Imagining What Might Have Been: The Meaning-Confirmation and Meaning-Seeking Functions of Counterfactual Reflection

A dissertation presented to
the faculty of
the College of Arts and Sciences of Ohio University

In partial fulfillment
of the requirements for the degree
Doctor of Philosophy

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August 2016

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This dissertation titled

Imagining What Might Have Been: The Meaning-Confirmation and Meaning-Seeking Functions of Counterfactual Reflection

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Abstract

CHOI, HYEMAN, Ph.D., August 2016, Experimental Psychology

Imagining What Might Have Been: The Meaning-Confirmation and Meaning-Seeking Functions of Counterfactual Reflection

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The present work investigates how counterfactual reflection (i.e., thoughts of what might have been) maintains and enhances perceptions that life is imbued with meaning. Specifically, the current research examines whether certain types of counterfactual reflection (i.e., additive versus subtractive counterfactual thinking) serve different functions for meaning maintenance (i.e., meaning-confirmation and meaning-seeking). It was hypothesized that people would be more likely to generate subtractive counterfactuals (i.e., mentally subtracting actions committed) under meaning-confirmation motivation (i.e., motivation to confirm one’s sense of meaning) because subtractive counterfactuals help individuals perceive coherence and significance in their lives by illuminating connections between past actions and current life and heightening a comparison standard that is worse than reality (i.e., imagining worse outcomes). It was also hypothesized that people would be more likely to generate additive counterfactuals (mentally adding actions omitted) under meaning-seeking motivation (i.e., motivation to find additional source of meaning) because additive counterfactuals facilitate the identification of possible pathways to achieve a desired outcome and experience a significance in life. In Study 1, participants who were motivated to prepare for the future generated more additive counterfactuals, whereas participants who were motivated to
understand the past generated more subtractive counterfactuals. Consistently, Study 2 showed that high levels of meaning-seeking motivation facilitated increased generation of additive counterfactuals. However, the manipulation of event repeatability in Study 2 failed to elicit different levels of meaning-confirmation and meaning-seeking motivations. Finally, Study 3 showed that participants were more likely to engage in subtractive (versus additive) counterfactuals when contemplating meaningful life events. Meaningless life events, conversely, elicited greater additive (versus subtractive) counterfactuals. Together, these findings suggest that people use subtractive counterfactuals to confirm a sense of meaning in life, while additive counterfactuals facilitate a search for meaning in life with potential experiences.
Acknowledgments

I would like to thank my advisor, Keith Markman, and committee members, Mark Alicke, Kimberly Rios, Jennifer Howell, and Mijeong Noh, for their help in leading to the improvement and completion of this project. Also, I would like to give special thanks to my family for their support and love. Without you this journey would not have been possible.
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Introduction

People seek to experience a sense of meaning in life; it is fundamental to humanity and critical for life adjustments (Baumeister & Vohs, 2002; Pyszczynski, Greenberg, & Solomon, 2004; Heine, Proulx & Vohs, 2006; Heintzelman & King, 2014).

Meaning in life is 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; Proulx, Markman, & Lindberg, 2013). Given that sense of meaning results from one’s subjective interpretation, how does subjective reflection of the past serve to maintain a sense of meaning in the present?

The present studies investigate this question by examining how counterfactual reflection (i.e., imagining how a past event could have turned out differently given some antecedent event had happened differently) maintains and enhances perceptions that life is comprehensible, purposeful, and significant. Specifically, the current research examines the meaning-maintenance functions that subtractive counterfactuals (i.e., mentally subtracting actions committed) and additive counterfactuals (i.e., mentally adding actions omitted) serve. I hypothesize that subtractive counterfactuals serve a meaning-confirmation (i.e., confirming an existing sense of meaning) function because subtractive counterfactuals promote a sense of coherence and significance in life by illuminating connections between past actions and current life and providing a comparison standard that is worse than reality (i.e., imagining worse outcome). I also hypothesize that additive counterfactuals serve a meaning-seeking (i.e., searching for new
sources of meaning) function because additive counterfactuals heighten awareness of potentially more significant futures by identifying pathways to achieve desired outcomes and revealing missed opportunities for experiencing life with a greater significance.

Although converging evidence shows that imagining alternatives to reality leads to increased meaning surrounding a past event and current life (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; Waytz, Hershfield, & Tamir, 2015), previous studies have not examined the link between particular content of counterfactual reflection and a sense of meaning.

Thus, the present research attempts to clarify the link between particular content of counterfactual thinking (i.e., counterfactual structure) and a sense of meaning both about past events and the present life. Furthermore, the present research attempts to demonstrate the motivational influence on the link between the counterfactual structure and a sense of meaning. The present research contributes to the literature by elaborating the pathways from mental simulation (i.e., counterfactual thinking) to meaning perception and by introducing motivational influence into this relationship.

**Counterfactual Thinking and Meaning of a Past Event**

When reflecting on past experiences, one should perceive an ‘expected pattern and association’ among the experiences (see Heine et al., 2006, see also Heintzelman & King, 2014) to gain a sense of coherence and significance in one’s life (for instance, in the form of a personal narrative identity; McAdams, 2013). The coherence aspect of
meaning is about understanding what the world is (i.e., sense-making) and the significance aspect is about justifying why the world (including oneself) exists as it is (i.e., benefit-finding; see Martela & Steger, 2016, and Proulx et al., 2013).

In light of the coherence and significance aspects of meaning experience, it appears that counterfactual thinking can influence each aspect of the meaning experience. That is, because counterfactual thinking is closely related to causal inference (Wells & Gavanski, 1989), counterfactuals can influence a sense of coherence by heightening connections among life events. Furthermore, because counterfactual thinking provides (imagined) comparison standards (i.e., alternative outcomes) that are better or worse than reality (Markman & McMullen, 2003; Olson, Buhrmann, & Roese, 2000), it can influence people’s evaluation of whether their life has value in it and is worth living (i.e., meaning as a sense of significance; Kahneman & Miller, 1986; McMullen, Markman, & Gavanski, 1995).

Indeed, Kray and her colleagues (2010) provided compelling evidence for a sense-making and benefit finding function of counterfactual thinking. In Kray et al. (2010, Study 3 and 4), participants were asked to write about either the details of a turning point in their life (factual condition) or how their current life would be different if the turning point event had never occurred (counterfactual condition). Interestingly, participants who engaged in counterfactual thinking (versus factual thinking) were more likely to see the connection between the past event and their current self (e.g., “It made me who I am today”) and the significance of the past event (e.g., “It added meaning to my life”). The authors also demonstrated that these meaning-enhancing effects of counterfactual
thinking were mediated by increased fate perception and benefit-finding (i.e., seeing the positives in the consequences) about their turning point event.

Importantly, these findings were due to mental *subtraction* of a focal event (i.e., undoing events) as opposed to a mental *addition* of new events. Similarly, other studies that report meaning-enhancing effects of counterfactual thinking appear to have the same subtractive nature in the content of counterfactuals. For example, participants in Koo et al. (2008) reported increased satisfaction in romantic relationship after imagining how their lives would be different if they had not met their current partner. Also, people perceive greater meaning in life after imagining how they might not have been born (Heintzelman et al., 2013). Taken together, these findings suggest that it is the particular content of counterfactual thinking (i.e., subtractive counterfactuals, or mentally removing any components in the antecedent) that helps people understand and value their past and present.

Given that people engage in both additive (i.e., mentally inserting any new elements that were in fact was not present in the antecedent) and subtractive (i.e., mentally erasing any elements in the antecedents) counterfactual thinking (Roese & Olson, 1993) which influence a variety of psychological processes (e.g., Kruger, Wirtz, & Miller, 2005; Markman, Lindberg, Kray, & Galinsky, 2007), an important question arises: does counterfactual structure (i.e., additive versus subtractive) play a role in the experience of meaning when people reflect on their past experiences? The present study tries to answer this question.
Counterfactual Structure and Meaning Maintenance

An important motivational aspect of meaning experience is that people are motivated to maintain a certain level of meaning (see Heine et al., 2006). Consequently, when a sense of meaning is momentarily lost, people actively make use of another source of meaning to compensate for the loss in meaning. For example, research shows that participants who read absurdist literature (that violates one’s expected pattern), compared to those who read non-absurdist literature (i.e., Aesop’s Fables), more strongly endorsed the importance of their cultural identity (Proulx, Heine, & Vohs, 2010). Relatedly, motivation for search for meaning increases as one feels insufficient levels of meaning in life (see Steger, 2013 for a review; Steger, Frazier, Oishi, & Kaler, 2006).

Thus, given that a sense of meaning is both an end product and a process of achieving a meaning maintenance goal, the key to identifying the link between the content of counterfactuals (i.e., counterfactual structure) and a sense of meaning is to examine how motivations influence the generation of additive and subtractive counterfactuals. As previous research suggests (e.g., Koo et al., 2008; Kray et al., 2010), there may be certain counterfactuals (e.g., subtractive or additive) that people want to engage in to maintain a sense of meaning (cf. Kunda, 1990). For example, Landau et al. (2011) showed that participants whose sense of meaning was temporarily undermined by thoughts of their own death bolstered the subtractive counterfactual statement (e.g., “If that action never occurred… I would be someone other than who I am today”) in order to strengthen the perceived continuity of self that provides a sense of coherence and significance in life.
Accordingly, the present studies posit that the meaning maintenance process involving counterfactual reflection consists of two motivational strategies: *meaning-confirmation*, whereby individuals try to secure a sense of coherence and significance that has already been achieved, and *meaning-seeking*, whereby individuals try to seek new sources of meaning beyond their experiences that could provide a sense of meaning in the future. That is, individuals can maintain a sense of meaning either by avoiding loss of meaning (i.e., valuing what one has experienced) or by exploring new sources of meaning (i.e., valuing what one could experience).

Due to the cognitive and motivational characteristics of subtractive and additive counterfactual thinking, I hypothesize that subtractive counterfactuals will serve a meaning-confirmation function. On the other hand, additive counterfactuals will serve a meaning-seeking function.

**Meaning-confirmation through mental subtraction of actions.** One way people secure their current sense of meaning (i.e., a sense of meaning that is already made) is by confirming their past experiences as comprehensible and significant. This goal can be achieved primarily through subtractive (as compared to additive) counterfactual reflection because subtractive counterfactuals are more likely to help individuals see connections among events and find benefits from those experiences. Indeed, a recent study (Choi & Markman, 2016) showed that participants who were asked to think about actions they might not have done (i.e., subtractive counterfactuals) perceived greater meaning from past events (i.e., turning point in life) and current life, as compared to those who thought about actions they might have done but did not (i.e.,
additive counterfactuals). Such findings provide preliminary evidence that subtractive counterfactuals serve a meaning-confirmation function. However, this study did not manipulate motivations for counterfactual generation, making it unclear whether counterfactual structure serves distinct meaning maintenance goals.

**Confirming a sense of coherence.** Markman et al. (2007) showed that subtractive counterfactual thinking leads to an analytical information processing style, whereas additive counterfactual thinking leads to an expansive information processing style, suggesting that subtractive relative to additive counterfactuals can be more helpful for identifying a causal link among events. In their studies (Studies 1 & 2), participants who were induced to form a subtractive (relative to additive) counterfactual mind-set subsequently performed better on cognitive tasks that require sufficient understandings of relationships (i.e., Remote Associates Test and Syllogism problem). To mentally subtract certain components from the context, an individual should consider the possible impact of the change on the known outcome, whereas mentally adding a new component to the context may not necessarily require such a relational mind-set (Markman et al., 2007; see Epstude & Roese, 2008, for a review). Thus, since a sense of meaning arises when a perceiver connects seemingly random and meaningless dots into a coherent subject (Heine et al., 2006), the Markman et al. (2007) findings suggest that subtractive relative to additive counterfactual thinking should be more likely to serve a meaning-confirmation motivation.

In line with differences in information processing style, Roese, Hur, and Pennington (1999) showed that additive and subtractive counterfactual thinking convey a
different sense of causal inference, such that subtractive counterfactuals imply causal necessity (i.e., any actions are viewed as requirements to bring about an alternative outcome) whereas additive counterfactuals imply causal sufficiency (i.e., commission of a new action is believed to be sufficient to bring about an alternative outcome). Thus, people who generate subtractive, but not additive, counterfactual thinking may perceive the target of mutation as a necessary event that facilitated one’s current standing. In other words, people may perceive that current aspects of their lives (e.g., current friendship, social status, or family etc.) might be absent without the occurrence of a focal past event that is mutated, concluding that the target event played a critical role in their life (i.e., meaning as significance).

Furthermore, the focus of attention also differs between subtractive and additive counterfactual thinking, such that subtractive counterfactual thinking is confined within a context, whereas additive counterfactual thinking considers aspects outside the given context (see Markman et al., 2007, and see Roese, 1994). In other words, the focus of subtractive counterfactual thinking tends to be on what actually happened (i.e., the known fact), whereas additive counterfactual thinking tends to focus on possibilities that could happen (i.e., the unknown fact). Consequently, subtractive relative to additive counterfactual thought is more apt to achieve a meaning-confirmation goal by valuing reality, whereas additive counterfactual thought is more apt to achieve a meaning-seeking goal by valuing possible future outcomes.

To conclude, considering the cognitive differences between subtractive and additive counterfactual thinking, subtractive relative to additive counterfactual thought is
expected to serve the meaning-confirmation function better. As discussed above, it appears that previous research (i.e., Heintzelman et al., 2013; Koo et al., 2008; Kray et al., 2010) found a meaning-enhancing effect of counterfactual thinking because the studies prompted participants to generate subtractive counterfactual thinking.

Confirming a sense of significance. A sense of meaning as significance requires an evaluation of one’s life as worth living (Martela & Steger, 2016). Counterfactual thinking lies on the core of this process, because alternative outcomes can be better (i.e., upward counterfactuals) or worse (i.e., downward counterfactuals) than reality. As such, they serve as comparison standards when evaluating the quality of the present (Markman, Gavanski, Sherman, & McMullen, 1993; Markman & McMullen, 2003). Thus, people are more likely to generate downward as compared to upward counterfactuals when they are motivated to experience positive feelings and maintain favorable self-images while simultaneously avoiding negative feelings (e.g., Rim & Summerville, 2014; White & Lehman, 2005).

Likewise, people who are motivated to view a past event as meaningful may generate predominantly downward counterfactual thinking. For example, when death thoughts are highly accessible, people show a reduction in experienced regret, which aids to protect their self-esteem (Rudert, Reutner, Walker, & Greifeneder, 2015). Indeed, in Kray et al. (2010), the majority of generated counterfactuals were downward (and subtractive), and the downward counterfactuals were positively correlated with a sense of meaning. Similarly, in other studies that reported meaning-enhancing effects (i.e., Heintzelman et al., 2013; Koo et al., 2008), the counterfactual thinking that participants
generated reflected alternatives that were worse than reality (e.g., imagining the world without oneself or a significant other). Also, as mentioned above, it was subtractive counterfactuals that participants thought about in these studies (i.e., Heintzelman et al., 2013; Koo et al., 2008; Kray et al., 2010; Landau et al., 2011). To conclude, converging evidence suggests that subtractive and downward counterfactuals help individuals to achieve a meaning-confirmation goal.

Stated differently, the meaning-confirmation motivation combines subtractive counterfactuals (in the form of *if* clause) with downward counterfactuals (in the form of *then* clause; e.g., “If I had not gone to a graduate school, then I could have not met my fiancé.”). It should be noted that all the events employed in the previous studies, including a turning point (Kray et al., 2010), meeting with a current partner (Koo et al., 2008), one’s birthday (Heintzelman et al., 2013), and a past action that significantly influenced one’s life (Landau et al., 2011), are already perceived as meaningful events. Thus, when participants were asked to mentally erase any elements of the meaningful past events (i.e., subtractive counterfactuals), it is likely that the participants were motivated to confirm their belief that the target event was indeed meaningful, by comparing their reality with worse possible world (i.e., downward counterfactuals) that highlights the value of reality. Such reality-valuing mind-set (i.e., meaning-confirmation) that involves subtractive counterfactuals is more closely related to prevention than promotion regulatory focus (Higgins, 1998), in that people in a prevention focus are motivated to maintain what they already have. Indeed, Roese et al. (1999) showed that
subtractive counterfactual thinking tends to evoke a prevention focus, whereas additive counterfactual thinking tends to evoke a promotion focus.

Furthermore, to justify why one’s life is worth living (i.e., a sense of significance), all the actions (and inactions) that were committed (and omitted) in the past also need to be justified to some extent (e.g., Festinger, 1957; Gilovich, Medvec, & Chen, 1995). The difference between subtractive and additive counterfactuals in the causal inference (Roese et al., 1999) can influence the level of motivation to justify one’s past experiences, as implicated in the regret literature (e.g., Gilovich et al., 1995). Research has shown that people experience more intense regret for actions they committed (as a function of subtractive counterfactuals) than actions they failed to commit (as a function of additive counterfactuals) (e.g., Kahneman & Tversky, 1982). This may be the case because actions relative to inactions elicit a greater level of perceived responsibility, and therefore, require a greater level of justification (Gilovich et al., 1995). Relatedly, in moral judgment, people think of a target person as more immoral and responsible when the target person causes harm by committing compared to omitting actions (Spranca, Minsk, & Baron, 1991). This action effect in regret (see Zeelenberg, van den Bos, van Dijk, & Pieters, 2002, for a review) implies that people are motivated to generate downward, but not upward, counterfactuals when subtracting actions from reality to justify their actions (e.g., “If I had not gone to a graduate school, I would not have met my fiancée.”).

Indeed, people tend to generate downward counterfactuals when asked to generate subtractive counterfactuals, whereas people tend to generate upward counterfactuals when asked to generate additive counterfactuals (e.g., Choi & Markman, 2016). The
opposite relationship holds true. For example, Sanna and Turley (1996) showed that people generate additive counterfactual thinking after a failure, whereas people generate subtractive counterfactual thinking after a success. Roese and Olson (1993) argued that people do so because the success is viewed as a result of correct actions whereas the failure is viewed as a result of a failure to commit correct actions.

To summarize, because subtractive counterfactual thinking is suited to help individuals see coherence and significance by identifying the causal links among life experiences and by highlighting the value of those experiences, people should be more likely to generate subtractive counterfactual thinking when they want to confirm their worldview regarding a sense of meaning (i.e., “My life is meaningful”).

**Meaning-seeking through mental addition of actions.** Another way to maintain meaning in life is to actively seek out a sense of coherence and significance through novel experiences, because people can feel a sense of meaning not only from actions that were committed but also from actions to be committed. This notion is reflected in literature positing that purpose in life is one aspect of subjective meaning experience (see Martela & Steger, 2016). A sense of purpose as meaning differs from a sense of significance, in that a sense of purpose is future-oriented and is ‘about evaluating the potential future value of one’s life through sustained goals that give life direction and momentum’ (Martela & Steger, 2016, p. 7). Inherently, new actions (e.g., asking someone for her phone number) are needed to have new experiences in life (e.g., a romantic relationship) and develop new sources of meaning. As Steger (2013) argues, people search for meaning when feeling devoid of meaning, and as such people should be
motivated to look for new sources of meaning outside the experiential context (through additional actions) when they have little or no sense of meaning to confirm in their past experiences. Thus, additive counterfactuals that specify actions that could or should have been taken serve meaning-seeking goals, in that the omitted actions represented in additive counterfactuals provide a potential for additional experiences (in the future) beyond an original context.

Given that people try to find additional sources of meaning through novel actions, the valence of the alternative outcomes that are created by additive counterfactuals ought to be positive. That is, when people generate additive counterfactuals to achieve a meaning-seeking goal, people should imagine better (as compared to worse) alternative outcomes (i.e., upward counterfactuals) that will increase a sense of significance in the future. Indeed, people tend to expect positive outcomes from actions (Scheier & Carver, 1985). For example, research shows that people become action-oriented, as opposed to state-oriented, when they are asked to think about ways to improve a negative outcome, revealing people’s perceptions about the causal world (i.e., “do something to improve your life;” van Putten, Zeelenberg, & van Dijk, 2009).

In this sense, additive and upward (i.e., imagining better alternative outcomes than reality) counterfactuals are closely related to one another (e.g., Choi & Markman, 2016; Roese et al., 1999; Roese & Olson, 1993; Sanna & Turley, 1996). Research has shown that additive relative to subtractive counterfactuals better serve a future-preparation function because additive counterfactuals are construed as more specific and creative. For example, research (e.g., Roese, 1994) has shown that people improve their
performance on a task to a greater degree after generating additive than subtractive counterfactual thoughts. Importantly, functional theorists in counterfactual research (see Epstude & Roese, 2008; and see Markman, Karadogan, Lindberg, & Zell, 2008, for a review) argue that, to imagine better alternative outcomes in the past that could have been attained could mean to ‘be prepared’ or to ‘improve’, for upward (as compared to downward) counterfactuals serve future preparative functions. Convergent evidence suggests that upward more than downward counterfactuals can help prepare one to act and improve in the future (e.g., Dyczewski & Markman, 2012; Myers, McCrea, & Tyser, 2014). That is, upward (as compared to downward) counterfactuals enhance control (Nasco & Marsh, 1999) and self-efficacy perceptions (Tal-Or, Boninger, & Gleicher, 2004), and also facilitate the formation of behavioral intentions (Smallman & Roese, 2009).

Thus, a person’s motivation to be well prepared and do better next time can be translated to the meaning-seeking motivation, in that being prepared means that the person has a good chance of experiencing significance in life in the future (i.e., a success or a better outcome). The very act of pursuing one’s goal possibly provides a sense of purpose in life (see Baumeister & Vohs, 2002; and see Martela & Steger, 2016).

It is worth noting that although upward counterfactual thinking can make reality look worse (Zeelenberg & Pieters, 2007), it does not necessarily mean that upward counterfactual thinking has no meaning enhancing effect or even deprives meaning in life. Social comparison literature (e.g., Taylor & Lobel, 1989) argues that, although upward social comparison may make people feel bad about themselves, it does not compete with
the goal of viewing oneself favorably because the upward comparison motivates an individual to improve one’s self-image which will make the individuals feel good about themselves in the end. Relatedly, Markman and McMullen (2003) argue that as long as the better alternative is attainable and, thus, included in one’s self-construal, then upward counterfactual thinking yields positive affect (i.e., assimilation effect), instead of negative affect, because people simulate the alternatives to reality as if they are real. Thus, although upward counterfactual thinking may not increase perceived meaning about the target event in the present, it may provide meaning in life in general during the process of achieving goals (i.e., a sense of meaning as purpose) and when the goal is actually achieved (i.e., a sense of meaning as significance).

To summarize, the cognitive and motivational characteristics of additive counterfactual thinking are suited to serve a meaning-seeking goal. That is, additive counterfactuals are more creative and flexible (e.g., Kray, Galinsky, & Markman, 2009; Markman et al., 2007), focused on possibilities that value potentials, related to upward counterfactuals (e.g., Choi & Markman, 2016) and promotion focus (Roese et al., 1999), and help individuals to improve performance (e.g., Roese, 1994), all of which contribute to effective meaning-seeking. Thus, when people are motivated to seek new sources of meaning, people should be more likely to generate additive counterfactuals that ultimately create a better alternative reality, where people expect to experience a sense of significance in life later on.
The Role of Future Opportunity

What factors would influence people’s motivation either to confirm or seek a sense of meaning? Given that a sense of meaning that is being experienced results from an interpretation of past actions that were committed or future actions that to be committed, it appears that whether or not an individual believes that he or she has future opportunity to re-experience the past event would play an important role in a meaning maintenance process (see Scheier & Carver, 1985; and see Snyder, 2002).

Indeed, counterfactual researchers find that whether or not a target event provides an individual with future opportunity to change the event outcome is an important variable to consider in processes involving counterfactual thinking (see Epstude & Roese, 2008; Markman & McMullen, 2003; and see Markman & Beike, 2012, for a review). For instance, Markman and his colleagues demonstrate that the repeatability of a focal event (either repeatable (providing high level of future opportunity) or non-repeatable (providing low level of future opportunity)) influences the generation of upward and downward counterfactuals (Markman et al., 1993), control perception (Markman & Weary, 1996), and satisfaction (McMullen & Markman, 2002), such that high future opportunity (i.e., repeatable event) fosters the preparative function of counterfactuals (i.e., generation of upward counterfactuals; Markman et al., 1993).

Under the presence of future opportunity, people regulate their sense of meaning in life by considering actions they could perform in the future, which illuminates the potential future significance of their life. As discussed above, this view is consistent with the functional perspective of counterfactual thinking which posits that people generate
counterfactuals to improve upon their past in the future (see Epstude & Roese, 2011). Accordingly, it is expected that people should be more likely to generate additive counterfactuals to satisfy a goal of meaning-seeking under the presence of future opportunity.

Conversely, under the absence of future opportunity, people have no choice but to confirm their belief that past experiences were meaningful because the other meaning maintenance strategy (i.e., meaning-seeking) is not viable without future opportunity. In other words, people are pressured to confirm their sense of meaning from their experience, for the actions committed are the only source for a sense of meaning when future opportunity is absent. For example, when past events do not provide people with future opportunity to change the outcome, any cognition (e.g., additive and upward counterfactuals) for future preparation would not be functional, even causing a depressive feeling (see Markman & Weary, 1996). Thus, when future opportunity is absent, people are more likely to generate subtractive counterfactuals to confirm their sense of meaning.

In light of the preceding analysis, it is possible that the participants in Kray et al. (2010) increased their sense of meaning about the event (i.e., turning point event in life) after mentally undoing the event, partly because they viewed the event as a non-repeatable one that does not provide future opportunity. That is, the specific instruction (i.e., “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.”, p. 109) appears to imply a non-repeatable nature of an event. Thus, it could be that the activated meaning-confirmation goal guided the generation of
counterfactuals. Indeed, the majority of the counterfactuals the participants in Kray et al. (2010) generated were downward counterfactuals (and subtractive due to the wording in instruction). Consequently, these findings (Kray et al., 2010) exemplify a particular motivational situation (i.e., meaning-confirmation) that utilizes particular contents of counterfactuals (i.e., subtractive-downward counterfactuals). In this sense, the present proposal extends previous studies by investigating the phenomenon of a meaning maintenance process in a broader motivational context.

To conclude, it is expected that future opportunity will influence motivation (i.e., meaning-confirmation and meaning-seeking) and cognition (i.e., additive and subtractive counterfactuals) in the meaning experience context. I hypothesize that meaning-confirmation goals are more strongly activated under the absence (versus presence) of future opportunity, whereas meaning-seeking is more strongly activated under the presence (versus absence) of future opportunity. Consequently, people should generate subtractive counterfactuals to satisfy their meaning-confirmation goal under the absence of future opportunity, whereas people should generate additive counterfactuals to satisfy their meaning-seeking goal under the presence of future opportunity.
The Present Studies

The present studies test the idea that people, in pursuit of maintaining a sense of meaning, strategically use subtractive and additive counterfactuals to satisfy the goals of meaning-confirmation and meaning-seeking. Specifically, it is hypothesized that people would be more likely to generate subtractive counterfactual thinking (i.e., imagining alternative worlds by mentally erasing actions committed) when they are motivated to confirm meaning with the given experience, whereas people would be more likely to generate additive counterfactual thinking (i.e., imagining alternative worlds by mentally adding new actions) when they are motivated to seek additional sources of meaning beyond the given experience.

Accordingly, Study 1 examined whether a temporal focus (i.e., past vs. future) influences the content (i.e., structure) of counterfactual thinking, such that past-focused participants generate subtractive relative to additive counterfactuals, whereas future-focused participants generate additive relative to subtractive counterfactuals. To further explore whether future opportunity of a past event can play a role in the link between counterfactual thinking and a sense of meaning, Study 2 manipulated both the level of future opportunity to re-experience a target event and the reflection type (i.e., counterfactual vs. factual thinking), and measured the sense of meaning about past and present. Finally, given that Study 1 and Study 2 used indirect manipulations of the two meaning maintenance goals (i.e., meaning-confirmation and meaning-seeking), Study 3 attempted to directly manipulate the relevant motivations by varying the levels of a sense of meaning about past events.
Study 1

The goal of Study 1 was to empirically establish the relationship between counterfactual structure and meaning maintenance motivations (i.e., meaning-confirmation and meaning-seeking). Assuming that motivation for understanding the past is closely related to meaning-confirmation (whereas future preparation motivation is closely related to meaning-seeking) it was hypothesized that participants would be more likely to generate subtractive counterfactuals when participants are motivated to better understand their past experiences than when participants are motivated to better prepare for future events. Conversely, participants should be more likely to generate additive counterfactuals when motivated to better prepare for future events versus understand their past experiences.

Method

Participants and design. 60 participants ($M_{\text{age}} = 19.21, SD = 1.38$; 76.7% female; 86.7% Caucasian, 5.6% Hispanic/Latino, 4.4% African American, 2.2% other, 1.1% Asian/Asian American) enrolled in Psychology courses at Ohio University were assigned to either the ‘past understanding’ or ‘future preparation’ motivation condition.

Procedure. Participants recalled and wrote about a negative life event that influenced their life in some important way. After the writing task, participants indicated how negative the event was, using 9 point scale ranging from 1 (not at all negative) to 9 (extremely negative). Then, participants were asked to engage in counterfactual thinking and list up to five counterfactual thoughts either to better understand past experiences
(past understanding motivation condition) or to better prepare for future experiences (future preparation motivation condition).

**Results and Discussion**

Two judges, blind to experimental condition and hypotheses, independently categorized the counterfactual statements generated by participants according to their direction (upwards vs. downwards) and structure (subtractive vs. additive). The interrater agreement was high (Cohen’s $k = .93$) and all disagreements were resolved through discussion.

In line with previous research (e.g., Markman et al., 1995), the first counterfactual thought that participants reported was analyzed to assess the most spontaneously generated counterfactual thought. As predicted, a chi-square test showed that the majority of participants in the past understanding condition (58.1%, $n = 18$) generated subtractive counterfactuals, whereas majority of the participants in future preparation condition (65.5%, $n = 19$) generated additive counterfactuals, $\chi^2 (1, N = 60) = 3.35, p = .07$, supporting the hypothesis that meaning-confirmation motivation would lead to a generation of subtractive counterfactuals, whereas meaning-seeking motivation would lead to a generation of additive counterfactuals (see Table 1).
Table 1

*Participants Who Generated Additive or Subtractive Counterfactuals in Their First Counterfactual Thought, Study 1.*

<table>
<thead>
<tr>
<th>Counterfactuals Generated</th>
<th>Experimental Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Past Understanding</td>
</tr>
<tr>
<td></td>
<td>$n$ (%)</td>
</tr>
<tr>
<td>Subtractive counterfactuals</td>
<td>18 (58.1%)</td>
</tr>
<tr>
<td>Future Preparation</td>
<td></td>
</tr>
<tr>
<td>$n$ (%)</td>
<td></td>
</tr>
<tr>
<td>Additive counterfactuals</td>
<td>13 (41.9%)</td>
</tr>
<tr>
<td></td>
<td>10 (34.5%)</td>
</tr>
</tbody>
</table>

To further investigate whether the total numbers of additive and subtractive counterfactuals generated by participants also differed based on experimental condition, independent samples $t$-tests for number of both additive and subtractive counterfactuals were conducted. Supporting the hypothesis and consistent with the results for the first counterfactuals, results showed that participants in the future preparation motivation condition generated a greater number of additive counterfactuals ($M = 2.55$, $SD = 1.43$) than did those in past understanding motivation condition ($M = 1.78$, $SD = 1.56$), $t(58) = -2.01$, $p = .05$, $d = .52$. Also, consistent with this hypothesis, the $t$-test examining the number of subtractive counterfactuals revealed that participants in the past understanding motivation condition tended to generate a greater number of subtractive counterfactuals ($M = 1.74$, $SD = 1.41$) than did those in future preparation motivation condition ($M = 1.24$, $SD = 1.27$), although not significantly so, $t(58) = 1.44$, $p = .16$, $d = .52$ (see Table 2).
Table 2

Means and Standard Deviations for the Additive and Subtractive Counterfactuals Generated by Participants, Study 1.

<table>
<thead>
<tr>
<th>Measures</th>
<th>Experimental Condition</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Past Understanding</td>
<td>Future</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Preparation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
</tr>
<tr>
<td>Number of Additive Counterfactuals</td>
<td>1.78</td>
<td>1.56</td>
<td>2.55</td>
</tr>
<tr>
<td>Number of Subtractive Counterfactuals</td>
<td>1.74</td>
<td>1.41</td>
<td>1.24</td>
</tr>
</tbody>
</table>

Study 1 demonstrated that different motivations for a past appraisal influence the content of counterfactual thinking, such that the activation of future preparation motivation (compared to the activation of past understanding motivation) leads to the generation of additive counterfactual thinking, indicating that the goal of meaning-seeking can be achieved via additive counterfactual thinking and the goal of meaning-confirmation can be achieved via subtractive counterfactual thinking.

The present study aims to empirically demonstrate a specific link between counterfactual structure and motivations for a sense of meaning. In other words, the present study identifies boundary conditions as to when and what type of counterfactual thinking leads to an increase in meaning-perception about a past event and current life. Indeed, as mentioned earlier, Choi and Markman (2016) found that participants who were asked to generate subtractive relative to additive counterfactuals reported a greater sense of meaning about a past event and their current life.
It should be noted that all participants in Study 1 recalled a negative event, which limited the direction of counterfactual thinking, such that participants exclusively generated upward counterfactuals. Given that people tend to generate additive as compared to subtractive counterfactual thinking after experiencing a failure (i.e., a negative experience; e.g., Sanna & Turley, 1996), it may have felt more natural for participants to generate additive than subtractive counterfactual thinking. This may explain the non-significant difference between the past understanding and future preparation conditions in the generation of subtractive counterfactual thinking, limiting the impact of the different motivations on the generation of counterfactual thinking. Thus, empirical demonstrations of prompts for counterfactuals surrounding positive life events are needed to establish more reliable evidence for the link between subtractive counterfactuals and meaning-confirmation motivation.

Lastly, although Study 1 detected differences in the number of additive counterfactuals between the future preparation and past understanding conditions, it is critical to further examine whether the generation of particular counterfactual thought in response to meaning maintenance goals leads to a change in sense of meaning.
Study 2

Building upon findings from Study 1, Study 2 explored the influence of opportunity to re-experience a similar event in the future on counterfactual structure. As discussed previously, for past events that provide future opportunity, people can assign additional meaning to their life in the future by considering how one can engage in novel experiences (i.e., by mentally committing actions that they think they could have taken in the past). In other words, the presence of future opportunity should activate the meaning-seeking goal, which, in turn, ought to elicit additive relative to subtractive counterfactual thinking. As long as the door for future engagement in past inactions is open, individuals can construe the past inactions as actual actions that are to be committed in the future.

For past events that provide no future opportunity, reflecting on additional routes to a success or additional experiences in a given context would not be functional for meaning maintenance because there would be no chance for an individual to actually commit new actions anyway. In other words, assigning additional meaning by (mentally) engaging in additional experiences is not possible in these situations. Instead, people can maintain their sense of meaning by valuing their experiences or reappraising the meaning of what actually happened (i.e., by conducting a counterfactual thought experiment which compares the focal experience to an alternative outcome that could have possibly resulted from their decision to not engage in certain actions they have committed). Thus, meaning-confirmation motivation would be more likely to be activated when future opportunity is closed than open. Consequently, people would be more likely to generate subtractive than additive counterfactual thinking for a past event when future opportunity
is absent. Consistent with Study 1, having no future opportunity to change a past outcome should motivate people to make sense of past experiences.

To reiterate, I hypothesize that the presence of future opportunity (i.e., repeatable event) activates meaning-seeking motivation, which, in turn, leads to generation of increased additive counterfactual thinking. The absence of future opportunity (i.e., non-repeatable event), on the other hand, activates meaning-confirmation motivation, which, in turn, leads to the generation of subtractive counterfactual thinking. Consequently, I also expect that participants in a counterfactual (versus factual) condition should report a greater sense of meaning about a past event when the event is non-repeatable. However, I make no specific prediction as to whether participants in the counterfactual (compared to factual) thought condition would report less of a sense of meaning when a focal event is repeatable. It could be that generating (additive) counterfactuals for repeatable events reduces a sense of meaning through a comparison process (i.e., contrast between better alternatives and reality).

In line with previous literature (see Beike et al., 2009), Study 2 operationalized the perceived level of future opportunity as event repeatability, such that a repeatable event represents the presence of future opportunity whereas a non-repeatable event represents the absence of future opportunity. Although the event repeatability manipulation may indirectly elicit meaning-confirmation and meaning-seeking goals as compared to the manipulation employed in Study 1, given that previous research in counterfactual thinking has manipulated event repeatability to test the future preparative function of counterfactuals (e.g., Markman et al., 1993), it is worth exploring whether
varying the degree of event repeatability activates either meaning-confirmation (when the target event is non-repeatable) and meaning-seeking goals (when the target event is repeatable), which, in turn, are expected to influence the generation of additive and subtractive counterfactuals.

Several procedural limitations from Study 1 were addressed in Study 2. First, to allow the comparison between counterfactual thought and factual thought conditions on a sense of meaning, Study 2 included a factual thought condition wherein participants were asked to describe any factual aspects (e.g., exactly what happened, when it happened, who was involved, and what they were thinking and feeling etc.) of the focal event (Kray et al., 2010). Second, to measure meaning-confirmation and meaning-seeking motivations, two subscales (i.e., presence of meaning and search for meaning) of the 10-item Meaning in Life Questionnaire (MLQ; Steger et al., 2006) were administered after the event repeatability manipulation but before participants generated counterfactuals. The presence of meaning subscale served as an index for meaning-confirmation motivation, as it contains items that measure the current sense of meaning being generated (e.g., “I understand my life’s meaning”, and “I have a good sense of what makes my life meaningful”). The search for meaning subscale served as an index for meaning-seeking motivation, as it contains items that measure people’s willingness to find new meanings and engage in more experiences (e.g., “I am always searching for something that makes my life feel significant”, and “I am looking for something that makes my life feel meaningful”).
Method

Participants and design. Two hundred participants from an online survey website (i.e., Amazon Mechanical Turk) participated for a payment in Study 2 (\(M_{age} = 36.11, SD = 11.82\); 51% female; 74% Caucasian, 8.0% Asian/Asian American, 7.5% African American, 7% Hispanic/Latino, 3.5% other). Participants were assigned to one of the following conditions based on a 2 (Reflection Type: Counterfactual vs. Factual) × 2 (Event Repeatability: Repeatable vs. Non-repeatable) between-participants design (\(n = 45\)–56 per cell).

Procedure. Participants were prompted to think and write about one life event that readily came to their mind. Importantly, the instructions were varied to manipulate event repeatability, such that participants in the repeatable event condition were asked to recall an event that they believe could possibly happen to them again in the future, whereas those in the non-repeatable event condition were asked to recall an event that they believe will probably not happen to them again in the future (see Appendix B). Upon the completion of the writing task, participants estimated how likely they would experience similar event again in the future, using a 7-point scale (1 = very unlikely, 7 = very likely). Also, to see if the event repeatability manipulation successfully activated either a meaning-seeking goal (for repeatable condition) or a meaning-confirmation motivation (for non-repeatable condition), participants were asked to complete a 10-item MLQ, using 7-point scales (1 = absolutely untrue, 7 = absolutely true). Afterwards, participants were asked to list up to five counterfactual thoughts about or factual aspects
of the event, depending on their experimental condition. For the counterfactual reflection condition, participants were given an instruction as follows:

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. In the space below, please list specific actions that could HAVE or HAVE NOT been taken that, in retrospect, would have made a difference at the time of the event. Each thought you list should complete the phrase “If I HAD / HAD NOT . . . the (outcome) would have been . . .” You may provide up to five different thoughts.

Once they have finished the thought listing task, participants were asked to rate their thoughts on the three meaning perception items (i.e., “The event gave meaning to my life”, “The event made me who I am today”, and “My life is meaningful now”) and a single item for a life satisfaction (i.e., “I am satisfied with my current life”).

**Results and Discussion**

Two judges, blind to experimental condition and hypotheses, independently categorized each counterfactual statement generated by participants according to its structure (subtractive vs. additive) as well as its direction (upwards vs. downwards). The interrater agreement was high (Cohen’s $k = .87$) and all disagreements were resolved through discussion with a primary researcher.

**Preliminary analysis.**

**Manipulation checks.** First, for the event repeatability manipulation check, participants’ likelihood estimation about the similar event happening again in the future
was submitted to an independent samples $t$-test with the event repeatability as an independent variable. Results showed that participants in the repeatable event condition ($M = 5.00, SD = 1.81$) reported a greater level of likelihood estimation, when compared to those in the non-repeatable event condition ($M = 1.67, SD = 1.28$), $t(176.12) = 14.96, p < .001, d = 2.12$ (see Table 3 for descriptive statistics). Thus, the perceived future opportunity manipulation was successful.

Second, to see if meaning-confirmation motivation is activated in the non-repeatable relative to repeatable event condition, whereas meaning-seeking motivation is activated in the repeatable relative to non-repeatable event condition, the mean scores on the presence of meaning subscale ($\alpha = .92$) and the searching for meaning subscale ($\alpha = .94$) of MLQ were submitted respectively to independent samples $t$-tests with event repeatability as the independent variable. Contrary to the predictions, the $t$-tests revealed no significant differences between the experimental conditions in either presence of meaning ($M_{\text{non-repeatable}} = 4.92, SD = 1.40$, and $M_{\text{repeatable}} = 4.81, SD = 1.29$), $t(198) = .54, p = .59, d = .08$, or searching for meaning ($M_{\text{non-repeatable}} = 4.64, SD = 1.56$, and $M_{\text{repeatable}} = 4.78, SD = 1.45$), $t(198) = .62, p = .54, d = .09$.

Thus, given the null effect of event repeatability on both meaning-confirmation (as indexed by presence of meaning subscale) and meaning-seeking (as indexed by meaning search subscale) motivations, it appears that Study 2 failed to elicit different types of meaning maintenance motivations using the event repeatability manipulation. One possibility is that event repeatability may not be directly related to the meaning-confirmation and meaning-seeking motivations. Alternatively, it could be that the indices
(i.e., two subscales of MLQ) were not sensitive enough to capture the possibly activated motivations.
Table 3

*Means and Standard Deviations for the Measures, Study 2.*

<table>
<thead>
<tr>
<th>Measures</th>
<th>Experimental Condition</th>
<th>Non-Repeatable Event</th>
<th>Repeatable Event</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Counterfactual Thought</td>
<td>Factual Thought</td>
<td>Counterfactual Thought</td>
</tr>
<tr>
<td></td>
<td>( M ) (( SD ))</td>
<td>( M ) (( SD ))</td>
<td>( M ) (( SD ))</td>
</tr>
<tr>
<td>Likelihood Estimation</td>
<td>1.87 (1.59)</td>
<td>4.65 (2.08)</td>
<td>5.33 (1.47)</td>
</tr>
<tr>
<td>Presence of Meaning</td>
<td>5.00 (1.46)</td>
<td>4.77 (1.13)</td>
<td>4.86 (1.44)</td>
</tr>
<tr>
<td>Searching for Meaning</td>
<td>5.01 (1.44)</td>
<td>4.93 (1.45)</td>
<td>4.63 (1.43)</td>
</tr>
<tr>
<td>Number of Additive Counterfactuals</td>
<td>2.07 (1.61)</td>
<td>1.80 (1.62)</td>
<td>-</td>
</tr>
<tr>
<td>Number of Subtractive Counterfactuals</td>
<td>1.63 (1.57)</td>
<td>1.53 (1.52)</td>
<td>-</td>
</tr>
<tr>
<td>Past event meaning</td>
<td>5.64 (2.42)</td>
<td>5.59 (2.43)</td>
<td>5.75 (2.26)</td>
</tr>
<tr>
<td>Current life meaning</td>
<td>6.31 (2.58)</td>
<td>6.08 (2.17)</td>
<td>6.53 (2.41)</td>
</tr>
<tr>
<td>Life satisfaction</td>
<td>6.62 (2.36)</td>
<td>6.23 (2.18)</td>
<td>6.55 (1.98)</td>
</tr>
</tbody>
</table>

**Counterfactual structure.** Participants generated on average about three
counterfactual thoughts (\( M_{overall} = 3.36, SD = 1.67 \)) across conditions. As in Study 1, the
first counterfactual thought that participants reported was analyzed. However, a chisquare test did not yield any significant differences, $\chi^2 (1, N = 89) = .13, p = .83$, failing to support the hypothesis that non-repeatable events would lead to a generation of subtractive counterfactuals, whereas repeatable events would lead to a generation of additive counterfactuals.

As in Study 1, a further analysis was performed with independent samples $t$-tests on the total numbers of additive and subtractive counterfactual thoughts. However, there were no differences in the number of subtractive counterfactuals generated by participants between the repeatable event ($M = 1.53, SD = 1.52$) and non-repeatable event ($M = 1.63, SD = 1.57$) conditions, $t(86) = .29, p = .78, d = .07$, or in the number of additive counterfactuals generated by participants between the repeatable event ($M = 1.76, SD = 1.62$) and non-repeatable event ($M = 2.07, SD = 1.61$) conditions, $t(87) = .90, p = .37, d = .19$, failing to support the hypothesis.

Table 4

*Participants Who Generated Additive or Subtractive Counterfactuals in Their First Counterfactual Thought, Study 2.*

<table>
<thead>
<tr>
<th>Counterfactuals Generated</th>
<th>Experimental Condition</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-repeatable Event</td>
<td>Repeatable Event</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$n$ (%)</td>
<td>$n$ (%)</td>
<td></td>
</tr>
<tr>
<td>Subtractive counterfactuals</td>
<td>18 (41.9%)</td>
<td>21 (45.7%)</td>
<td></td>
</tr>
<tr>
<td>Additive counterfactuals</td>
<td>25 (58.1%)</td>
<td>25 (54.3%)</td>
<td></td>
</tr>
</tbody>
</table>
A sense of meaning. It was hypothesized that participants in the counterfactual thought condition, as compared to those in the factual thought condition, would report a greater sense of meaning when the target event was non-repeatable, whereas there would be no significant difference, if not lower for counterfactual thought condition, between the two conditions when the target event was repeatable.

First, a past event meaning index was created by averaging the responses on two items (i.e., “The event gave meaning to my life”, and “The event made me who I am today”), $r(198) = .50, p < .001$. Failing to support the hypothesis, a 2 (Reflection Type: Factual vs. Counterfactual) × 2 (Event Repeatability: Non-Repeatable vs. Repeatable) between-participants ANOVA on the past event meaning index did not yield any significant results, $F_{event repeatability}(1, 196) = .00, p = .98, \eta^2 < .01$, $F_{reflection type}(1, 196) = .08, p = .78, \eta^2 < .01$, and $F_{event repeatability \times reflection type}(1, 196) = .03, p = .86, \eta^2 < .01$, respectively (see Table 3 for means and standard deviations for each condition).

Second, the single-item measure of current meaning (i.e., “My life is meaningful now”) was submitted to the 2 × 2 ANOVA, which revealed no significant effects, $F_{event repeatability}(1, 196) = .07, p = .79, \eta^2 < .01$, $F_{reflection type}(1, 196) = .86, p = .36, \eta^2 < .01$, and $F_{event repeatability \times reflection type}(1, 196) = .17, p = .68, \eta^2 < .01$, respectively (see Table 3).

Third, as a proxy for a current meaning, ratings on life satisfaction (i.e., “I am satisfied with my life”) were submitted to the 2 × 2 ANOVA. Although not significant, $F(1, 196) = 1.50, p = .22, \eta^2 = .01$, there was a noticeable interaction pattern, indicating that participants tended to report a greater level of life satisfaction after generating counterfactuals (as compared to factual thoughts) about non-repeatable events, $F(1, 196)$
= 1.02, \( p = .32, \eta^2 = .01 \), whereas participants tended to report a lower level of life satisfaction after generating counterfactuals (as compared to factual thoughts) about repeatable events, \( F(1, 196) = .52, p = .47, \eta^2 < .01 \) (see Figure 1). This pattern is consistent with the research hypothesis and previous literature, suggesting that event repeatability may influence a sense of meaning in life through different types of counterfactual thinking (i.e., subtractive and additive).

Figure 1. Means (with Standard Error Bars) of Life Satisfaction as a Function of Event Repeatability, Study 2.

Regression analysis. It was hypothesized that meaning-confirmation motivation (as measured by the presence of meaning subscale) would elicit subtractive
counterfactuals, whereas meaning-seeking motivation (as measured by the search for meaning subscale) would elicit additive counterfactuals.

Given that there were no significant differences in the meaning-confirmation and meaning-seeking goals as a function of event repeatability, to further explore the possible link between the meaning-confirmation and meaning-seeking motivations and the content (i.e., additive and subtractive) of counterfactuals, the numbers of subtractive and additive counterfactuals generated by participants were regressed one at a time on the means of the presence of meaning and the search for meaning subscales, respectively. Supporting the hypothesis, the results showed that the search for meaning positively predicted the number of additive counterfactuals, $b = .27, SE = .11, t = 2.34, p = .02$, but negatively predicted the number of subtractive counterfactuals, $b = -.16, SE = .11, t = -1.43, p = .16$, although not significantly (see Table 5). However, the presence of meaning did not significantly predict any of the counterfactual content, $b = .07, SE = .13, t = .54, p = .59$, for subtractive counterfactuals, and $b = -.01, SE = .13, t = -.05, p = .96$, for additive counterfactuals.
Table 5.

Results of Regression Predicting the Number of Subtractive and Additive Counterfactuals, Study 2.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Dependent Variable</th>
<th>b</th>
<th>SE</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of meaning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtractive counterfactuals</td>
<td></td>
<td>.07</td>
<td>.13</td>
<td>.54</td>
<td>.59</td>
</tr>
<tr>
<td>Additive counterfactuals</td>
<td></td>
<td>-.01</td>
<td>.13</td>
<td>-.05</td>
<td>.96</td>
</tr>
<tr>
<td>Search for meaning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtractive counterfactuals</td>
<td></td>
<td>-.16</td>
<td>.11</td>
<td>-1.43</td>
<td>.16</td>
</tr>
<tr>
<td>Additive counterfactuals</td>
<td></td>
<td>.27</td>
<td>.11</td>
<td>2.34</td>
<td>.02</td>
</tr>
</tbody>
</table>

To conclude, although it is reasonable, based on the findings in Study 1, to hypothesize that people would be more motivated to confirm meaning when future opportunity is closed (i.e., non-repeatable event), whereas people would be more motivated to seek new sources of meaning when future opportunity is open (i.e., repeatable event), this idea was not supported in Study 2. Consequently, the status of event repeatability did not influence the main dependent variables (i.e., counterfactual structure and a sense of meaning), possibly because the event repeatability manipulation was an indirect way of manipulating the meaning-confirmation and meaning-seeking motivations.
Nevertheless, partly supporting the hypothesis, the results of the regression analysis in Study 2 provided direct evidence that meaning-seeking motivation would lead to a generation of additive counterfactuals. Thus, findings from Study 2 suggest that it is not merely the degree of event repeatability that influences the generation of different counterfactual structures, but it is the meaning-maintenance motivations (i.e., meaning-confirmation and meaning-seeking) that should be activated by the repeatability manipulation. Also, the results of Study 2 reflect people’s general beliefs that their additional actions will bring about a greater sense of meaning in their life (see Roese & Olson, 1993).
Study 3

Although Study 1 and Study 2 introduced an interesting temporal factor for the link between counterfactual structure and meaning experience, the manipulations of temporal focus (Study 1) and future opportunity (Study 2) are indirect ways of activating the meaning maintenance motivations. Thus, using a more direct antecedent to the meaning maintenance motivations, Study 3 tried to establish the relationship between counterfactuals and meaning experience. Given that people are motivated to experience a certain level of meaning and, when deficient in meaning, will search for meaning to restore a desired level (see Baumeister & Vohs, 2002; Heine et al., 2006; Steger, 2013), it was hypothesized that, if subtractive counterfactual thinking serves a meaning-confirmation function whereas additive counterfactual thinking serves a meaning-seeking function, people should be more likely to generate subtractive counterfactual thinking when they are motivated to confirm their sense of meaning that was already found in the target experience. Conversely, people should be more likely to generate additive counterfactual thinking when they are motivated to seek new sources of meaning beyond what actually happened.

To test this idea, Study 3 manipulated the level of perceived meaning in life in relation to a past event by asking participants to recall either a meaningful or meaningless moment in their life. Given that perceptions about meaning in life can be influenced even by a trivial stimulus such as pictures of four seasons in random orders (e.g., Heitzelman & King, 2014), it is expected that the prompt for a direct manipulation of perceived
meaning in life would influence the level of motivation for meaning-confirmation and meaning-seeking as intended.

Thus, I hypothesized that participants in the meaningless (vs. meaningful) moment condition would generate a greater number of additive counterfactuals. It was also hypothesized that higher scores on the meaning-seeking measure (i.e., search of meaning subscale in MLQ; Steger et al., 2006) would predict a greater degree of additive counterfactual thinking.

**Method**

**Participants and design.** One hundred and two users ($M_{age} = 36.07, SD = 12.36$; 45.5% female; 73.3% Caucasian, 10.9% Asian/Asian American, 6.9% African American, 6.9% Hispanic/Latino, 2% other) on Amazon’s Mechanical Turk participated in Study 3 for a payment. Participants were randomly assigned to either the meaningful or meaningless moment condition.

**Procedure.** First, participants were asked to recall and describe a moment in their life. Specifically, participants in the meaningless moment condition were asked to think about a moment in their life when they felt empty, uncertain, and aimless, whereas participants in the meaningful moment condition were asked to think about a moment in their life when they felt full, life made sense, and they had a sense of direction (see Appendix C). Participants in the meaningless moment condition reported a significant life event, such as losses of a job or significant other. Next, participants answered the question “How meaningful was your life during the time that you described in a previous page?” This question served as the level of meaning manipulation check. Participants
also provided their ratings on the event valence (i.e., “With regards to the event you described, how positive or negative did you feel about the event at that time?”).

Afterwards, participants completed the MLQ (Steger et al., 2006) on 7-point scales to ensure that the sense of meaning manipulation was effective as intended. Upon the completion of these measures, participants were asked to imagine and write about any actions or inactions that they could have done in retrospect that could have changed their life. Importantly, unlike Study 2, participants were given only one text box for their response and the instructions did not limit the number of counterfactuals participants could generate. When finished the counterfactual thought listing task, participants indicated whether they think the moment in the past that they described could have been more or less meaningful if they had committed (or not committed) certain actions, using 9-point scale (-4 = much less meaning at that time, 0 = about the same level of meaning at that time, +4 = much more meaning at that time).

Results

Two judges, blind to experimental condition and hypotheses, independently categorized each counterfactual statement generated by participants according to its structure (subtractive vs. additive) as well as its direction (upwards vs. downwards). The interrater agreement was high (Cohen’s $k = .91$) and all disagreements were resolved through discussion.

**Manipulation checks.** First, an independent samples $t$-test on the single-item measure of past sense of meaning revealed a significant effect of the manipulation, such that participants in the meaningful moment condition ($M = 7.90, SD = 1.09$) reported a
greater level of meaning experienced in the past, compared to those in the meaningless moment condition ($M = 3.90, SD = 2.32$), $t(69.09) = -11.11, d = 2.21, p < .001$. Thus, the meaning manipulation was successful.

Second, the same test was performed on the presence of meaning and search for meaning subscales of MLQ that were included as indices for meaning-confirmation and meaning-seeking motivations. Results showed that participants in the meaningful moment condition ($M = 5.39, SD = 1.30$), as compared to those in the meaningless moment condition ($M = 4.67, SD = 1.58$), scored higher on the meaning present subscale of MLQ, $t(100) = -2.51, p = .01, d = .50$, whereas participants in the meaningless moment condition ($M = 5.06, SD = 1.65$), as compared to those in the meaningful moment condition ($M = 4.59, SD = 1.56$), tended to score higher on the meaning search subscale of MLQ, although statistically non-significant, $t(100) = 1.49, p = .14, d = .29$. The observed mean patterns in the subscales of MLQ indicate that participants in the meaningless (vs. meaningful) moment condition held a greater level of meaning-seeking motivation, whereas participants in the meaningful (vs. meaningless) moment condition held a greater level of motivation for meaning-confirmation.
Table 6

*Means and Standard Deviations for the Measures, Study 3.*

<table>
<thead>
<tr>
<th>Measures</th>
<th>Experimental Condition</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Meaningless Moment</td>
<td>Meaningful Moment</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>M</em></td>
<td><em>SD</em></td>
<td><em>M</em></td>
</tr>
<tr>
<td>Meaning of the Recalled Event</td>
<td>3.90</td>
<td>2.32</td>
<td>7.90</td>
</tr>
<tr>
<td>Presence of Meaning</td>
<td>4.67</td>
<td>1.58</td>
<td>5.39</td>
</tr>
<tr>
<td>Search for Meaning</td>
<td>5.06</td>
<td>1.65</td>
<td>4.59</td>
</tr>
<tr>
<td>Number of Additive Counterfactuals</td>
<td>.83</td>
<td>.56</td>
<td>.41</td>
</tr>
<tr>
<td>Number of Subtractive Counterfactuals</td>
<td>.31</td>
<td>.47</td>
<td>.84</td>
</tr>
<tr>
<td>Meaning-Focused Counterfactuals</td>
<td>.88</td>
<td>2.41</td>
<td>-1.73</td>
</tr>
</tbody>
</table>

**Counterfactual structure.** As in previous studies, the first counterfactual thought that participants reported was analyzed. It was expected that participants in the meaningful moment condition would be more likely to generate subtractive relative to additive counterfactuals, whereas participants in the meaningless moment condition would be more likely to generate additive relative to subtractive counterfactuals. Consistent with this prediction, a chi-square test showed that the majority of the participants in the meaningful moment condition (67.3%, *n* = 33) generated subtractive counterfactuals, whereas the majority of the participants in the meaningless condition (70.8%, *n* = 34) generated additive counterfactuals, $\chi^2(1, N = 97) = 14.15, p < .001,$
suggesting that the meaning-confirmation motivation leads to a generation of subtractive counterfactuals, whereas the meaning-seeking motivation leads to a generation of additive counterfactuals.

Table 7

*Participants Who Generated Additive or Subtractive Counterfactuals in Their First Counterfactual Thought, Study 3.*

<table>
<thead>
<tr>
<th>Counterfactuals Generated</th>
<th>Experimental Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Meaningless Moment</td>
</tr>
<tr>
<td></td>
<td>n (%)</td>
</tr>
<tr>
<td>Subtractive counterfactuals</td>
<td>14 (29.2%)</td>
</tr>
<tr>
<td>Additive counterfactuals</td>
<td>34 (70.8%)</td>
</tr>
</tbody>
</table>

A further analysis was performed with independent samples *t*-tests on the total numbers of additive and subtractive counterfactual thoughts. Consistent with the findings on the first counterfactuals participants generated, participants in the meaningful moment condition generated a greater number of subtractive counterfactuals (*M* = .84, *SD* = .66) than did those in the meaningless moment condition (*M* = .31, *SD* = .47), *t*(95) = 4.52, *p* < .001, *d* = .93, whereas participants in the meaningless moment condition generated a greater number of additive counterfactuals (*M* = .83, *SD* = .56) than did those in the meaningful moment condition (*M* = .41, *SD* = .61), *t*(95) = 3.58, *p* = .001, *d* = .72. On average, participants generated about one counterfactual thought across conditions (*M*<sub>overall</sub> = 1.13, *SD* = .52).
Meaning-focused counterfactuals. The mean ratings on the meaning-focused counterfactual statement (i.e., “If the things have unfolded differently as I have written above, I would have experienced...”; -4 = much less meaning at that time, 0 = about the same level of meaning at that time, and +4 = much more meaning at that time) were tested against the midpoint (i.e., 0), which showed that participants in the meaningful moment condition believed that their life would have been less meaningful (M = -1.73, SD = 2.22), t(51) = -5.61, p < .001, d = 1.57, whereas participants in the meaningless moment condition believed that their life would have been more meaningful (M = .88, SD = 2.41), had they acted differently, t(49) = 2.58, p = .01, d = .74.

Regression analysis. To further explore whether the activated meaning-confirmation and meaning-seeking motivations predicted different types of counterfactual structure (i.e., subtractive and additive), the number of additive and subtractive counterfactuals, respectively, were regressed on either the presence of meaning subscale of MLQ (as an index of the meaning-confirmation motivation) or the search for meaning subscale of MLQ (as an index of the meaning-seeking motivation). Resonating with findings with other measures in Study 3, results showed that the presence of meaning positively predicted the number of subtractive counterfactuals, b = .08, SE = .04, t = 1.93, p = .06, but negatively predicted the number of additive counterfactuals, b = -.07, SE = .04, t = -1.79, p = .08 (see Table 7). However, the search for meaning did not significantly predict any of the counterfactual content, b = -.02, SE = .04, t = -.55, p = .58, for subtractive counterfactuals, and b = .01, SE = .04, t = .33, p = .74, for additive counterfactuals.
Table 8.

Results of Regression Predicting the Number of Subtractive and Additive Counterfactuals, Study 3.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Dependent Variable</th>
<th>b</th>
<th>SE</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of meaning</td>
<td>Subtractive counterfactuals</td>
<td>.08</td>
<td>.04</td>
<td>1.93</td>
<td>.06</td>
</tr>
<tr>
<td></td>
<td>Additive counterfactuals</td>
<td>-.07</td>
<td>.04</td>
<td>-1.79</td>
<td>.08</td>
</tr>
<tr>
<td>Search for meaning</td>
<td>Subtractive counterfactuals</td>
<td>-.02</td>
<td>.04</td>
<td>-.55</td>
<td>.58</td>
</tr>
<tr>
<td></td>
<td>Additive counterfactuals</td>
<td>.01</td>
<td>.04</td>
<td>.33</td>
<td>.74</td>
</tr>
</tbody>
</table>

On the face of it, this finding is inconsistent with that of Study 2, where the search for meaning positively predicted additive counterfactuals and negatively predicted subtractive counterfactuals, while the presence of meaning was not a significant predictor. However, the results of the regression analysis in Study 3 are conceptually consistent with the main hypothesis of the present research, such that the meaning-confirmation motivation should lead to a generation of subtractive counterfactuals.

**Mediation analysis.** In the analysis above, there was a significant difference between experimental conditions in the reported meaning-confirmation motivation. Also, the meaning-confirmation motivation significantly predicted the number of additive and subtractive counterfactuals. Thus, an exploratory mediational analysis was conducted to
test whether the levels of meaning-confirmation and meaning-seeking motivation influence the meaning-focused counterfactuals through the generation of particular type (i.e., either subtractive or additive) of counterfactuals.

To this end, a bootstrapping mediation analysis with 5,000 iterations was conducted (Preacher & Hayes, 2008) for each possible mediation model. First, with regard to the meaning-confirmation motivation, results showed that the 95% confidence interval for the indirect path coefficient excluded zero for a model with the number of subtractive counterfactuals as a mediator, CI [-.28, -.02], as well as for a model with the number of additive counterfactuals as a mediator, CI [-.31, -.001], suggesting that there was a significant indirect influence of the meaning-confirmation motivation through the effect of the number of subtractive and additive counterfactuals on the meaning-focused counterfactuals (see Figure 2). Specifically, consistent with the hypothesis, a greater level of meaning-confirmation motivation led participants to believe that their past could have been less meaningful by promoting the generation of subtractive counterfactuals (i.e., imagining actions they could have not committed), while discouraging the generation of additive counterfactuals (i.e., imagining actions they could have committed).

Importantly, this finding attests that the structure of counterfactual thinking plays a mediating role in a way that serves currently activated meaning-confirmation goals. Furthermore, the present findings are aligned with those of a previous study (i.e., Choi & Markman, 2016), which showed that subtractive relative to additive counterfactuals lead to an increased sense of meaning.
Second, with regards to the meaning-seeking motivation, results showed that the 95% confidence interval for the indirect path coefficient included zero for a model with the number of subtractive counterfactuals as a mediator, CI [-.08, .18], as well as for a model with the number of additive counterfactuals as a mediator, CI [-.10, .18], suggesting that the indirect influence of the meaning-confirmation motivation through the effect of the number of subtractive and additive counterfactuals on the meaning-focused counterfactuals was not significant (see Figure 3).
Figure 3. Mediational Analysis for the Indirect Effect of Meaning-Seeking Motivation on the Meaning-Focused Counterfactuals through the Number of Additive and Subtractive Counterfactuals: Coefficients (Standard Errors) for a Pathway, b Pathway, and c Pathway. 

Event valence. The mean ratings on event valence for each condition were tested against the scale midpoint (i.e., 0). Results showed that participants in the meaningful moment condition recalled positive events ($M = 3.58, SD = .67$), $t(51) = 38.67, d = 10.83, p < .001$, whereas participants in the meaningless moment condition recalled negative events ($M = -2.54, SD = 2.22$), $t(49) = -8.11, d = 2.32, p < .001$.

Discussion

To conclude, resonating with Studies 1 and 2, Study 3 provides supporting evidence for the hypothesis that people are more likely to generate subtractive counterfactuals for meaningful past moments, whereas people are more likely to generate additive counterfactuals for meaningless past moments.
General Discussion

The main goal of the present research was to investigate how the motivations to seek or confirm meaning in life guide the generation of specific content of counterfactual thinking in a way that the counterfactuals serve such motivations. Three studies in the present research consistently supported the main hypothesis that people would be more likely to generate subtractive counterfactuals when they are motivated to confirm their sense of meaning, whereas people would be more likely to generate additive counterfactuals when they are motivated to seek new sources of meaning.

Specifically, Study 1 demonstrated that people are more likely to generate additive counterfactuals when they are motivated to prepare for the future, as compared to when they are motivated to understand the past, suggesting that additive counterfactuals can be used to seek out novel meaningful experiences in life. In Study 2, the motivation to seek out meaning positively predicted the number of additive counterfactuals generated by participants. However, unexpectedly, the hypothesis that participants would be more likely to generate additive counterfactuals when the event was repeatable (i.e., presence of future opportunity) than non-repeatable (i.e., absence of future opportunity), whereas participants would be more likely to generate subtractive counterfactuals when the event they described was non-repeatable than repeatable, was not supported in Study 2. Lastly, Study 3 showed that the majority of participants who recalled a meaningful moment in their life generated subtractive counterfactuals, whereas the majority of participants who recalled meaningless moment in their life generated additive counterfactuals.
Together, these three studies suggest that subtractive counterfactuals can serve a meaning-confirmation function, whereas additive counterfactuals can serve a meaning-seeking function.

**Theoretical Implications**

Although converging evidence suggests that counterfactual reflection can enhance a sense of meaning in life (e.g., Kray et al., 2010; Seto et al., 2015), it is worth noting that no attempt has been made to identify mechanisms involving specific contents of counterfactual thoughts in the process of meaning maintenance. As mentioned above, it seems that previous studies tended to examine only certain types of counterfactuals that lead to an increase in meaning perception. Given that people contemplate various alternatives to reality with disparate motivations, the process by which counterfactual reflection influences a sense of meaning should be more complicated than it appears to be. Thus, the present studies advance the literature in counterfactual thinking and meaning by elaborating upon the link between the particular content of counterfactual thinking (i.e., counterfactual structure) and a sense of meaning.

Furthermore, previous studies fail to provide explanations as to why, *ab initio*, people engage in such counterfactuals. It has been demonstrated that people spontaneously generate counterfactual thoughts especially in response to unexpected negative life events (e.g., Davis, Nolen-Hoeksema, & Larson, 1998; Lindberg, 2011; Sanna & Turley, 1996), suggesting that people engage in counterfactual reflection to better understand why such unexpected events happened the way they did (i.e., sense-meaning; cf. Weiner, 1985). Thus, it is reasonable to believe that there are particular
contents of counterfactual thinking people want to generate to experience a sense of meaning. In this sense, the present study contributes to the literature by introducing motivational forces that guide the content of counterfactual thinking in the context of meaning appraisal.

Additionally, it should be noted that although researchers speculate additive (versus subtractive) counterfactuals to be more helpful for future preparation (Epstude & Roese, 2008), the effect of counterfactual structure is relatively unknown. Indeed, the vast majority of the research since the 1990s has been focused on counterfactual direction (i.e., upward and downward), especially in light of the preparative function (i.e., helping individuals to prepare for future). However, no direct empirical evidence has addressed whether subtractive counterfactual thinking serves affective functions (i.e., helping individuals feel better in the face of negative outcomes). The functional framework in the present study (i.e., meaning-confirmation and meaning-seeking) parallels previously established functional distinctions (i.e., preparative vs. affective), such that meaning-seeking and future preparative functions are both served by additive and upward counterfactuals, whereas meaning-confirmation and affective functions are both served by subtractive and downward counterfactuals.

Thus, the present studies shed lights on the differential functions of counterfactual structure. Further, the present work connects previously established functions of counterfactual thinking (i.e., preparation and affect regulation: see Epstude & Roese, 2008; see also Markman et al., 2008, for a review) to the emerging discussion of the meaning-making function of counterfactual thinking.
Future Research

The present research explores major aspects of the meaning-maintenance phenomenon through counterfactual reflections (i.e., characteristics of a focal event, motivational forces, and counterfactual structure). That said, there are several limitations of these studies, inviting future studies to address remaining important questions.

Event valence. Importantly, the present studies do not examine the role of event valence systematically. In Study 1, the valence of the target event was limited to negative events, and in Study 2, event valence was not even measured. Further, although there were significant differences between conditions regarding the main dependent variables in Study 3, the valence of the event also differed between conditions, limiting the interpretation of the findings in terms of the effect of counterfactual structure. However, Study 3 provides evidence that counterfactual structure mediates the relationship between the meaning-confirmation goal and the meaning-focused counterfactuals, suggesting that the independent role of counterfactual structure does exist in a meaning maintenance process about past events. Thus, to systematically rule out the confounding effect of event valence, future research should design a study manipulating event valence independently. That said, it is challenging to tease apart event valence because the very definition of a sense of meaning includes a sense of significance, which reflects a value-laden evaluation.

Control perception. It should be noted that contrary to previous investigations (e.g., Kray et al., 2010) the present study prompted participants to think about actions people could or could not have taken. Although the instructions for counterfactual
generation employed in the present studies seem natural because people tend to mutate aspects of a focal event that are perceived to be controllable (e.g., Girotto, Legrenzi, & Rizzo, 1991; Markman, Gavanski, Sherman, & McMullen, 1995), the nature of the instructions limits the scope of the present studies to counterfactuals that focus on controllable aspects. In other words, the present research does not explore whether mentally adding a new event (i.e., “if the new school policy became effective before I graduated, I would have not be able to graduate in time”) or mentally undoing a focal event as in Kray et al. (2010) (“if the turning point had not occurred...”) would have differential effects on sense of meaning.

It seems possible that mutating situational factors, regardless of mental addition or subtraction, would be more likely to serve meaning-confirmation goals because the outcome would be construed as something that happened rather than resulted from one’s (in)action. Conversely, it could also be that people predominantly generate subtractive counterfactuals when thinking about how the situation could have been different. Indeed, Alquist et al. (2015) showed that belief in free will fosters additive counterfactuals that mutate aspects of the self (as compared to subtractive and situation focused counterfactuals), suggesting that the meaning-seeking function of counterfactual thinking requires a sense of control or agency (Ryan & Deci, 2000). For events over which one does not have any control, engaging in counterfactual reflection should increase fate perception (e.g., “it was meant to happen.”) and, in turn, serve meaning-confirmation goals (cf. Norenzayan & Lee, 2010). Thus, future studies should investigate the role of control perception in the link between mental simulation and meaning experiences.
Spontaneous generation of counterfactuals. The current research employed a prompt for counterfactual generation to encourage participants to generate a good number of counterfactuals for an analysis purpose. This procedure may elicit concerns about demand characteristics, for people tend to generate more counterfactuals when they are told to do so (see Kasimatis & Wells, 1995). However, researchers have been relying on the counterfactual prompt because of the challenge in measuring online counterfactual thinking. That is, for an event that happened in the past, individuals may have thought about counterfactual scenarios immediately after the outcome was known, but the individuals may or may not engage in the same thought during a given experimental session.

The same problem applies to the free thought listing task (i.e., no instructions for counterfactuals) as well. For example, for an individual who did not report counterfactuals in a thought listing task, it would be unclear whether it is the case that the participant actually engaged in counterfactual thoughts but did not list them or had not at all thought about them. Thus, the instructions for counterfactual generation are considered a useful procedure for facilitating counterfactual generation.

Nevertheless, it is worthwhile to consider measuring spontaneous counterfactuals in the future study to see if the two meaning maintenance motivations (i.e., meaning-confirmation and meaning-seeking) have differential effects on the activation of counterfactual reflection. One possibility is that people may be motivated not to engage in counterfactual reflection when they are pursuing a meaning-confirmation goal because thinking about alternatives in itself may be viewed as undermining the validity of their
past experience as real. Indeed, Hirt, Kardes, and Markman (2004) showed that people high in personal need for structure (Neuberg, Judice, & West, 1997) are not influenced by the manipulation of ease of counterfactual generation, suggesting that people who want to hold a sense of structure (i.e., secure a sense of meaning) would not want to be bothered by considering alternatives.

**Additive counterfactuals and meaning as purpose.** Martela and Steger (2016) posit that a sense of meaning consists of a sense of coherence (i.e., epistemic understanding of what is), significance, and purpose (i.e., teleological understanding of what should or why). The present study was less explicit about the purpose aspect of meaning, and indeed, focused the discussion on coherence and significance aspects of meaning that counterfactual reflection may facilitate.

The idea that additive counterfactuals serve meaning-seeking functions is based on people’s optimistic assumption that their previously omitted actions can be performed in the future, and more importantly, that those actions should result in a desired outcome (see Roese & Olson, 1993). In other words, additive counterfactuals reflect a goal state that has not been achieved (see Gilovich & Medvec, 1995; and see Roese et al., 1999). Thus, it is reasonable to believe that engaging in additive counterfactual reflection can lead to a sense of purpose in certain situations. Relatedly, recent research shows that counterfactuals form specific behavioral intentions (e.g., Smallman, 2013; Smallman & McCulloch, 2012). Considering that long term goals and purpose in life are construed abstractly, it would be challenging but worthwhile to further examine whether additive
(as compared to subtractive) counterfactuals can prime long term goals and purpose in life, thereby providing a sense of purpose and direction in life.

**True self-knowledge.** Importantly, the self is closely related to a sense of meaning, in that the self is the subject that experiences meaning. Although the present study taps into people’s perceptions about self-continuity, as measured by one of the meaning items (i.e., "the event made me who I am today"), the present study failed to examine sense of self systematically. Indeed, recent studies reveal that people who believe that they know their true self well (or think it is easy to access to their true self) report high sense of meaning in life (Schlegel, Hicks, Arndt, & King, 2009; Schlegel, Hicks, King, & Arndt, 2011). This suggests that people partly base their judgment about meaning in life on how well they know themselves.

Furthermore, other research shows that people hold a belief that the true self is a subject to be discovered rather than something to be created (Schlegel, Vess, & Arndt, 2012). These findings indicate that people should be motivated to seek true self-knowledge when they believe that they have not discovered their true self yet. In this sense, to search for true self-knowledge is to search for meaning in life. Likewise, to confirm one’s sense of self-knowledge might also serve to confirm meaning in life.

Accordingly, extending the present work to literature examining true self-knowledge, it is expected that people should be more likely to generate subtractive counterfactuals when they are motivated to confirm their sense of true self-knowledge, whereas people should be more likely to generate additive counterfactuals when they are motivated to discover their true self-knowledge. Supporting this prediction, Kim, Seto,
and Hicks (2016) showed that participants who are induced to seek their true self-knowledge showed a preference for experiential goods (e.g., travel package) to material goods (e.g., television), suggesting that people use actions as a medium for acquiring their true self-knowledge.

Thus, when looking back on the past, people who think that they have not found who they really are should regret (through additive counterfactuals) their missed opportunities to discover their true self-knowledge, whereas people who think that they have already found their true self should be motivated to secure their past actions (through subtractive counterfactuals) as significant moments that led up to their current understanding of themselves. This line of research would shed light on the relationship between counterfactual structure and a sense of meaning in life, where a sense of meaning is defined as a sense of true self-knowledge.

**Conclusion**

In conclusion, the present studies suggest that counterfactual reflection that imagines how the world could have been different had an individual committed or omitted certain actions in the past can be a useful tool for understanding what the world is and why the world exists as it is. The present studies provide a snapshot of people’s tendencies to use certain aspects of their imaginations to value their past and future experiences in the pursuit of a sense of meaning in life.
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http://dx.doi.org/10.1037/a0038322


DOI: 1037/0033-2909.97.1.74


Appendix A: Materials for Study 1

Instruction for Past Understanding Motivation Condition

Understanding Your Past

“Life can only be understood backwards…” -Søren Kierkegaard-

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…”).

Your task is to imagine how the event you described might have unfolded differently. Take a moment and think about how “different forks or turns in the road” might have led to a different outcome in the past. How could the event have turned out differently?

Try to imagine a variety of routes that might have brought about a different outcome. Describe each “fork in the road” in one of the boxes below. Each thought should appear in a separate box, and each thought should begin with the word “If…” You may provide up to five different thoughts.

Instruction for Future Preparation Motivation Condition

Preparing for Your Future

“Study the past if you would define the future…” -Confucius-

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…”).

Your task is to imagine how the event you described might have unfolded differently. Take a moment and think about how “different forks or turns in the road” might have led to a different outcome in the past. How could the event have turned out differently?
Try to imagine a variety of routes that might have brought about a different outcome. Describe each “fork in the road” in one of the boxes below. Each thought should appear in a separate box, and each thought should begin with the word “If…” You may provide up to five different thoughts.
Appendix B: Materials for Study 2

Instruction for Repeatable-Counterfactual Condition

Try to think about one life event (either positive or negative) that happened to you within the last 5 years.
The event that you recall should be one that could POSSIBLY HAPPEN TO YOU AGAIN IN THE FUTURE.
Please briefly describe what happened at that time in the box below.

Manipulation Check item
How likely do you think the event would occur again in the future? (1 = Very unlikely, 7 = Very likely)
10-item MLQ scale (Steger et al., 2006)

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. In the space below, with regards to the event you described in the previous page, please list specific actions that could HAVE or HAVE NOT been taken that, in retrospect, would have made a difference at the time of the event. Each thought you list should complete the phrase “If I HAD / HAD NOT . . . the (outcome) would have been…” You may provide up to five different thoughts.

Instruction for Non-Repeatable-Counterfactual Condition

Try to think about one life event (either positive or negative) that happened to you within the last 5 years.
The event outcome that you recall should be one that will probably NOT HAPPEN TO YOU AGAIN IN THE FUTURE.
Please briefly describe what happened at that time in the box below.

Manipulation Check item
How likely do you think the event would occur again in the future? (1 = Very unlikely, 7 = Very likely)
10-item MLQ scale (Steger et al., 2006)

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. In the space
below, please list specific actions that could HAVE or HAVE NOT been taken that, in retrospect, would have made a difference at the time of the event. Each thought you list should complete the phrase “If I HAD / HAD NOT . . . the (outcome) would have been.” You may provide up to five different thoughts.

**Instruction for Repeatable-Factual Condition**

Try to think about one life event (either positive or negative) that happened to you within the last 5 years. The event that you recall should be one that could POSSIBLY HAPPEN TO YOU AGAIN IN THE FUTURE. Please briefly describe what happened at that time in the box below.

*Manipulation Check item*
How likely do you think the event would occur again in the future? (1 = Very unlikely, 7 = Very likely)
10-item MLQ scale (Steger et al., 2006)

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.

**Instruction for Non-Repeatable-Factual Condition**

Try to think about one life event (either positive or negative) that happened to you within the last 5 years. The event outcome that you recall should be one that will probably NOT HAPPEN TO YOU AGAIN IN THE FUTURE. Please briefly describe what happened at that time in the box below.

*Manipulation Check item*
How likely do you think the event would occur again in the future? (1 = Very unlikely, 7 = Very likely)
10-item MLQ scale (Steger et al., 2006)

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.
Dependent Variables

*Meaning Perception items*

1. The event gave meaning to my life.
2. The event made me who I am today.
3. My life is meaningful now.
4. I am satisfied with my current life.
Appendix C: Materials for Study 3

Instruction for Meaningless Condition

At a certain point in your life, you might have felt that your life is meaningless, regardless of whether you experience positive or negative event. You may feel meaningless when you fail or even succeed on what you wanted to achieve. Think about the moment in your life when you felt empty, uncertain, and aimless in your life. Then, describe one event or situation that you experienced during that time period.

Instruction for Meaningful Condition

At a certain point in your life, you might have felt that your life is meaningful, regardless of whether you experience positive or negative event. You may feel meaningful when you succeed or even fail on what you wanted to achieve. Think about the moment in your life when you felt full, life makes sense, and direction in your life. Then, describe one event or situation that you experienced during that time period.

Measures:
1. To what extent did you feel a sense of meaning in life during that time? (1 = no meaning at all; 9 = full of meaning)
2. With regards to the event you described, how positive or negative did you feel about the event at that time? (-4 = very negative; 0 = neither negative nor positive; +4 = very positive)
3. To what extent would you say that the event was under your control? (1 = I had no control at all, 7 = I had complete control)

Meaning search items (From MLQ by Steger et al., 2006):
1. I am looking for something that makes my life feel meaningful.
2. I am always looking to find my life’s purpose.
3. I am always searching for something that makes my life feel significant.
4. I am seeking a purpose or mission for my life.
5. I am searching for meaning in my life.

Instruction for Counterfactual Thinking Generation

When looking back, people imagine how things could have been different. With regards to the event you wrote, please take a moment to think about ways that the event that came to your mind could have turned out differently. What specific actions could you have or have not taken at the moment? Please complete the sentence(s) starting with either “If I HAD…, then….” Or “If I HAD NOT…, then…”

Dependent variables
You wrote, “(the first counterfactual statement participants wrote will be inserted here on the screen)”. With regards to what you wrote, please click the number that best represents your idea:

1. If the things have unfolded differently as I have written above, I would have experienced… (1 = much less meaning at that time, 4 = about the same level of meaning at that time, 9 = much more meaning at that time)

2. My life is meaningful now.

3. I am satisfied with my current life.