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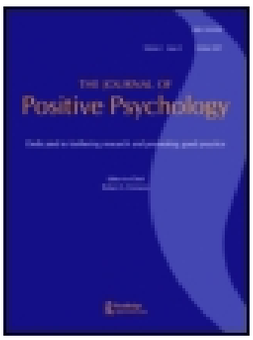

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"If only I had" versus "If only I had not": Mental deletions, mental additions, and perceptions of meaning in life events

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ABSTRACT

The present research investigated the relationship between meaning perceptions and the structure of counterfactual thoughts. In Study 1, participants reflected on how turning points in their lives could have turned out otherwise. Those who were instructed to engage in subtractive (e.g. If only I *had not* done X…") counterfactual thinking (SCT) about those turning points subsequently reported higher meaning perceptions than did those who engaged in additive (e.g. 'If only I *had* done X…') counterfactual thinking (ACT). In Study 2, participants who reflected upon life events from the perspective of understanding the past (versus preparing for the future) tended to engage in more SCT than ACT. Finally, in Study 3, participants engaged in more SCT than ACT about life events whose meaning was perceived as certain (as opposed to uncertain) – presumably to maintain their pre-existing sense of meaning. Implications for the study of counterfactual thinking and meaning are discussed.

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Counterfactual thinking; counterfactual structure; meaning in life; temporal focus; certainty

Individuals seek to experience a sense of meaning in life – it is fundamental to humanity and critical for life adjustment (e.g. Baumeister & Vohs, 2002; Frankl, 1946; Heine, Proulx, & Vohs, 2006; Heintzelman & King, 2014; Piaget, 1960; Pyszczynski, Greenberg, & Solomon, 2004). *Meaning in life* has been defined as the subjective experience of life as comprehensible (i.e. coherent and connected), consisting of goals for the future (i.e. purpose) and an overall sense that life is worth living (i.e. significance; Martela & Steger, 2016; Wong & Fry, 1998). Given that a sense of meaning results from subjective interpretations of experiences, how might reflections upon the myriad ways that life events might have turned out differently help maintain and enhance existing sources of meaning?

In fact, converging evidence suggests that imagining how event outcomes could have turned out differently (i.e. counterfactual thinking) enhances individuals' sense of meaning surrounding past events and their current lives more generally (e.g. Ersner-Hershfield, Galinsky, Kray, & King, 2010; Heintzelman, Christopher, Trent, & King, 2013; Koo, Algoe, Wilson, & Gilbert, 2008; Kray et al., 2010; Landau, Kosloff, & Schmeichel, 2011; Lindberg, Markman, & Choi, 2013; Seto, Hicks, Davis, & Smallman, 2015). Notably, however, previous work has not examined how the specific structure of counterfactual thoughts might differentially relate to the level of meaning that individuals ascribe to life events. Given that individuals generate counterfactual thoughts that are both *additive* (i.e. mentally adding actions omitted; 'If only I HAD…') and *subtractive* (i.e. mentally deleting actions committed; 'If only I had NOT…') in structure (Roese & Olson, 1993), and that counterfactual structure has been shown to influence a variety of psychological processes (e.g. Kruger, Wirtz, & Miller, 2005; Markman, Lindberg, Kray, & Galinsky, 2007), an important question arises as to whether additive versus subtractive counterfactual thoughts are better suited for maintaining and enhancing meaning perceptions.

Maintaining meaning through the mental deletion of actions

A wealth of prior research suggests that individuals are motivated to maintain and enhance current levels of meaning in their lives (see Heine et al., 2006, for a review). Consequently, when a sense of meaning is momentarily lost or threatened, individuals will focus on alternative sources of meaning to compensate (e.g. Proulx, Heine, & Vohs, 2010). In the present work, we hypothesize that subtractive counterfactual thinking (SCT) is better suited than is additive counterfactual thinking (ACT) for achieving the goal of understanding past experiences and maintaining that they are

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significant. To mentally subtract specific elements from the context surrounding an event, individuals need to consider the possible impact of such changes on the known outcome. Notably, Roese, Hur, and Pennington (1999) demonstrated that subtractive and additive counterfactuals correspond to different modes of causal inference: subtractive counterfactuals mutate elements related to causal necessity, whereas additive counterfactuals mutate elements related to causal sufficiency. As Roese et al. (1999) noted,

> …additive counterfactuals typically specify the insertion of an act that would have been sufficient for a desired but unobtained outcome, whereas subtractive counterfactuals typically specify the deletion of an act that was necessary for an undesired but obtained outcome (p. 1117).

Subtractive counterfactuals, then, mentally delete actions that were necessary for bringing about the known outcome, producing thoughts that take the form, 'If I had NOT done X, then the outcome would not have occurred,' whereas additive counterfactuals mentally add actions sufficient for bringing about a different outcome, producing thoughts that take the form, 'If I HAD done X, then a different outcome would have occurred.' To the extent that individuals perceive that current aspects of their lives (e.g. friendships, job security, romantic attachments, social status) might be absent if it were not for the occurrence of certain events (or, event elements) (e.g. 'If I had not gone to the party that night, I wouldn't have met my soul mate') – clear instances of SCT – they should tend to conclude that those events played a significant and meaningful role in their lives (e.g. 'The event made me who I am today').

Several recent studies have provided evidence for the meaning-maintenance function of counterfactual thinking. Importantly, however, although participants in these studies were instructed to engage in counterfactual thinking *generally* (i.e. to generate 'if only' thoughts with no regard to their specific structure), we suggest that the reported effects may have been facilitated by a tendency for the various experimental prompts employed to elicit SCT. For example, participants in Kray et al.'s (2010) Studies 3 and 4 were directed to consider how their current lives would be different if the turning point events on which they focused had *never* occurred (as opposed to being directed to consider how a *different* turning point *could* have occurred). Similarly, participants in Koo et al.'s (2008) studies reported enhanced levels of satisfaction in their current romantic relationships after being directed to imagine how their lives would be different if they had *not* met their current partner (as opposed to being directed to imagine having met a *different* partner). In addition, Heintzelman et al. (2013) found that participants perceived greater meaning in their lives after imagining how they might *not* have been born. Notably, moreover, the target events employed in these previous studies (see also Landau et al., 2011) were likely to have *already* been perceived as meaningful – to consider a life event to be a 'turning point,' one must already perceive that it was pivotal and significant. Thus, it is reasonable to speculate that the counterfactuals participants generated in these studies exerted meaning-enhancing effects because they tended to be more subtractive than additive in structure.

Preparing for the future and exploring novel possibilities through the mental addition of actions

Because additive counterfactuals mutate omitted actions that could potentially be applied to future experiences, ACT should be especially well-suited for pursuing future-oriented goals and novel possibilities (Epstude & Roese, 2008; Roese & Epstude, 2017; Smallman & Summerville, 2018). In contrast to subtractive counterfactuals that are bounded by the context that surrounds what happened in the past, additive counterfactuals mutate aspects that go beyond the past context and can thus potentially enhance the availability of novel, future alternative paths.

Supporting this contention, prior findings (Roese, 1994) indicate that ACT is more apt to improve subsequent task performance than is SCT, presumably because additive counterfactuals help individuals identify alternative pathways that can help them achieve desired outcomes in the future. In kind, Markman et al. (2007) found that instantiating an ACT mindset (i.e. by instructing participants to generate additive counterfactuals about a past life event) elicited better performance on a subsequent novel and exploratory idea generation task than did instantiating an SCT mindset (see also, Kray, Galinsky, & Markman, 2009). According to Markman et al. (2007):

> Because additive counterfactuals are more open to the construction of alternative antecedents that may not have been part of the factual event, the activation of an additive counterfactual mind-set may encourage an expansive processing style that enhances performance on creative generation tasks that require a broadening of conceptual attention that goes beyond the boundaries of what is currently known or salient (p. 315)

Given converging evidence for the future-oriented, exploratory quality of ACT, we hypothesize that additive counterfactuals are more prevalent than subtractive

counterfactuals when individuals are either focused on preparing for the future or exploring novel possibilities (i.e. and not so focused on enhancing existing sources of meaning).

The present studies

Study 1 examines whether individuals are more likely to report enhanced meaning perceptions after engaging in SCT than after engaging in ACT, and Studies 2 and 3 investigate whether individuals are more likely to generate subtractive counterfactual thoughts when they are motivated to maintain and enhance their sense of meaning. In Study 1, we instructed participants to engage in either ACT or SCT about turning points in their lives (e.g. Kray et al., 2010). By contrast, we manipulated temporal focus (past understanding vs. future preparation) in Study 2 and varied levels of certainty (certain vs. uncertain) regarding the perceived meaningfulness of specific past moments in Study 3 to elicit differential levels of focus on meaning-maintenance concerns.

Study 1

Based on procedures employed by Kray et al. (2010; Studies 3 & 4), participants in Study 1 were asked to reflect upon 'turning points' – described by McAdams (2001) as well-defined moments of transition after which a person's life is fundamentally altered. After reflecting on such turning point events, participants in the Kray et al. studies were asked to either describe the factual aspects of their events (*factual* condition), or to 'Describe how your life would be now if the turning point incident had never occurred' (*counterfactual* condition, p. 110). In the present study, we extended this work by creating *two* counterfactual conditions in which one group was instructed to engage in SCT and another group was instructed to engage in ACT. To the extent that individuals perceive that current aspects of their lives might be absent if it were *not* for the occurrence of certain events or elements (as opposed to if it *had* been for the occurrence of additional events or elements), they should tend to conclude that those events played a significant and meaningful role in their lives. Thus, we predicted that engaging in SCT about a turning point event would more strongly enhance meaning perceptions than would focusing on the factual aspects of the event or engaging in ACT about the event.

Method

Participants and design

Seventy-five Amazon Mechanical Turk (MTurk) workers (63% female) were paid $.40 each for their participation. Two participants were removed from the *factual* condition for failing to describe a turning point, leaving a total of 73 participants in the final sample. These participants were randomly assigned to one of the following three conditions: *factual* (n = 20), *additive counterfactual* (n = 26), or *subtractive counterfactual* (n = 27). A sensitivity power analysis employing GPower (N = 73, α = .05, two-tailed, power = 80%) revealed that the sample was sufficiently powered to detect a minimum effect size of f = .37.

Procedure

All participants read the following description of a life turning point (Kray et al., 2010):

> Turning points are not very common moments or episodes in a person's life in which rapid, intense, and clear change occurs, such that the person and his or her life is never the same again. Turning points can be initiated by a person or from forces outside of the individual.

After selecting and reflecting upon one such turning point event in their lives, participants were asked to indicate how thinking about the event made them feel (i.e. *event valence*; along a 9-point scale, −4 = *very negative*; +4 = *very positive*). Next, participants in the *factual* condition received these instructions (Kray et al., 2010):

> Describe exactly what happened, when it happened, who was involved, what you were thinking and feeling, what happened right before and right after the incident occurred, or any other factual aspects of the incident that you can recall.

Participants in the *subtractive counterfactual* condition, on the other hand, received these instructions (Markman et al., 2007):

> People often have thoughts like 'if only …' or 'at least…' when looking back at past events, in that they can see how things might have turned out differently. Often, we wish we had not done something or that some event around us had not happened. For example, 'If only I HAD NOT tried…the outcome would have been different.' In the space below, please list TWO specific actions that you took that, in retrospect, would have made a difference at the time of your turning point if you had not done them. Each thought you list should complete the phrase 'If I HAD NOT … the (outcome/event) would have been…'

whereas participants in the *additive counterfactual* condition received these instructions:

> People often have thoughts like 'if only …' or 'at least…' when looking back at past events, in that they can see how things might have turned out differently. Often, we wish we had done something or that some event around us had in fact happened. For example, 'If only I HAD tried… the outcome would have been better/worse.' In the space below, please list TWO specific actions that could have been taken that would have made your turning point unfold differently. Each thought you list should complete the phrase 'If I HAD … the (outcome/event) would have been…'

After describing the factual aspects of their turning point events, or engaging in SCT or ACT about these events, participants completed the following measures:

Control perceptions. A single item (i.e. '*To what extent would you say that the event was under your control?*') was used to measure participants' perceptions of the amount of control they perceived they had over the turning point event (along a 9-point scale, 1 = *I had no control at all*; 9 = *I had complete control*).

Meaning perceptions. Participants responded to two meaning perception items employed by Kray et al. (2010): ('*It made me who I am today*' and '*It added meaning to my life*'), as well as an additional item ('*My life is meaningful*'), all along 9-point (1 = *not at all*; 9 = *extremely*) scales.

Affect. Participants reported their affective state by employing the 20-item Positive Affect and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988).

After completing these measures, participants were debriefed and thanked for their participation.

Results and discussion

One-way ANOVAs performed on the control perception and PANAS measures revealed no significant differences between conditions, all *p*s > .35. To examine our main predictions of interest, the three meaning perception items were averaged to form a composite meaning index (α = .89). Because event valence was found to correlate with the resulting meaning index, (r = .37, p = .001), a one-way ANCOVA was conducted that employed event valence as a covariate. The analysis revealed a significant main effect, $F(2, 69) = 6.40$, p = .003, after which a series of planned contrasts were performed. Consistent with predictions, the *subtractive counterfactual* condition (M = 7.68, SD = 1.46) reported higher meaning perceptions than did the *factual* condition (M = 6.10, SD = 2.25), $t(45) = 2.92$, p = .005, d = .83, and the *additive counterfactual* condition (M = 6.31, SD = 2.09), $t(51) = -2.78$, p = .008, d = −.76. The *additive counterfactual* and *factual* conditions did not differ from one another, $t < 1$.

These results provide initial evidence that meaning perceptions can be differentially impacted by counterfactual thoughts that differ in structure. In an important set of studies, Kray et al. (2010) found that counterfactual (as compared to factual) thinking enhanced meaning perceptions. The present finding extends their work by suggesting that the counterfactual-meaning link may be moderated by structure, as SCT was found to be more apt to enhance meaning perceptions than either factual thinking or ACT.

Study 2

In Study 1, participants were instructed to engage in specific forms of counterfactual (or factual) thinking to examine their differential impact on perceptions of meaning (i.e. meaning perceptions were the measure of interest). By contrast, in Study 2 we attempted to elicit differential levels of focus on meaning-maintenance and made counterfactual structure the measure of interest. Specifically, participants were prompted to recall an important life event within the context of either trying to understand past experiences or trying to prepare for future experiences. After doing so, participants were prompted to engage in counterfactual thinking, and we coded the resulting written protocols for instances of SCT and ACT. As noted, SCT is bounded by what happened in the past, whereas ACT has the flexibility to focus on additional, exploratory possibilities that might have happened and can potentially be directed toward the future.

Thus, we hypothesized that participants would be more likely to generate subtractive than additive counterfactuals if they were focused on understanding what transpired in the past, and they would be more likely to generate additive than subtractive counterfactuals if they were focused on future preparation.

Method

Participants and design

Sixty participants (M_{age} = 19.21, SD_{age} = 1.38; 76.7% female; 86.7% Caucasian, 5.6% Hispanic/Latino, 4.4% African American, 2.2% other, 1.1% Asian/Asian American) enrolled in introductory psychology courses at Ohio University participated for research credit. Participants were randomly assigned to either the *past understanding* (n = 31) or *future preparation* (n = 29) conditions. A sensitivity power analysis employing GPower (N = 60, α = .05, two-tailed, power = 80%, correlation among repeated measures = −.65)

revealed that the sample was sufficiently powered to detect a minimum effect size of $f = .33$.

Procedure

Participants were instructed to recall and write about a negative life event that had influenced their lives in some important way. Next, participants were asked to list up to five counterfactual thoughts with the directive that the counterfactuals they generate should help them either solidify their understanding of the past or prepare them for the future. Specifically, participants in the *past understanding* condition received these instructions:

> When individuals are reminded of a particular negative event that they experienced in the past, they often reflect on that experience in order to make sense of it – by asking themselves, "How did this happen?" and "Why did this happen to me?" One way that individuals try to make sense of the past is by "undoing" the past – by thinking about how the event could have been prevented and how it could have turned out differently (i.e. "if only…" and "what if…").

Participants in the *future preparation* condition, on the other hand, received these instructions:

> When individuals are reminded of a particular negative event that they experienced in the past, they often reflect on that experience in order to prepare for the future. By asking themselves, "How did this happen?" and "Why did this happen to me?", individuals can learn how to prevent the same kind of negative outcome from happening in the future by making better choices that produce more positive outcomes. One way that individuals try to learn from the past in order to prepare for the future is by "undoing" the past – by thinking about how the event could have been prevented and how it could have turned out differently (i.e. "if only…" and "what if…").

When participants completed recording their counterfactual thoughts they were debriefed and thanked for their participation.

Results and discussion

Participants generated about three to four counterfactual thoughts ($M = 3.65$, $SD = 1.22$) overall. Two judges, blind to experimental condition and hypotheses, independently categorized the counterfactual statements generated by participants according to their structure (i.e. subtractive or additive). Interrater agreement was high (Cohen's $k = .93$), and thus all disagreements were resolved by discussion.

Consistent with previous research (e.g. Markman, Gavanski, Sherman, & McMullen, 1993), the first counterfactual thought that participants reported (i.e. participants' most accessible counterfactual thought) was coded as either subtractive or additive. Supporting our main hypotheses, chi-square analyses indicated that the first counterfactuals that participants in the *past understanding* condition generated tended to be subtractive (58.1%, $n = 18$), whereas the first counterfactuals that participants in the *future preparation* condition generated tended to be additive (65.5%, $n = 19$), although this effect was only marginally significant, χ^2 (1, $N = 60$) = 3.35, $p = .07$ (see Table 1).

We next submitted the *total* number of subtractive and additive counterfactuals generated to a mixed ANOVA, with Temporal Focus (*past understanding* versus *future preparation*) operating as a between-subjects factor and Counterfactual Structure (*subtractive* versus *additive*) operating as a within-subjects factor. The omnibus test revealed a marginally significant Temporal Focus × Counterfactual Structure interaction, $F(1, 58) = 3.69$, $p = .06$, $\eta_p^2 = .06$. Simple effects tests were then conducted to explore our primary hypotheses. Consistent with predictions, participants in the *future preparation* condition generated a greater number of additive ($M = 2.55$, $SD = 1.43$) than subtractive counterfactuals ($M = 1.24$, $SD = 1.27$), $F(1, 58) = 7.50$, $p = .008$, $\eta_p^2 = .11$. On the other hand, participants in the *past understanding* condition did not differ in the number of additive ($M = 1.78$, $SD = 1.56$) and subtractive ($M = 1.74$, $SD = 1.41$) counterfactuals generated, $F < 1$ (see Figure 1).

A possible explanation for the somewhat weak effects obtained, particularly in the *past understanding* condition, is that the study was not sufficiently powered to detect the predicted interaction effect, and thus in Study 3 we aimed to conduct a higher-powered study. In addition, it may be that participants in the *past understanding* condition were not directly instructed to recall a life event about which they *already* had a strong sense of meaning. Thus, participants in this condition may have generated equivalent numbers of subtractive and additive counterfactuals

Table 1. Participants who generated additive or subtractive counterfactuals in their first counterfactual thought, study 2 and 3.

	Counterfactual structure	
Study and condition	Subtractive counterfactuals *n* (%)	Additive counterfactuals *n* (%)
Study 2 (Temporal Focus)		
Past understanding	18 (58.1%)	13 (41.9%)
Future preparation	10 (34.5%)	19 (65.5%)
Study 3 (Certainty Level)		
Certain	33 (67.3%)	16 (32.7%)
Uncertain	14 (29.2%)	34 (70.8%)

because they recalled life events that varied widely in how much meaning they had already derived. In Study 3, we attempted to remedy this problem by directing participants to recall a moment in the past during which they were feeling very *certain*. In so doing, we tried to maximize the likelihood that participants would have already considered the meaningfulness of the moment they recalled.

Study 3

The results of Study 2 provided evidence that a future preparation focus tends to elicit more ACT than SCT. On the other hand, the prediction that a past understanding focus would tend to elicit more SCT than ACT received mixed support. Because our manipulation of temporal focus attempted to activate meaning maintenance-related concerns indirectly, however, in Study 3 we employed a more direct approach by asking participants to either recall a moment in their lives during which they felt *certain*, or a moment in their lives during which they felt *uncertain*.

We hypothesized that if SCT serves a meaning-maintenance function and ACT serves an exploratory function, then participants should be more likely to generate subtractive than additive counterfactuals when they are focused on maintaining their existing sense of meaning (*certain* condition), and participants should be more likely to generate additive than subtractive counterfactuals when they have an opportunity to explore novel possibilities (*uncertain* condition).

Method

Participants and design

One hundred and two MTurk workers (M_{age} = 36.07, *SD* = 12.36; 45.5% female; 73.3% Caucasian, 10.9% Asian/Asian American, 6.9% African American, 6.9% Hispanic/Latino, 2% other) participated for payment of $.40. Participants were randomly assigned to either the *certain* (n = 52) or *uncertain* (n = 50) moment recall conditions. A sensitivity power analysis employing GPower (N = 102, α = .05, two-tailed, power = 80%, correlation among repeated measures = −.77) revealed that the sample was sufficiently powered to detect a minimum effect size of f = .26.

Procedure

To begin, participants were asked to recall and describe a moment in their lives. Specifically, participants in the *certain* condition were asked to think about a moment in their lives when they felt that 'life was full,' that 'life made sense,' and that they had 'a sense of direction,' whereas participants in the *uncertain* condition were asked to think about a moment in their lives when they felt 'empty, uncertain, and aimless.' After doing so, participants rated the valence of the event on a 9-point scale (–4 = *very negative*, 0 = *neither negative nor positive*, + 4 = *very positive*) and completed the Meaning in Life Questionnaire (MLQ; Steger, Frazier, Oishi, & Kaler, 2006). The MLQ consists of two subscales that measure 'presence of meaning' and 'search for meaning' along 7-point (1 = *absolutely untrue*, 7 = *absolutely true*) scales.

After responding to these measures, participants were asked to imagine and write about any actions they could have taken or failed to take that in retrospect could have changed their lives. Unlike Studies 1 and 2, the instructions did not limit the number of counterfactuals they could generate. When participants completed recording their counterfactual thoughts they were debriefed and thanked for their participation.

Results and discussion

Two judges, blind to experimental condition and hypotheses, independently categorized each generated counterfactual statement according to its structure. Interrater agreement was high (Cohen's k = .91), and thus all disagreements were resolved through discussion. Across the entire sample, participants generated an average of slightly more than one counterfactual thought (M = 1.13, *SD* = .52).

Our main hypothesis was that participants in the *certain* condition would generate more subtractive than additive counterfactuals, and participants in the *uncertain* condition would generate more additive than subtractive counterfactuals[1]. As in Study 2, we began by analyzing the first counterfactual thought that participants generated. Consistent with predictions, a chi-square analysis indicated that the first counterfactual participants in the *certain* condition (67.3%, n = 33) generated tended to be subtractive, whereas the first counterfactual participants in the *uncertain* condition (70.8%, n = 34) generated tended to be additive, $\chi^2(1, N = 97) = 14.15$, $p < .001$ (see Table 1).

Also consistent with Study 2, we next submitted the *total* number of subtractive and additive counterfactuals generated to a mixed ANOVA where Certainty Level (*certain* vs. *uncertain*) operated as a between-subjects factor and Counterfactual Structure (*subtractive* versus *additive*)

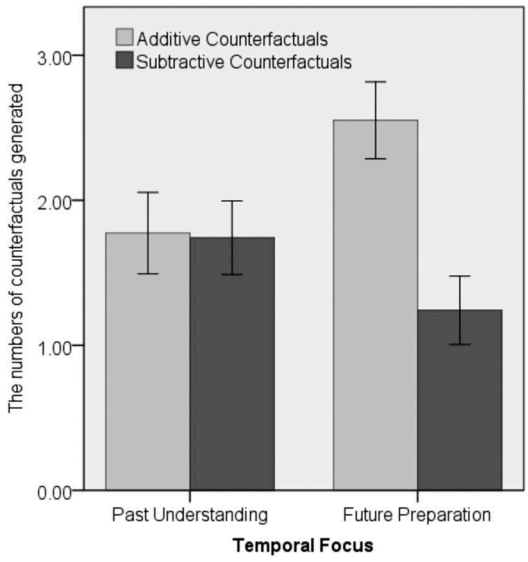

Figure 1. The numbers of additive and subtractive counterfactuals generated as a function of temporal focus (study 2). Error bars represent standard errors.

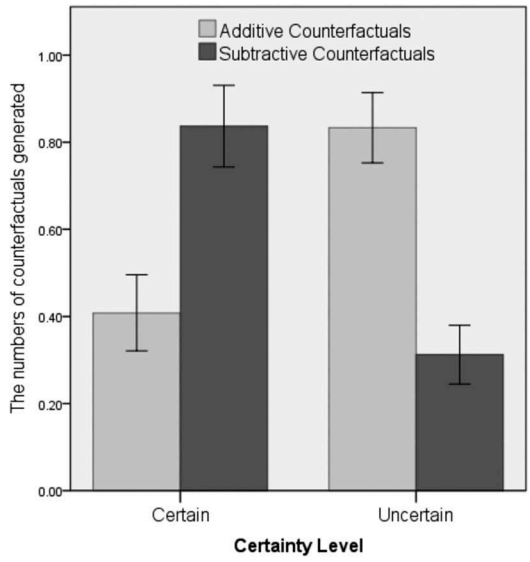

Figure 2. The numbers of additive and subtractive counterfactuals generated as a function of certainty level (study 3). Error bars represent standard errors.

operated as a within-subjects factor. This analysis revealed a significant interaction, $F(1, 95) = 18.88$, $p < .001$, $\eta_p^2 = .17$, indicating that whereas participants in the *certain* condition generated a greater number of subtractive ($M = .84$, $SD = .66$) than additive counterfactuals ($M = .41$, $SD = .61$), $F(1, 95) = 7.77$, $p = .006$, $\eta_p^2 = .08$, participants in the *uncertain* condition generated a greater number of additive ($M = .83$, $SD = .56$) than subtractive counterfactuals ($M = .31$, $SD = .47$), $F(1, 95) = 11.25$, $p = .001$, $\eta_p^2 = .11$ (see Figure 2).[2] In all, these results provide additional supportive evidence that SCT is better suited for addressing meaning maintenance concerns than is ACT.

General discussion

The primary goal of the present research was to investigate the relationship between meaning perceptions, exploratory and future-oriented thinking, and the structure of counterfactual thoughts. The central hypothesis was that SCT is particularly well-suited for maintaining and enhancing meaning perceptions and understanding the past, whereas ACT is more prevalent in contexts where individuals are focused on the future and have an opportunity to explore novel possibilities.

In a well-known set of studies, Kray et al. (2010) found that counterfactual thinking about turning point events enhanced meaning perceptions about those events. The results of Study 1 extend their work by suggesting that the counterfactual-meaning link may be moderated by structure, as SCT enhanced meaning perceptions more than either factual thinking or ACT.

In Study 2, we switched the measure of interest from meaning perception levels to the content of the counterfactuals generated after reflecting upon an important life event from the perspective of understanding the past or focusing on the future. The results provided some initial support for the hypothesis that focusing on the past would elicit more SCT than ACT, whereas focusing on the future would elicit more ACT than SCT.

Reasoning that our manipulation of past understanding in Study 2 failed to direct participants to recall an event about which they already held strong meaning beliefs, in Study 3 we employed a certainty manipulation that was designed to maximize the likelihood that participants would recall a moment in the past about which they had already processed meaning. Consistent with our hypothesis, participants who were directed to recall a *certain* moment from their past generated more subtractive than additive counterfactuals, whereas participants who were directed to recall an *uncertain* moment from their past generated more additive than subtractive counterfactuals. Thus, Study 3 provided stronger evidence for the notion that SCT is particularly well-suited for maintaining and enhancing meaning.

The present studies advance the literature on counterfactual thinking and meaning by suggesting how counterfactuals that vary in structure may uniquely relate to perceptions of meaning. Up until now, the assembled evidence has demonstrated how

counterfactual thinking, *in general*, can enhance one's global sense of meaning (e.g. Kray et al., 2010; Seto et al., 2015). The present findings, however, suggest that the specific *content* of counterfactual thoughts may differentially impact meaning perceptions (Study 1), and may be differentially impacted by focusing on understanding past events (as opposed to preparing for future events) (Study 2) and by reflecting on moments imbued with certainty (as opposed to uncertainty) (Study 3). Future research conducted in this area might be directed toward examining how the content of counterfactual thoughts could influence and be shaped by *multiple* meaning-related concerns (e.g. meaning-maintenance, meaning-seeking).

Contrary to some previous investigations (e.g. Kray et al., 2010), the present studies directed participants to think about *actions* that they might or might not have taken. Although the counterfactual thinking prompts we employed may seem natural because individuals do, in fact, tend to mutate controllable (relative to uncontrollable) aspects of events (e.g. Girotto, Legrenzi, & Rizzo, 1991; Markman, Gavanski, Sherman, & McMullen, 1995), the nature of the prompts limits the scope of the present investigation to counterfactuals that focus on relatively controllable aspects. In other words, the present work does not speak to whether mentally adding event aspects (e.g. 'If the new tax reforms *had* taken effect before I graduated…'), or mentally subtracting event aspects (e.g. 'If the hurricane *had not* damaged my home…') that are perceived as out of one's control would exert differential effects on an individual's sense of meaning and/or need to create meaning (cf. Lindberg et al., 2013). Thus, future studies might investigate the role that control perceptions play in moderating relationships between counterfactuals of varying structures and meaning perceptions.

Conclusion

The present research contributes to a burgeoning literature on how counterfactual musings upon life experiences enhance perceptions of significance and meaning. We believe that the findings advance current knowledge in this area by demonstrating how counterfactuals with specific structures – subtractive and additive, respectively – may be uniquely suited for maintaining and enhancing meaning. In all, this work provides a snapshot of how individuals strategically employ mental simulations of past experiences to experience meaning in the present and prepare for the future.

Notes

1. Treating the *presence of meaning* subscale on the MLQ as an index of meaning-maintenance concerns, a mixed ANOVA was run with Certainty Level (*certain* vs. *uncertain*) operating as a between-subjects factor and MLQ Subscale (*presence of meaning* vs. *search for meaning*) operating as a within-subjects factor. The analysis revealed a significant Certainty Level × MLQ Subscale interaction, $F(1, 100) = 5.76$, $p = .018$, $\eta_p^2 = .05$, indicating that participants in the *certain* condition ($M = 5.39$, $SD = 1.30$) scored higher on the *presence of meaning* subscale than did those in the *uncertain* condition ($M = 4.67$, $SD = 1.58$), $F(1, 100) = 6.31$, $p = .014$, $\eta_p^2 = .06$, whereas participants in the *uncertain* condition ($M = 5.06$, $SD = 1.65$) tended to score higher on the *search for meaning* subscale than did those in the *certain* condition, although not significantly ($M = 4.59$, $SD = 1.56$), $F(1, 100) = 2.22$, $p = .14$, $\eta_p^2 = .02$. These results provide supportive evidence that participants in the *certain* condition were more focused on meaning-maintenance concerns than were participants in the *uncertain* condition.
2. Mean ratings of event valence also differed between conditions, in that participants in the *certain* condition tended to recall more positive events ($M = 3.58$, $SD = .67$) than did participants in the *uncertain* condition ($M = -2.54$, $SD = 2.22$), $t(100) = 19.04$, $p < .001$, $d = 3.74$. To control for differences in event valence, the Certainty Level × Counterfactual Structure mixed ANOVA was run again, but this time including event valence as a covariate. The analysis remained significant, $F(1, 94) = 4.40$, $p = .04$, $\eta_p^2 = .04$, indicating that the interactive effect of Certainty Level and Counterfactual Structure was not accounted for purely by differences in reported event valence.

Disclosure statement

No potential conflict of interest was reported by the authors.

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