correlated positively with all of the upward CTNES subscales. The Positive Reappraisal subscale related most strongly to Nonreferent Downward but was also related to Self-Referent Upward and Nonreferent Upward.

GENERAL DISCUSSION

Both Study 1 and Study 2 provide evidence that the newly created CTNES has adequate psychometric properties. The factors were largely orthogonal and appear to assess different aspects of counterfactual thinking. The subscales had adequate internal consistency and test-retest reliability. Importantly, the CTNES was significantly related to the number of counterfactuals participants generated in response to a commonly used open-ended assessment format. The small magnitude of these correlations most likely reflects the restricted range of the number of counterfactuals generated by participants and the fact that the two assessment methods explore somewhat different aspects of counterfactual thinking (number vs. frequency). The CTNES subscales were also related to contextual aspects of the negative event as expected (e.g., the more likely the negative event was perceived within one's personal control, the higher participants scored on Self-Referent Upward). The CTNES was also sensitive to an experimental manipulation concerning type of negative event. Specifically, participants who recalled a negative event that was largely caused by themselves scored signif-

icantly higher on Self-Referent Upward, whereas participants who recalled a negative event that was largely caused by another person (or other persons) scored significantly higher on Other-Referent Upward. No differences were found across subscales for participants assigned to the fate condition. However, an objective rater had a harder time identifying responses from the fate condition than the others, suggesting that participants had a wide range of interpretations for what type of negative event was "nobody's fault."

Salient Dimensions of the CTNES

The factor analysis yielded an interesting factor structure. Contrary to hypotheses, counterfactual structure (i.e., additive/subtractive/substitutional), was not reflected in the factor analysis. Although Roese and Olson (1993) noted ample evidence for the functional bases for certain dimensions of structure, these dimensions may not be as salient when considering negative events. For instance, Roese and Olson (1993) found that subtractive counterfactuals are not commonly utilized following failure or distressing events.

Object of reference and upward counterfactuals. One salient dimension that emerged from our factor analysis involved object of reference. It appears that attribution of responsibility is a theme around which counterfactual thoughts cluster. Although other researchers have noted that counterfactuals that reference oneself have different correlates than counterfactuals that reference other people (e.g., Roese & Olson, 1993), this dimension has not received as much attention in the literature as the dimensions of direction and structure. However, in our study, self-referent and other-referent upward counterfactuals had important implications for affect and cognitive style.

With regard to mood, the Self-Referent and Nonreferent Upward subscales were positively related to depression. This is consistent with the revised learned helplessness theory, which suggests that depressed individuals are more likely to make negative attributions that are global, internal, and stable (Abramson, Seligman, & Teasdale, 1978). The Self-Referent subscale clearly reflects internality. The Nonreferent Upward subscale may also reflect global thinking as evidenced by its positive association with negative views of the world. Moreover, there is a ruminative, depressogenic theme to the Nonreferent Upward subscale (e.g., "I feel sad when . . ." "I cannot stop thinking about . . ."). Both subscales were also related to rumination, self-esteem, and pessimism. It is possible that Self-Referent and Nonreferent Upward counterfactuals stimulate these cognitive processes (i.e., rumination, pessimism, and low self-esteem), which in turn increase feelings of depression.

Interestingly, Other-Referent Upward was unrelated to depression. Other-Referent counterfactual thinking might mitigate self-reproach and depressed mood by attributing blame (or other negative characteristics) to a clearly specified other. Moreover, Other-Referent Upward was the only upward subscale that was not related to self-esteem, pessimism, CTI-Self, or Positive Reappraisal subscales. These findings highlight the importance of examining referents when studying how constructs relate to counterfactual thinking.

Direction of counterfactuals. Consistent with hypotheses, another dimension that differentiated factors was counterfactual

direction (i.e., upward/downward). Interestingly, Nonreferent Downward was unrelated to depression. This is somewhat surprising given that downward counterfactuals are presumed to play an important role in affect regulation (Markman et al., 1993; Nasco & Marsh, 1999; Roese & Olson, 1995a, 1995b; White & Lehman, 2005). Perhaps severity of negative events plays a role in determining whether downward counterfactuals improve mood. Conceivably, some negative events could be so distressing that thinking about how things could have been worse does little to improve mood. Similarly, Nonreferent Downward was generally unrelated to the cognitive style and coping measures, with the exception of Positive Reappraisal. Perhaps downward counterfactuals with different referents (e.g., self or other) relate to these constructs, but future research is needed to explore this possibility.

With regard to stress and coping, all upward CTNES subscales were positively related to the Logical Analysis subscale, which assesses "cognitive attempts to understand and prepare mentally for a stressor ..." (Moos, 1993, p. 15). This finding corresponds with the idea that upward counterfactuals serve a preparatory function (Roese, 1994).

Consistent with past research, there was no relationship among any CTNES subscales and locus of control, despite our manipulation and the distinct referential subscales in the CTNES. The findings from both our study and Eck and Kite (1997) appear to confirm that a general perception of controllability over events offers little predictive ability for specific counterfactual thoughts (or frequency of such thoughts).

Limitations and Future Directions

Although the CTNES offers a promising option for assessing counterfactual thinking, it has some constraints. In these studies, we used college student samples, and it is unclear how well the results will generalize to other populations. Given that clinical samples were not used, speculations about the role of counterfactual thinking in depression and rumination remain tentative. We wonder how CTNES scores might differ between a control group and individuals who meet the clinical criteria for a depressive disorder or for obsessive-compulsive disorder. A variety of other clinical measures (e.g., worry, obsessive rumination) and trait measures (e.g., self-efficacy, perfectionism) might reveal interesting relationships with the CTNES. We look forward to future research that explores such questions and that further examines the validity of the CTNES using diverse populations.

The CTNES is not designed for counterfactual research about positive or neutral events. However, research suggests that counterfactuals are generated more frequently in response to negative events than positive or neutral events (Gleicher et al., 1990). According to Gavanski and Wells (1989), "negative outcomes naturally trigger counterfactual thinking because people are motivated to understand how to avoid such outcomes for themselves in the future" (p. 323). Because the CTNES asks participants to reflect on a personally experienced negative event, responses will vary more than when using assessment approaches involving a common stimulus such as a vignette. However, the CTNES could be easily adapted to a common stimulus. For example, participants could be directed to complete the scale based on a recent relationship break-up, a failure experience at work/school, or some other specific event of interest to researchers.

Another constraint is that the CTNES is based on one event the participant chooses. We found a moderate positive correlation between two of the CTNES subscales (i.e., Self-Referent Upward, Nonreferent Downward) and a single item index of one's general tendency to counterfactualize. However, future research could supplement the CTNES by developing a multiple-item trait measure of counterfactual thinking in which the focus is one's propensity for counterfactualizing about everyday experiences.²

Additionally, some of the subscale items are quite similar to each other. In retrospect, we wish we had created a greater variety of items pertaining to object of reference. However, we did not anticipate that object of reference would be a salient factor, and removal of the similar items would have compromised subscale reliability. Nevertheless, we believe these subscales make a unique contribution to counterfactual thinking assessment.

Finally, the CTNES identifies some dimensions of counterfactual thinking but not all of them. For instance, the CTNES does not measure self-referent or other-referent downward counterfactuals. Researchers interested in the specific antecedents and consequences of participants' counterfactuals will still want to use the thought-listing method. The CTNES does not directly assess the intensity of counterfactual thoughts, which is an important dimension to consider (Sanna & Turley-Ames, 2000). Intensity offers information about one's overall adjustment. Cognitive therapists, for instance, consider intensity or the degree of belief in a particular thought (e.g., "How strongly do you believe this to be true?") as one index of maladaptive thinking (Beck, 1995). As noted earlier, the CTNES is designed for retrospective reflection on a past negative event and is therefore not appropriate for studies requiring immediate reflection following a laboratory induced event.

These considerations underscore the importance of developing multiple forms of assessment in counterfactual thinking research. The CTNES is intended not as a substitute but as a complement to existing assessment strategies. We hope that expanding the existing repertoire of methods will further illuminate the role of this basic cognitive process in human functioning.

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²We identified several items in our original pool that could form the basis for such a scale, but our inability to validate the scale precluded presentation in this article.

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APPENDIX

Counterfactual Thinking for Negative Events Scale (CTNES) Instructions

Please think of an event that occurred somewhat recently that had a negative impact on you. Take a few moments to vividly recall that experience and what it was like for you.

Now, think about the types of thoughts you experienced following that undesirable event. Using the following scale, rate the frequency with which you experienced the thoughts described below.

Scale

1 = Never; 2 = Rarely; 3 = Sometimes; 4 = Often; 5 = Very Often

Items

- | | |
|-----|--|
| 1. | I think about how much worse things could have been. |
| 2. | If only another person (or other people) had not been so selfish, this whole mess could have been avoided. |
| 3. | I think about how much better things would have been if I had acted differently. |
| 4. | I feel sad when I think about how much better things could have been. |
| 5. | I feel relieved when I think about how much worse things could have been. |
| 6. | If another person (or other people) had not been so inconsiderate, things would have been better. |
| 7. | I wish I had a time machine so I could just take back something I said or did. |
| 8. | I think about how much better things could have been. |
| 9. | I count my blessings when I think about how much worse things could have been. |
| 10. | If only another person (or other people) would have acted differently, this situation would have never happened. |
| 11. | If only I had listened to my friends and/or family, things would have turned out better. |
| 12. | I cannot stop thinking about how I wish things would have turned out. |
| 13. | Although what happened was negative, it clearly could have been a lot worse. |
| 14. | If only another person (or other people) had spoken up at the time, the situation would have turned out better. |
| 15. | I think about how much better things could have been if I had not failed to take action. |
| 16. | Although the bad situation was nobody's fault, I think about how things could have turned out better. |
-

Scoring

Nonreferent Downward: 1, 5, 9, 13; Other-Referent Upward: 2, 6, 10, 14; Self-Referent Upward: 3, 7, 11, 15; Nonreferent Upward: 4, 8, 12, 16.