

When What Happens Tomorrow Makes Today Seem Meant To Be: The Meaning
Making Function of Counterfactual Thinking

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This dissertation titled
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Making Function of Counterfactual Thinking

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Abstract

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The ability to find meaning following traumatic events has been found to be very important for recovery and psychological well-being. The present research utilized a two-stage cognitive account of the search for meaning (e.g., meaning-as-comprehensibility and meaning-as-significance) to demonstrate that counterfactual thinking can serve a meaning-making function that provides explanatory coherence to a series of events. Six studies investigated the meaning-making function of counterfactual thinking and the factors conducive to a retrospective reasoning process. The first set of studies (Studies 1-3) demonstrated that the consideration of counterfactuals of subsequent events that provide meaning-as-significance can imbue prior outcomes and events with meaning-as-comprehensibility, a sense of determinism and purpose. The second set of studies (Studies 4-6) focused on the motivation component of the meaning-making function. Study 4 demonstrated that the meaning-making function of subsequent counterfactuals will be utilized when there is motivation to make sense of a previous event. Study 5 further supported a motivated component of the meaning-making function by demonstrating that subsequent counterfactuals will be used to the extent that they provide a coherent narrative to a sequence of events. Lastly, Study 6 offered further support for a functional interpretation by demonstrating that a meaning threat elicits counterfactual

thinking and that increases in counterfactual thinking correspond with increases in fate-based judgments. The results of the current studies offer evidence for a retrospective reasoning process by which counterfactual simulations of subsequent events serve a meaning-making function to provide explanatory coherence to earlier events. The role of motivation and individual differences in the willingness to consider counterfactuals is discussed as well as when counterfactual thinking will lead to perceptions of determinism and free will.

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Overview

On September 11, 2001, Seth MacFarland, the creator of the television show “The Family Guy,” missed American Airlines Flight 11 that was scheduled to fly out of Boston’s Logan Airport at 7:45 A.M. because his travel agent incorrectly informed him that the flight was scheduled to leave at 8:15 A.M. An hour after missing the flight, he learned that the plane had been hijacked by terrorists and deliberately flown into the North Tower of the World Trade Center in New York City. MacFarland and many other individuals that day would have lost their lives had it not been for the occurrence of coincidental events such as scheduling errors, traffic jams, and illness. When individuals attempt to make sense of unexpected events, they are often struck by the feeling that larger forces were at work – fate, perhaps, or the intervention of some deity. Moreover, the perceived meaning and purpose of life events can seemingly be clarified by the occurrence of later events. From the perspective of some, subsequent knowledge of the plane crash imbues the travel agent’s prior error – an annoyance to MacFarland at first – with greater meaning and purpose.

Thoughts of “what might have been” invoke counterfactual simulations of alternative realities, a process that has been shown to impact numerous domains of social and psychological life including causal reasoning (e.g., Hilton & Slugoski, 1986; Mandel & Lehman, 1996; Wells & Gavanski, 1989), emotion (e.g., Connolly & Zeelenberg, 2002; Mellers, Schwartz, Ho, & Ritov, 1997), blame (Alicke, Buckingham, Zell, & Davis, 2008; Miller & Gunasegaram, 1990), and behavior (Markman & McMullen, 2003;

Roese, 1994; Sanna, 1996). To date, researchers in this area have primarily explored two functions of counterfactual thinking: an affective function and a preparative function. Research on the affective function suggests that the comparison of reality to a simulated better or worse alternative evokes affective contrast (e.g., Markman, Gavanski, Sherman, & McMullen, 1993; Roese, 1994; Taylor & Schneider, 1989; but for exceptions note Markman & McMullen, 2003). Reflecting on how an outcome could have been worse – *downward* counterfactual thinking – often ameliorates affect and may thereby aid in coping and psychological adjustment. With regard to the preparative function, on the other hand, reflecting on how an outcome could have been better – *upward* counterfactual thinking - may serve to identify behaviors or actions that will elicit more desirable outcomes in the future (e.g., Epstude & Roese, 2008; Kray, Galinsky, & Markman, 2009; Nasco & Marsh, 1999). The goal of the current research is to examine how counterfactual thinking serves a more general “meaning-making” function and to delineate the mechanisms by which this may occur. Specifically, the proposed and described studies explore how the consideration of counterfactuals triggers a retrospective meaning-making process that leads individuals to construe prior outcomes as “meant to be,” and identify factors that make prior outcomes particularly amenable to counterfactual meaning-making.

Finding Meaning in Trauma

When faced with unexpected and tragic events, people are particularly prone to engage in causal reasoning to restore a sense of order and understanding to the world (Hastie, 1984; Heider, 1958; Kelley, 1972). However, research on responses to trauma,

victimization, and the loss of a loved one suggest that causal attributions are insufficient in terms of helping victims find meaning (Davis & Nolen-Hoeksema, 2001; Lehman, Wortman, & Williams, 1987). For example, knowledge that a car accident was caused by a drunk driver may provide little meaning to the paralyzed victim of the accident.

Research suggests that trauma of any kind is likely to evoke existential concerns (Burke, Martens, & Faucher, 2010). However, when the event is sudden, violent, unnecessary, or preventable (Green, 1990), it is particularly threatening to some of the most basic assumptions about the world. Namely, individuals tend to assume: (a) that the world is predictable and controllable; (b) that the world functions according to principles of fairness and justice; and (c) that the world is meaningful (Janoff-Bulman, 1992).

Events that shatter our assumptive worlds require more than simply answers to questions of how the event occurred (i.e., *what* caused the event). Rather, when these life-shattering events occur, individuals seek more philosophical answers to the selective incidence of *why* the event occurred, or the reason why the event happened to *them*. Indeed, research on coping with accidents, illnesses, losses and other traumatic events typically find that about 80% of individuals sought answers to the question “Why me?” (Affleck, Allen, Tennen, McGrade, & Ratzan, 1985; Bulman & Wortman, 1977; Davis, Wortman, Lehman, & Silver, 2000; Gotay, 1985; Kiecolt-Glaser & Williams, 1987).

Importantly, the more individuals feel that they are able to answer the question “Why me?,” the more likely they are to exhibit better coping, enhanced well-being, and diminished self-blame (Bulman & Wortman, 1977; Davis & Nolen-Hoeksema, 2001; Taylor, 1983). Among researchers of trauma and loss there is general agreement on the

psychological benefits of finding meaning. However, Park (2010) notes that perhaps the greatest limitation of the meaning literature is the lack of consistent operational definitions of meaning. Some researchers have focused on the positive growth one experiences following trauma (Tedeschi & Calhoun, 1996), whereas others have labeled this construct regarding growth as “discovering positive meaning” (Bower, Kemeny, Taylor, & Fahey, 2003). Researchers have also defined meaning as a sense-making process of reconciling an event with existing worldviews (Parkes & Weiss, 1983; Tait & Silver, 1989).

Derived from decades of research with individuals who have experienced trauma, Janoff-Bulman and Frantz (1997) proposed a two-stage conceptualization of the search for meaning. When faced with a traumatic event, survivors first attempt to comprehend how it may assimilate into their already existing worldviews. This initial search for meaning is marked by a desire to make sense of events—to find a comprehensible account of how the events are consistent with fundamental assumptions about the world (see also Davis, Nolen-Hoeksema, & Larson, 1998). However, for some especially tragic events, it can be too challenging to comprehend the senseless and meaninglessness of the event. Janoff-Bulman and Frantz suggest that with time, individuals move beyond meaning as comprehension, and begin to focus on a second type of meaning—meaning as significance—in which individuals ascribe personal value and significance to the event. Over time, individuals respond to tragedy by perceiving or constructing benefits from the traumatic experience. Across a wide range of traumatic events including HIV infection (Bower, Kemeny, Taylor, & Fahey, 1998), stroke (Thompson, 1991), cancer (Taylor,

1983), loss of a spouse (Glick, Weiss, & Parkes, 1974), spinal cord-injury (Bulman & Wortman, 1977), and loss of an infant (Cornwell, Nurcombe, & Stevens, 1977), empirical studies consistently find reports of construing benefit from the event.

Davis et al. (1998) conceptualized two construals of meaning that map directly onto the distinction offered by Janoff-Bulman and Frantz (1997): meaning as sense making (meaning-as-comprehensibility) and meaning as benefit finding (meaning-as-significance). In a prospective and longitudinal study on the ability of individuals to cope with the loss of a family member over time, Davis and his colleagues found that these two construals of meaning independently fostered psychological adjustment. In the first six months following a loss, the ability to make sense was more strongly related to positive adjustment than finding benefit. However, reports of finding benefit were subsequently more strongly related to adjustment than to the ability to make sense of the event at 13 and 18 months following the loss. Based upon these results, Davis and his colleagues concluded that sense making is more important in the early phases of adjustment to a loss, whereas perceiving benefit may be more important for long-term adjustment to loss.

Importantly, the prospective nature of this study allowed Davis et al. (1998) to control for potential confounds that would suggest alternative explanations, such as pre-loss distress levels and adjustment, dispositional optimism-pessimism, age-appropriateness of the loss, and differences in religious belief systems. Although the age-appropriateness of the loss and differences in religious belief systems were related to one's ability to make sense of the loss, these factors were not related to one's ability to

find something positive in the experience. Additionally, although dispositional optimism-pessimism predicted one's ability to find benefit, neither this factor nor any of the others could account for the relationship between psychological adjustment and the two construals of meaning (e.g., meaning as sense making, meaning as finding benefit). Davis and his colleagues interpreted the lack of a relationship between the factors that predict sense making and the ability to find benefit as further evidence that these two types of meaning are the result of different psychological mechanisms.

The distinction between meaning-as-comprehensibility (sense making) and meaning-as-significance (benefit finding) provides a much-needed theoretical framework to understand the constructs and processes involved in meaning making. Although the data of Davis et al. (1998) suggest two independent processes, it is proposed here that counterfactual thinking may bridge both construals of meaning. Specifically, counterfactual thinking may provide an explanatory coherence to unexpected events that creates both meaning as benefit finding and meaning as sense making. The following sections will further explore the characteristics of each construal of meaning and their cognitive appraisals, as well as the role counterfactual thinking may play in aiding in the process of finding meaning within each construal.

Counterfactuals and Meaning as Comprehensibility

Although the objective circumstances of traumatic events (e.g., sudden, violent, unnecessary, or preventable) are related to the severity of distress, researchers have consistently found that it is the subjective interpretation of the event—the ability to find meaning—that is most influential in accounting for ensuing grief responses and

psychological adjustment (Currier, Holland, Coleman, & Neimeyer, 2006; Currier, Holland, & Neimeyer, 2006; Davis, Nolen-Hoeksema, & Larson, 1998). Within a bereavement context, Currier et al. (2006) goes so far as to suggest that “traumatic loss” should be reserved for the subjective experience of loss rather than the objective details surrounding the event. Thus, exploring the cognitive process by which individuals make sense of events will aid in understanding how event construal impacts the severity of trauma.

The ability to find meaning and make sense of a traumatic event appears paramount to psychological adjustment and well-being. For example, those who unsuccessfully search for meaning show poor adjustment, and diminished coping and general mental health (Davis & Nolen-Hoeksema, 2001). Although the specific type of meaning found does not better predict adjustment (Davis et al. 1998; Dollinger, 1986; Taylor, 1983), overall, the types of meaning reported suggest a need to perceive the event as being consistent with an orderly and meaningful world. For example, Bulman and Wortman (1977) found that victims suffering from spinal cord injuries coped best when they perceived the accident to be unavoidable. Although there was considerable self-blame, those demonstrating the best coping attributed the accident to a reason of God, to predetermination, or probability. In other words, the meaning that victims created implied an underlying order and meaning. Similarly, Davis et al. (1998) found that individuals coping with the loss of a loved one reported making sense of the loss along similar dimensions, such that the loss was predictable, the result of God/fate, or that death “just happens.” The results of these studies suggest that a cognitive appraisal that creates

meaning that is external to the individual—concluding that the event was inevitable, fated, and predetermined—fosters better psychological adjustment.

Counterfactual Thinking and Meaning Research

To date, most of the research on the role of counterfactual thinking in coping with traumatic events has focused on avoidability and self-blame. Bulman and Wortman (1977) found that victims who perceived accidents as preventable and avoidable had the most difficulty coping and also displayed increased self-blame. For example, one accident victim reported thinking “if only I hadn’t ridden with her that day I wouldn’t be paralyzed” (Bulman & Wortman, 1977, p. 370). Across studies of rape victims, burn victims, and bereaved samples, the more individuals attempted to undo the event or perceived that they could have avoided their victimization, the more they blamed themselves for the event (Abbey, 1987; Branscombe, Owen & Allison, 1994; Frazier, 1990; Kiecolt-Glaser & Williams, 1987; Schulz & Decker, 1985; Davis et al. 1995).

However, it is important to highlight that the majority of research examining counterfactual thinking about traumatic events has made a broad assumption regarding how victims reflect on a past tragedy. Specifically, researchers have assumed that people “start with the supposition that a given outcome need not have occurred and then attempt to mentally simulate alternative scripts that effectively undo the outcome” (Davis et al. 1996, p. 559). Consistent with the preparative function of counterfactual thinking, this focus on undoing orients one to seek answers to questions regarding cause and preventability as opposed to the more existential question of selective incidence, namely, “why me?”

The methodology typically employed in research on counterfactual thinking regarding traumatic events clearly incorporates this underlying assumption. For example, counterfactual thinking has been measured by the amount of agreement to statements such as “If only I had done something differently, my [child/spouse] would still be alive” and “If only something had been different, my baby would still be alive” (Davis et al. 1995). In fact, Davis and colleagues (1996) directly equated counterfactual thinking with perceptions of avoidability, going so far as to substitute measures of avoidability for measures of counterfactual thinking.

It seems intuitive that after a negative event, one would want to simulate the event not occurring. However, a problem arises when one assumes that because actions *could* have been taken to avoid the outcome, that those actions *should* have been taken. It is unreasonable for one in hindsight to engage in self-blame for behavior that in foresight would not have changed the probability of the outcome. Miller and Turnbull (1990) proposed that this type of self-blame is accounted for by what they termed “the counterfactual fallacy.” They argued that individuals often confuse what *might have* happened with what *ought to have* happened. When the counterfactual fallacy is oriented towards perceptions of avoidability, the stronger the perception that an event could have been avoided, the stronger the sense that it *ought* to have been avoided.

Consistent with the counterfactual fallacy, Davis and colleagues (1996) found that in patients with spinal cord injuries, the consideration of self-implicating perceptions of avoidability was directly related to self-blame, even after controlling for outcome foreseeability and causal attributions. This finding is even more provocative in light of

the comparison between patients and trained raters on causal attributions. Specifically, there was no difference between raters and patients in causal attributions to the patient. However, patients attributed more causal significance to both chance and the situation than did the trained raters. These data suggest that self-implicating counterfactuals of avoidability do not lead to blaming oneself for *causing* the accident, but rather for *failing to avoid* the accident.

By equating counterfactual thinking with measures of avoidability and direct attempts at undoing, past research has focused on answering questions about *how* events occurred as opposed to the more potentially beneficial question of *why* such events occur. Counterfactual thinking directed at answering the question of *how* focuses on the actual events leading up to the tragedy, thereby narrowing the focus to those actions taken by the individual leading up to the event. In contrast, counterfactual thinking directed at answering the question of *why* may foster meaning-making by encouraging the victim to place the tragedy in a broader context and encouraging understanding of why it happened as opposed to how it could have been avoided. This difference in the orientation of counterfactual thinking is further illustrated by research implicating the role of counterfactual thinking in producing the hindsight bias.

Counterfactual Thinking and the Hindsight Bias

A common finding regarding reactions to unexpected events is that after having learned the outcome, the event seems in hindsight to have been more predictable and inevitable than it would have been without the benefit of outcome knowledge. This phenomenon, known as the hindsight bias, has been described as a projection of new

knowledge into the past paired with a denial of the influence of outcome information (Hawkins & Hastie, 1990). In a landmark study exploring the hindsight bias (Fischhoff, 1975), participants read about an obscure historical event, the 19th century wars between the British and the Ghurka of Nepal. Some participants read of a battle that ended with a British victory, others with a Ghurka victory, and some were provided with no outcome information. Those participants who received outcome information reported a higher a priori likelihood of that outcome occurring than did those who did not receive outcome information. The result is what Fischhoff (1975) aptly described as “creeping determinism”: a post hoc perception of outcome inevitability. Attempts to make sense of the outcome and create a coherent causal narrative apparently lead one to selectively recall outcome-consistent antecedent information and assimilate it with outcome knowledge.

It seems intuitive that the consideration of counterfactuals would diminish the hindsight bias. Indeed, counterfactual thinking was originally thought to reduce inevitability perceptions by illustrating how alternative outcomes were in fact possible. Sherman (1991) succinctly argued that, “to the extent that counterfactuals are easily and spontaneously generated, the past seems less inevitable: other outcomes were clearly possible” (p. 182). Fischhoff and colleagues were able to reduce the strength of the hindsight bias by instructing participants to consider alternative outcomes (Fischhoff, 1976; Slovic & Fischhoff, 1977). Considering opposing or alternative outcomes aids in shifting the focus from the focal hypothesis—that the focal outcome had to occur—to an alternative hypothesis, that a different outcome could have occurred (Hirt & Markman,

1995; Koehler, 1991). Thus, the consideration of how the same antecedent events could lead to a different outcome has been found to reduce the hindsight bias.

However, others have argued that counterfactual thinking could lead individuals to perceive events as *more* rather than less determined. Roese and colleagues proposed that counterfactual thinking would actually enhance the hindsight bias to the extent that counterfactual thinking could aid in the identification and creation of a coherent causal narrative (Roese & Maniar, 1997; Roese & Olson, 1996). These researchers suggest that counterfactual thinking does not necessitate the consideration of an alternative outcome but, rather, can be utilized to make sense of the outcome.

Roese (2004) argued that a single counterfactual inference identifying a causal connection between antecedent and consequent events may provide a satisfying feeling of coherence and comprehension that leads to greater post hoc certainty. Roese and Maniar (1997) use the example that a sports fan could make sense of a team's loss with the counterfactual that the team would have won had it not been for an injury earlier in the game. In the absence of the injury the team would have won, but given the injury, the loss would be construed as inevitable. Utilizing both laboratory studies as well as field research, Roese and colleagues found that counterfactual thinking directed towards an explanation leads to increases in the hindsight bias (Roese & Maniar, 1997; Roese & Olson, 1996). Similarly, Nestler and von Collani (2008) found that both priming counterfactual thinking and activating a counterfactual mindset led to an increase in the hindsight bias.

Thus, it appears that counterfactual thinking directed at undoing a focal outcome reduces the hindsight bias and the inevitableness of the focal event, whereas counterfactual thinking directed at understanding *why* a specific outcome occurred enhances the perceived deterministic nature of events and leads to the perception that the event was unavoidable. Although counterfactual thinking focused on undoing and avoidability has been linked to poor coping and self-blame, the relationship between counterfactual thinking and the hindsight bias suggests that counterfactual thinking may be able to serve a meaning-making function. Individuals who cope most effectively and demonstrate better psychological adjustment are those that are able to perceive traumatic events as unavoidable and deterministic. Counterfactual thinking directed at answering *why* an unexpected focal event occurred may be a mechanism by which the event becomes perceived as more inevitable and determined. In addition to serving a meaning making function through sense-making (which increases early adjustment), counterfactual thinking is also closely related to meaning making construed as benefit finding (which increases long-term adjustment).

Counterfactual Thinking and Meaning as Benefit Finding

Rather than trying to make sense of a traumatic event, individuals sometimes focus on ascribing personal significance to the event, which involves finding benefit in the experience. In a review of literature focusing on victims, Taylor, Wood, and Lichtman (1983) noted that researchers have observed attempts to derive meaning from tragic events among widows (Glick, Weiss, & Parkes, 1974), spinal cord-injured patients (Bulman & Wortman, 1977), mothers who have lost infants (Cornwell, Nurcombe, &

Stevens, 1977), parents of children with cancer (Chodoff, Friedman, & Mahburg, 1964), and burn patients (Andreason & Norris, 1972). Additionally, in interviews with breast cancer survivors Taylor (1983) found that over half of the women reported solely positive benefits from the experience, such as a reappraisal of life leading to more self-knowledge, better emotional adjustment, and even greater satisfaction from current relationships. Davis et al. (1998) found a similar pattern with bereaved individuals who reported finding significance and benefit from the loss of a loved one. Upon further examination, Davis and colleagues also found that independent of the circumstances of the loss, the benefit individuals reported could be categorized into one of three categories: (a) growth in character; (b) change in life perspective; and (c) strengthened relationships or an increased sense of connectedness with others. Consistent with research on meaning-as-comprehensibility, meaning-as-significance appears to be unrelated to the objective aspects of the traumatic event, but rather more the result of the individual's construal of the experience and subsequent events (Davis et al., 2001).

When faced with an unexpected event, not only are one's worldviews challenged, but additionally one's sense of self. Davis and Nolen-Hoeksema (2001) further delineate the processes of meaning-making by suggesting that meaning as sense-making focuses on maintaining threatened worldviews, whereas meaning as benefit finding serves to rebuild a threatened sense of self. Taylor et al. (1983) proposed that victims selectively evaluate and construe themselves and their situations in ways that are self-enhancing as well as to minimize the perceived victimization. One way that individuals may respond to a self-threat is to engage in downward comparison—comparing one's situation or outcome to

that of another less fortunate. Although downward comparisons provide less useful information for future improvement, they have the immediate benefit of making one feel better (Wills, 1981; Wood, 1989). In a review of the literature, Wills (1981) proposed that in situations that cannot be remedied by action, individuals will attempt to restore self-esteem by engaging in downward comparisons.

Taylor et al. (1983) found that all but two of the 78 breast cancer patients they interviewed reported doing as well or better than other women coping with breast cancer. Some women were found to engage in direct downward comparison with other women to whom they had been exposed, whereas other women, who lacked a direct downward comparison target created one. Of the patients that Taylor and colleagues interviewed, 22% engaged in the mental simulation of a comparison target that was coping poorly. For instance, a woman treated with a lumpectomy (the removal of a discrete lump) compared her situation to a hypothetical woman receiving a mastectomy (removal of the entire breast) and stated, “I had a comparatively small amount of surgery. How awful it must have been for women who have had a mastectomy. I just can’t imagine, it would be so difficult” (p. 29). Interestingly, Taylor and colleagues also found that women in their sample *always* found someone to whom they could compare themselves. Older women made downward comparisons to the young, and young married women compared themselves to single women. The downward comparison appears to be driven not by who is available, but rather by what comparison will provide the strongest self-esteem boost.

Although much of the research on benefit finding has focused on personal benefits (e.g., growth in character, change in life perspective, strengthened relationships),

work investigating the affective function of counterfactual thinking has demonstrated that individuals can also find comfort in simulating how events could have turned out worse (Markman et al., 1993; McMullen & Markman, 2000; White & Lehman, 2005).

Downward counterfactual thinking, the mental simulation of worse possible outcomes, has been found to be a robust reaction to serious events. Burgess and Holmstrom (1979) report that rape victims frequently consider how they could have suffered more violently or been killed, and Taylor et al. (1983) found that cancer patients frequently considered how their bout with cancer could have lasted longer or resulted in death. Comparison of one's situation with a worse alternative is a commonly reported experience across clinical populations. Often, downward counterfactual thinking serves to make one feel better by identifying the "silver lining" or helping to find "the good in the bad" (Gilovich & Medvec, 1995). Although not directly stated, much of the focus of meaning as benefit finding has involved a temporal component (e.g., personal growth and strengthened relationships). Over time, individuals can begin to consider events within the context of subsequent life experiences.

Koo, Algoe, Wilson, and Gilbert (2008) found that mentally undoing positive life events—by considering how they might not have occurred—led to more surprise and positive affect than simply reflecting on the occurrence. Additionally, the surprise generated from considering how one might *not* have met their romantic partner led participants to feel more satisfied with the relationship than when they simply thought about how they met their romantic partner. Kray et al. (2010) provided an even more direct demonstration of how mentally undoing major life moments enhances personal

meaning. After having participants reflect on their decision to attend a particular college, Kray and colleagues had some of them engage in counterfactual thinking by describing how events could have turned out differently following an alternative college decision. After simulating how their lives might have changed had they chosen to attend a different college, the actual college decision they made attained more meaning and significance.

In addition to creating personal meaning, Kray et al. (2010) proposed an ironic effect of considering counterfactual alternatives, specifically, that counterfactual thinking could enhance meaning perceptions through its effects on heightening fate-based explanations. By revealing all the possible alternative ways that a life event could have turned out differently, counterfactual thinking highlights the *improbability* of the way events *did* unfold. The sense of defying the odds, that the event was the product of fate, “amounts to rejecting that counterfactual world as somehow not ‘fitting’ one’s evolving life narrative, and instead embracing life as it is”(p. 110). Consistent with the defying the odds account, the increase in positive affect found by Koo et al. (2008) was mediated by feelings of surprise, suggesting that counterfactual thinking reduces the perceived probability of a focal event. In support, Kray et al. (2010) found that having participants reflect on a turning point in their life and how their life would have been different had the event not occurred made the event personally meaningful by influencing the perception that the event was the product of fate. From this perspective, considering counterfactual alternatives serves to highlight the improbability of life events, thereby leading individuals to perceive such events as meaningful.

By contrast, the current research proposes that the meaning-making function of counterfactual thinking goes beyond the relative benefit finding typical of the affective function. Downward counterfactual thinking not only renders a negative outcome "not so bad" in comparison to a worse alternative, but it can also suggest that greater forces are at work. Although Miller and Turnbull's (1990) discussion of the counterfactual fallacy focuses on upward counterfactuals (and concomitant perceptions of blame, preventability, and avoidability), it also suggests a completely different reaction when applied to downward counterfactuals.

The counterfactual fallacy as proposed by Miller and Turnbull (1990) refers to, "the confusion of what *might have been* the case and what *ought to have been* the case" (p. 2). This phenomenon is particularly relevant to downward counterfactual thinking because it suggests that the easier it is to imagine a worse alternative, the more likely it will seem that the alternative *ought* to have happened and, further, that the alternative was more likely to *have* happened. For example, Teigen (1998) found that in hindsight, participants perceived that a car hit by a boulder in a rockslide had a lower probability of being hit than the car parked next to it. In other words, the car that *almost* got hit, but did not, was perceived to have had a higher a priori chance of getting hit than the car that *actually* got hit by the boulder. Making use of autobiographical accounts of traffic accidents and near accidents, Teigen (2005) found that participants believed the probability of death was three times higher when they were *nearly* in an accident than when an accident *actually* occurred. "Close call" accidents in industrial settings are even considered to be more predictive of future disaster than actual accidents (Teigen, 2005).

Combined, these studies demonstrate that the easier it is to imagine a worse outcome occurring, the higher the perceived a priori probability that it would have occurred.

When one imagines a worse alternative that *ought* to have happened but did not, one is more likely to believe that extrapersonal forces played a role in preventing the worse outcome from happening. For example, after surviving a horrific car crash in which their vehicle flipped over a guardrail and plummeted 60 feet, survivors later reflected, "We both believe there is a higher power out there who said, 'It's not their time,'" suggesting that the accident would have been worse, had someone or something not intervened. Moreover, the State Police Sergeant who was at the scene of the accident commented, "These people are extremely lucky they were able to come through the way that they did." (Ellis, 2010). The salient counterfactual—they could have died in the accident—is so strong that it implies that they *should* have died. Rather than rejecting the counterfactual, the perception of extrapersonal forces at work amounts an *embracing* of the counterfactual. This sort of reaction is not unusual, as newspapers frequently describe situations in which luck, fate, and higher powers are assumed to have served as causal agents intervening on the behalf of individuals (Teigen, 1988).

Research on the assessment of luck is consistent with this perspective on the counterfactual fallacy. Luck is not a function of personal beliefs, but rather the construal of an event sequence. By comparing autobiographical stories of good and bad luck, as well as positive and negative life events, Teigen (1995) demonstrated that bad-luck episodes are very similar to negative life events. For example, Teigen (1995) argued that breaking a leg, whether due to bad luck or a negative life event, is bad in an absolute

sense. However good-luck episodes are distinct from positive life events, such that they are only good in a relative sense. For example, someone would be considered extremely lucky if they fell from a balcony and only broke their leg, but would be considered unlucky if they broke their leg by tripping on the sidewalk. Good luck events are not determined by the valence of the outcome, but rather by how much better the outcome was when compared to what almost happened (i.e., a downward counterfactual).

Furthermore, Teigen (1995) found that the closer the alternative was to happening, and the more severe the alternative was, the stronger the perception of luck. This suggests that luck perceptions are post-computed based upon what almost happened - the counterfactual that nearly occurred.

Thus, the counterfactual simulation not only aids in the creation of meaning as benefit finding, but it also contributes to the creation of meaning through sense making, implying that events transpired in order to prevent the worse outcome from happening. Counterfactual thinking is typically defined as the consideration of how the alteration of an antecedent event impacts the consequent or focal event - "If X, then Y." Apart from spontaneous counterfactuals that occur immediately after an event, the mental simulation of a past event is afforded the luxury of situating that event within the context of antecedent as well as subsequent events. Drawing upon research on retrospective probabilities of accidents, post-computed ascriptions to luck, and the temporal aspect of benefit finding in trauma, it is suggested here that counterfactuals that take the form "to avoid Z, then Y" serve a meaning-making function. Because the subsequent counterfactual event ("Z") appears likely to have happened, but did not happen (i.e., it

had a *propensity* to happen), a surprising outcome (“Y”) can now be understood as fated and predetermined.

Counterfactual Thinking as Meaning Making: Explanatory Coherence

The goal of the current research is to elucidate the underlying cognitive processes by which counterfactual thinking serves a “meaning-making” function. To do so, a model of retrospective reasoning is proposed that re-evaluates the past in light of present or future events and thereby lends explanatory coherence to unexpected events. The studies that follow will explore how the consideration of counterfactuals, particularly close counterfactuals, can provide meaning as benefit finding and meaning as sense making. An additional goal is to identify factors that make prior outcomes particularly amenable to such a sense-making process. Specifically, it is hypothesized that: (a) individuals are more likely to engage in counterfactual meaning-making for unexpected outcomes than for expected outcomes; and (b) individuals are more likely to believe that desirable rather than undesirable outcomes were meant to be. Finally, evidence will be presented suggesting that individuals’ ascriptions that event outcomes are meant to be at least partially derive from beliefs that extrapersonal forces have played a role in bringing about such outcomes.

Overview of the Studies

Each of the following studies employs scenarios for the purpose of exploring counterfactuals and meaning making. A historical (i.e., not self-relevant) event was selected in order to examine underlying cognitive mechanisms and to allow for the direct manipulation of factors believed to influence the meaning making process. A real-life event borrowed from the headlines of Boston newspapers afforded an opportunity to explore how the consideration of counterfactuals can serve a meaning-making function. In 1942, football rivals Boston College (BC) and Holy Cross (HC) met for the final game of the season. A heavily favored BC (9-0), seeking to finish the season undefeated, suffered a surprising upset at the hands of HC (4-4-1), losing by a score of 55-12. After losing, the dejected BC players chose not to attend a celebration planned for the evening at the Cocoanut Grove nightclub. That night, a fire broke out at the Grove, killing more than 500 patrons. The salient counterfactual evoked by this event is that the BC players “almost” died in the fire. It is proposed that knowledge of the fire elicits a retrospective reasoning process that leads perceivers to re-evaluate BC’s surprising loss in light of the subsequent close-call counterfactual. In other words, BC’s avoidance of the fire provides an explanation for why BC unexpectedly lost the game that was played earlier that day.

Seven studies make use of direct and indirect measures of counterfactual thinking to demonstrate that the consideration of a close-call counterfactual lends explanatory coherence to unexpected events and gives rise to the sense that “things happen for a reason.” In other words, a close-call counterfactual can elicit fate-based ascriptions for a surprising outcome that imbues that outcome with greater meaning. The first set of

studies sought to demonstrate how counterfactual thinking facilitates benefit finding.

Study 1 finds that an account of the game played between BC and HC does, in fact, elicit spontaneous counterfactual thinking as well as ascriptions of fate. Study 2a demonstrates how counterfactual thinking elicits ascriptions of fate and predetermination. Study 2b shows that increases in deterministic thoughts are related to the focal event and not to the subsequent event. Study 3 conceptually replicates the previous studies but also demonstrates that a proclivity for considering counterfactuals mediates the relationship between story type exposure and ascriptions of fate and predetermination.

The second set of studies identifies factors that make outcomes amenable to the meaning-making process. Study 4 demonstrates that unexpected outcomes are more likely to initiate sense-making cognitions. Study 5 shows that meaning making is more likely to occur for desirable than undesirable outcomes, and that fate-based judgments stem, in part, from perceptions that extrapersonal forces are at work. Finally, Study 6 attempted to demonstrate that the meaning-making function of counterfactual thinking is activated in response to a meaning threat.

Study 1

The goal of Study 1 was to demonstrate that the account of the football game and subsequent nightclub fire would elicit written reactions containing spontaneous instances of counterfactual thinking, and that the elicitation of counterfactuals would be positively related to ascriptions of fate and meaning.

Method

Participants

Fifteen male and twenty female introductory psychology students at Ohio University were recruited for a study entitled “Personality and Thinking” in exchange for partial course credit.

Procedure

Participants read a condensed version of an article from *The Boston Globe* (1942) that described the historic game played between BC and HC, as well as the subsequent events that occurred later that evening (see Appendix A). After reading the article, participants were asked to describe their reactions in writing, after which they responded to two questions (measured along 1 (“not at all”) – 9 (“very much”) scales) designed to assess perceptions of fate and meaning about the outcome of the football game: “To what extent do you believe that Holy Cross’ victory that day was fated?” and “To what extent do you believe that Holy Cross’ victory that day was meant to be?”

Results and Discussion

Two independent raters coded written reactions for the presence of counterfactual thoughts (e.g., “If BC had won there would have been many other people at the Coco

grove that night,” “It probably made the players somewhat happy that they lost”; see Table 1 for additional examples). In addition to more direct counterfactual statements, statements that implied a mental simulation of alternatives were coded as counterfactual thoughts. Thus “if BC had won there would have been many other people at the Coco grove that night” is a direct counterfactual and would be coded as such. An example of an implied mental simulation, “it probably made the players somewhat happy that they lost”, demonstrates that the participant imagined the BC players considering the alternative, BC winning, and the implications. Contrast this with a statement that is a mere statement of expectations, “The outcome of the article surprised me because I didn't expect the underdogs to win the game” is a statement of fact without the demonstration of any simulation or consideration of alternatives and would not be coded as a counterfactual thought. Following this coding scheme, two raters independently coded each participant's written reactions. The interrater agreement was extremely high as determined with Cohen's Kappa = .94, $p < .001$. Seventeen out of the thirty-four written protocols were coded as containing a counterfactual thought.

Table 1

Participants written reactions coded for the presence or absence of counterfactual thinking

Example responses w/ counterfactuals

"Because they lost it saved their lives. Somethings like that just give me goosebumps and think that things aren't just coincidental, that someone or something has to be looking out for us."

"By Boston Losing it saved the team from being at the nightclub where the fire broke out. I think that everything happens for a reason and that they lost that game so there lives would be spared."

"Second I was thinking about Fate. Because if Boston College won members would be in the club. Maybe they would die or is injured. Loss of the game is a bad thing to them, but at the end it turned out to be a good thing that saved their life."

Example responses w/o counterfactuals

"I just thought it was going to talk about the game and how they lost. I didn't expect the story at the end. The result of the game wasn't surprising with how they started the story."

"I thought the article was just about the big upset that happened. I would of never thought it was about a fire that killed hundreds of people. I thought BC just mailed in their game and didn't try while Cross shoved everything down their and their fans throats."

"At first I felt that this article was just going to be about a rival game between to teams. Reading I felt that rivals are stupid and people should just play the game to have fun. But I was shocked when I read the end of the article I definitely wasn't expecting that outcome."

In order to explore perceptions of fate and meaning, a single fate-based judgment composite score was created from the fate and meant to be questions ($\alpha = .82$). A point-biserial correlation was then computed for those participants who generated at least one counterfactual (coded as “1”), and for those who did not generate any counterfactuals (coded as “0”). Consistent with predictions, generating counterfactuals was positively correlated with a tendency to render fate-based judgments, $r(32) = .36, p < .05$ (See figure 1 for distribution of fate-based judgments). Thus, Study 1 offers initial support for the hypothesis that counterfactual thinking is related to perceptions of fate and meaning. The simultaneous consideration of the unexpected outcome (BC’s loss) and the subsequent close-call counterfactual (avoiding the fire) is posited to trigger a retrospective reasoning process that imbues BC’s surprising loss with greater meaning.

Study 2a

In Study 2a, all participants read about the rivalry between BC and HC, HC's improbable victory, and BC's choice to change plans for the evening. Half of the participants read about the fire at the nightclub, whereas the other half received no information about the fire. It was predicted that the written reactions of participants who read about the fire (i.e., who were exposed to a subsequent close-call counterfactual) would include more thoughts pertaining to meaning than the written reactions of those who did not read about the fire.

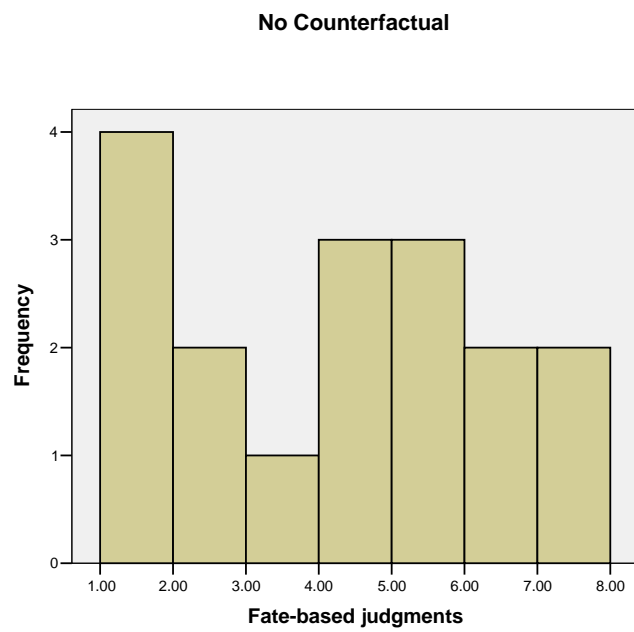
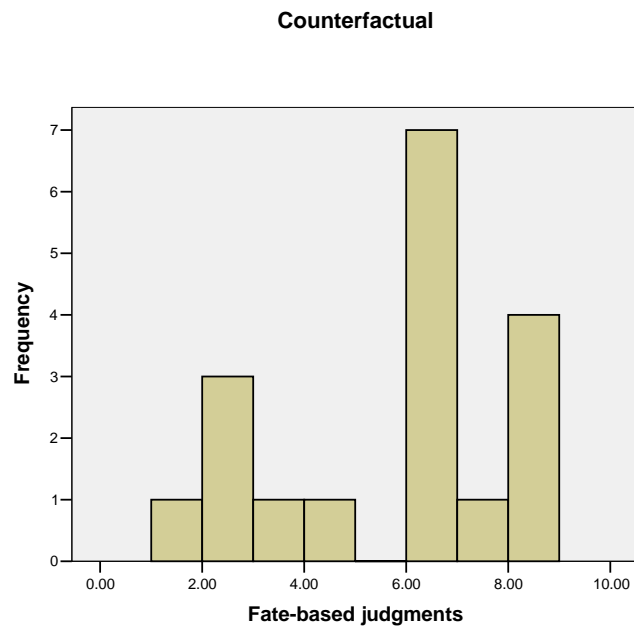


Figure 1. Study 1 Distribution of Fate-Based Judgment Scores by CF Coding

Method

Participants and Design

Twelve male and twenty-six female introductory psychology students at Ohio University were recruited for a study entitled “Personality and Thinking” in exchange for partial course credit. Participants were randomly assigned to either the *counterfactual* (fire) condition or the *control* (no fire) condition.

Procedure

Participants read one of two versions of the modified article from *The Boston Globe* (1942; see Appendix B). Both versions described the BC-HC rivalry and the game they played in 1942, but the versions differed with regard to how much information was provided about events that occurred subsequent to the game. In the *counterfactual* condition, participants read that after losing the game, the BC players changed their plans and did not attend the nightclub that evening. In the *control* condition, BC’s change of plans was merely described as resulting in no loss of revenue for the nightclub. After reading the article, participants provided written reactions.

Results

Written reactions were submitted to the Linguistic Inquiry and Word Count (LIWC) text analysis program (Pennebaker, Francis, & Booth, 2001). A dictionary was created to determine the number of words related to meaning that were spontaneously evoked (e.g., *fate*, *meaning*, *luck*, *reason*, *purpose*, etc., see Appendix C). Participants in the *counterfactual* condition generated more words relating to meaning ($M = 1.31$, $SD =$

1.70) than did participants in the *control* condition ($M = 0.10$, $SD = 0.31$), $t(36) = 3.05$, $p = .004$, $d = .99$. In addition to words generated, participants in the *counterfactual* condition generated a higher percentage of words relating to meaning ($M = .023$, $SD = .028$) than did participants in the *control* condition ($M = .002$, $SD = .005$) $t(36) = 3.14$, $p = .003$, $d = 1.06$.

Discussion

Study 2a offers additional evidence of the hypothesized meaning-making function of counterfactual thinking. The counterfactual condition spontaneously elicited words related to fate, purpose, and meaning. With regard to the possibility that participants were merely referencing the tragedy of individuals dying in the fire (i.e., independent of any connection to the outcome of the football game), it should be noted that five participants in the counterfactual condition directly stated that, “things happen for a reason” in reference to the game outcome. Such statements nicely demonstrate how consideration of the subsequent close-call counterfactual lends explanatory coherence to BC’s surprising loss.

Study 2b

Study 2a demonstrated how subsequent counterfactual information instigates meaning making. However, the locus of this relationship was not definitive. Thus, Study 2b sought to replicate the findings of Study 2a by focusing on the outcome of the game. It was hypothesized that the counterfactual, “if BC had won they would have died in the fire” would foster the perception that because the fire occurred, HC’s victory was facilitated by the hand of Fate.

Method

Participants and Design

Thirty-nine male and thirty-eight female introductory psychology students at Ohio University were recruited in exchange for partial course credit and were randomly assigned to either the *counterfactual* condition or the *control* condition.

Procedure

The procedure was the same as that employed in Study 2a, except that rather than provide written responses, participants responded to the fate-based measures used in Study 1.

Results and Discussion

Consistent with predictions, participants in the *counterfactual* condition exhibited stronger fate-based judgments regarding HC’s victory ($M = 5.83$, $SD = 2.11$) than did participants in the *control* condition ($M = 4.86$, $SD = 1.65$), $t(75) = 2.35$, $p = .02$, $d = 0.51$ (see Figure 2 for distribution of fate-based judgments by condition). Thus, considering

BC's surprising loss within the context of the subsequent close-call counterfactual appears to have imbued their loss with greater meaning and significance.

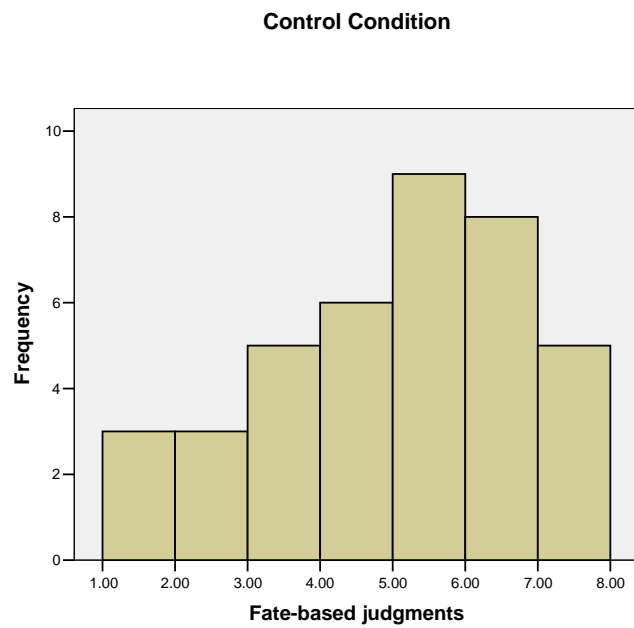
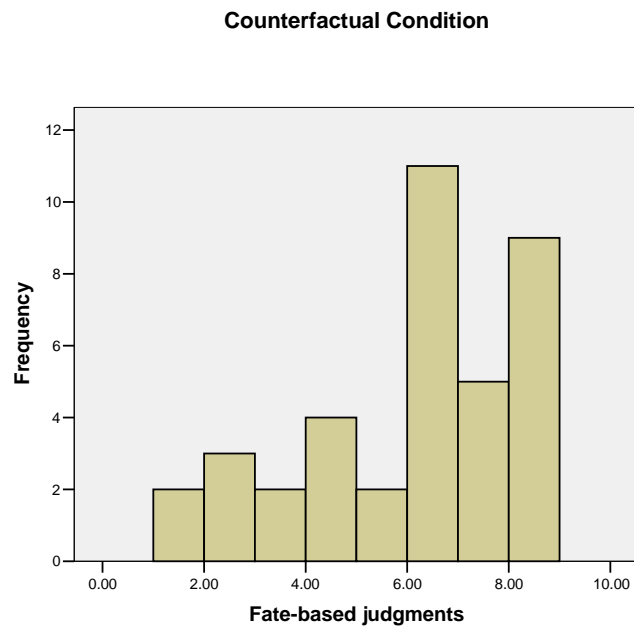


Figure 2. Study 2b Distribution of Fate-Based Judgment Scores by Condition

Study 3

The goal of Study 3 was to more definitively demonstrate the mediating role of counterfactual thinking in enhancing ascriptions of fate and predetermination. Rather than measure counterfactual thinking using an open-ended format, however, this study employed four questions that were created to provide continuous measures of counterfactual thinking (cf. Miller, Visser, & Staub, 2005). The first question focused on an *antecedent-consequent* relationship: “To what extent are you thinking about ways in which the outcome of the football game could have turned out differently?” The second question, by contrast, focused on a *consequent-subsequent* relationship: “To what extent are you thinking about what would have happened if Boston College won the game against Holy Cross?” The last pair of questions then assessed agreement with two counterfactual statements that focused on the relationship between the outcome of the game and events that occurred later that evening: “Boston College lost the game [Holy Cross won the game]. Which prevented the Boston College players from going to the Cocoanut Grove.”

For this study, it was predicted that there would be no difference between conditions on the antecedent-consequent question. In both conditions, participants read about the surprising outcome of the football game and thus should engage in similar levels of counterfactual thinking regarding how the game could have turned out differently. However, because the conditions differed with regard to the subsequent information provided, it was predicted that participants who read about the fire would

engage in more consequent-subsequent thinking than would those who merely read about the nightclub having a profitable evening despite the BC players' change of plans. In turn, it was predicted that this increase in consequent-subsequent thinking would yield enhanced ascriptions of fate and predetermination.

Method

Participants and Design

Twenty-nine male and eighteen female introductory psychology students at Ohio University were recruited in exchange for partial credit. Participants were randomly assigned either to the *counterfactual* condition or the *control* condition.

Procedure

As in Study 2b, participants read one of the two versions of the modified *Boston Globe* article. After reading this, participants responded to two questions measuring the extent to which they were considering how the game could have turned out differently (i.e., "To what extent are you thinking about ways in which the outcome of the game could have turned out differently?" and "To what extent are you thinking about what would have happened if Boston College had won the game against Holy Cross?") on 9-point scales ranging from 1 ("not at all") to 9 ("very much"). Following these, participants responded to the fate-based measures used in the previous studies, after which they rated their agreement with two statements: "Boston College lost the game, which prevented the Boston College players from going to the Cocoanut Grove" and "Holy Cross won the game, which prevented the Boston College players from going to

the Coconut Grove” on 6-point scales ranging from 1 (“strongly disagree”) to 6 (“strongly agree”).

Results

Counterfactual thinking. On the antecedent-consequent question (i.e., the extent to which participants indicated that they were considering how the game could have turned out differently), there was no significant difference between the *counterfactual* condition ($M = 5.71$, $SD = 2.40$) and the *control* condition ($M = 5.61$, $SD = 2.17$), $t < 1$. The remaining three questions, focusing on the consequent-subsequent relationship, were standardized and averaged to create a continuous counterfactual index ($\alpha = .75$). Participants in the *counterfactual* condition ($M = .37$, $SD = .77$) engaged in more consequent-subsequent thinking than did those in the *control* condition ($M = -.38$, $SD = .68$), $t(45) = 3.53$, $p = .001$, $d = 1.03$.

Meaning making. Employing the same fate-based measure composite score employed in Study 1 and Study 2b, and consistent with the findings of those previous studies, participants in the *counterfactual* condition endorsed stronger ascriptions of fate and predetermination regarding HC’s victory ($M = 5.67$, $SD = 2.17$) than did participants in the *control* condition ($M = 4.34$, $SD = 2.22$), $t(45) = 2.06$, $p < .05$, $d = 0.61$ (see Figure 3 for distribution of fate-based judgments by condition).

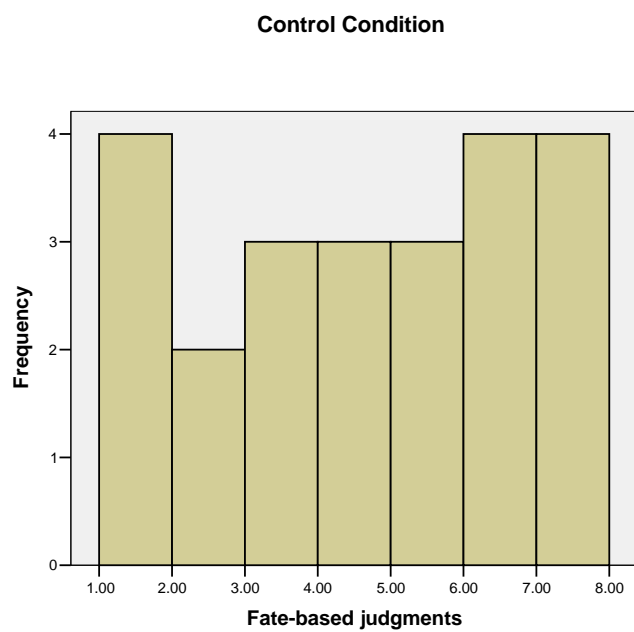
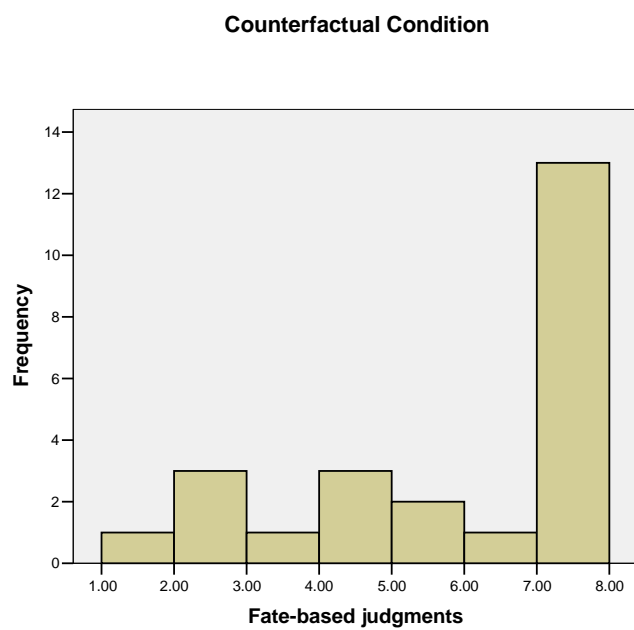


Figure 3. Study 3 Distribution of Fate-Based Judgment Scores by Condition

Mediating role of counterfactuals. Using procedures suggested by Kenny, Kashy, and Bolger (1996), the possible mediating role of counterfactual thinking in accounting for the relationship between scenario type (i.e., *counterfactual* vs. *control*) and fate-based ascriptions was examined next (see Figure 4).

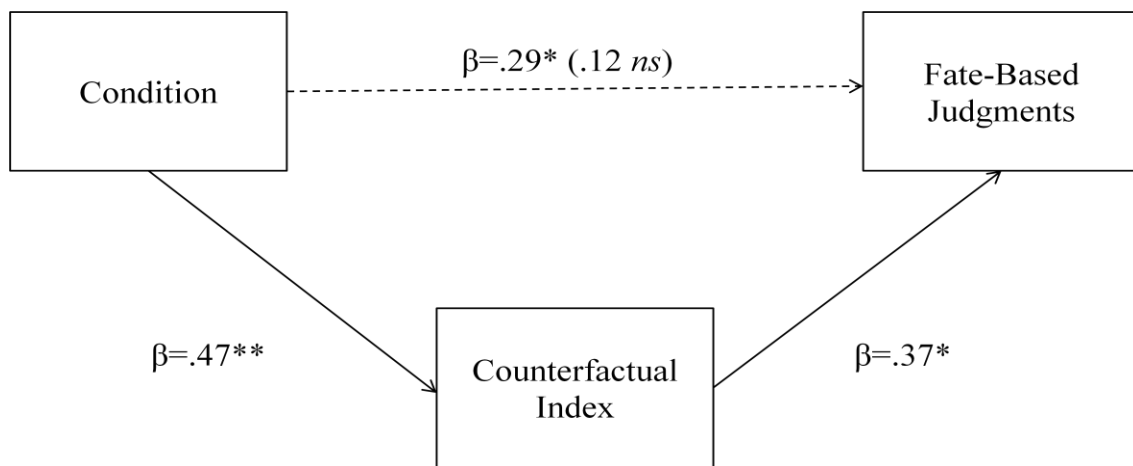


Figure 4. Counterfactual Index as the Mediator for the Effect of Condition on Fate-Based Judgments. Control condition coded 0 and counterfactual condition coded as 1. * $p < .05$. ** $p < .01$.

As previously noted, participants in the *counterfactual* condition reported engaging in more counterfactual thinking than did participants in the *control* condition. Further, the counterfactual index was found to uniquely predict ascriptions of fate and predetermination, $\beta = .37$, $t(44) = 2.42$, $p < .05$. Importantly, when the counterfactual index was included simultaneously with condition in the regression model, the relationship between scenario type and fate-based ascriptions was no longer significant, $\beta = -.12$, $t(44) = -.78$, $p = .43$. Moreover, a Sobel test (Sobel, 1982) confirmed that the

reduction in the beta weight associated with the relationship between scenario type and fate-based ascriptions when the counterfactual index was simultaneously entered was significant, $z = -1.99$, $p = .045$.

Discussion

Consistent with the previous studies, participants in the counterfactual condition endorsed more fate-based ascriptions for BC's surprising loss than those in the control condition, and the relationship between scenario type and the strength of fate-based ascriptions was mediated by counterfactual thinking that connected the outcome of the game to subsequent events that (nearly) occurred at the nightclub. This backwards form of reasoning lends explanatory coherence to both the close-call non-event (i.e., avoiding the fire) and the surprising outcome of the game that was played earlier that day.

Study 4

The first set of studies established that counterfactual thinking lends explanatory coherence to surprising events, imbuing the unexpected with perceived meaning and purpose. These studies also established that the consideration of counterfactuals that arise after a focal event can still impact one's construal of that focal event. The second set of studies identifies contextual factors that render prior outcomes particularly amenable to such a meaning-making process.

Part of what makes a traumatic event so psychologically devastating is that it can call into question many of our expectations regarding the nature of the world around us (Janoff-Bulman, 1992). At a more basic level, research on causal attribution has found that individuals are particularly prone to engage in causal reasoning in the face of disconfirmed expectancies (e.g., Clary & Tesser, 1983; Hastie, 1984; Newton, 1973; Pyszczynski & Greenberg, 1981; Stern, Marrs, Millar, & Cole, 1984). In such cases, individuals focus more attention on unexpected than expected events (Newton, 1973), engage in more cognitive activity (Stern, Marrs, Millar, & Cole, 1984), and spontaneously generate explanations (Clary & Tesser, 1983). Pyszczynski and Greenberg (1981) argued that when individuals observe expectancy-consistent behavior they rely on pre-existing causal theories to account for it and require no additional information. On the other hand, expectancy-inconsistent behavior triggers a search for explanation-relevant information to aid in generating a new causal attribution. Similarly, Clary and Tesser (1983) found that explanations spontaneously generated following unexpected events

tended to focus on excuses or justifications for the outcome, thereby allowing for the original expectation to remain intact.

Consistent with these attribution findings, the search for meaning that typically occurs following events that challenge assumptive worldviews focuses on assimilating the event with preexisting worldviews. Individuals spontaneously search for information and engage in sense making with the goal of construing the outcome as consistent with one's worldview. If an event outcome is consistent with one's worldviews, on the other hand, there is no need to initiate a search for meaning.

The goal of Study 4 was to shift the focus from manipulating information subsequent to the focal event, to manipulating expectations regarding the outcome of the focal event. To do so, the *Boston Globe* article was modified so that the expectedness of the outcome could be manipulated. Two versions of the article were created, and both versions described BC losing the game, changing their evening plans, and avoiding the fire at the Grove. However, different expectations were described for who should be most likely to win the game. Drawing on past attribution literature, it was predicted that an unexpected loss (i.e., when BC is 9-0 and Holy Cross is 4-4-1) is more likely to initiate a search for meaning than is an expected loss (i.e., when BC is 4-4-1 and HC is 9-0). Although there is still benefit to be gained from finding meaning in BC's expected loss, there should be substantially less motivation to engage in the processing of additional and subsequent information than when BC's loss is unexpected.

Method

Participants and Design

Nineteen male and twenty-one female introductory psychology students at Ohio University were recruited in exchange for partial course credit. Participants were randomly assigned to either the *unexpected loss* condition or the *expected loss* condition.

Procedure

Participants read one of two versions of the modified article from *The Boston Globe* (See Appendix D). The two versions differed only in their description of the expectedness of BC's loss. In the *unexpected loss* condition, BC is undefeated (9-0) and favored to win 4 to 1 over HC (4-4-1), whereas in the *expected loss* condition, HC is undefeated (9-0) and favored to win 4 to 1 over BC (4-4-1). In both versions, HC defeats BC 55-12. Following the loss, BC changes plans for the evening and avoids being at the Cocoanut Grove nightclub when it catches fire.

After reading the article, participants were instructed to take a moment to reflect on what they were thinking while reading the article. They then responded to the following sense-making measure: "To what extent were you trying to make sense of Boston College's loss to Holy Cross?" on a 9-point scale from 1 ("not at all") to 9 ("very much"). Following this, participants responded to the fate-based measures used in the previous studies.

Results and Discussion

Consistent with predictions, participants in the *unexpected loss* condition reported engaging in more sense-making ($M = 5.50$, $SD = 2.04$) following the HC victory than did

participants in the *expected loss* condition ($M = 3.90$, $SD = 1.71$), $t(38) = 2.68$, $p < .05$, $d = 0.85$. Moreover, participants in the *unexpected loss* condition perceived the HC victory to be more the result of fate and predetermination ($M = 6.45$, $SD = 1.68$) than did participants in the *expected loss* condition ($M = 4.30$, $SD = 1.89$), $t(38) = 3.81$, $p < .01$, $d = 1.20$ (see Figure 5 for distribution of fate-based judgments by condition). Finally, a significant positive correlation was found between the sense-making and fate-based ascription measures, $r(39) = .31$, $p = .05$.

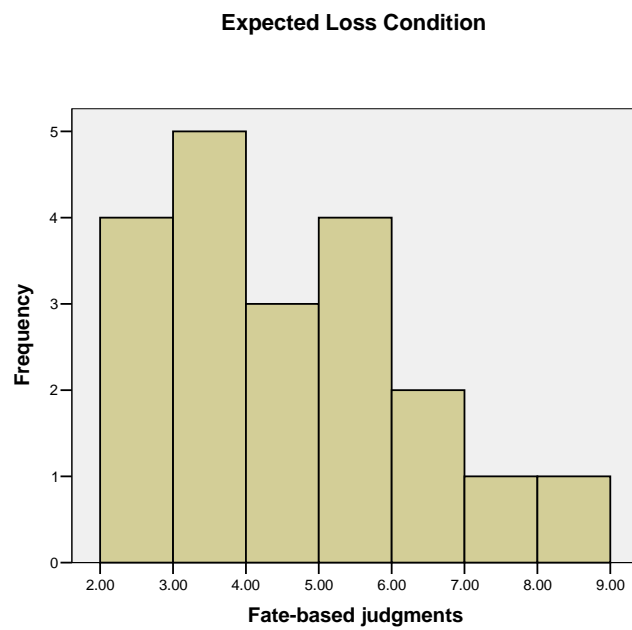
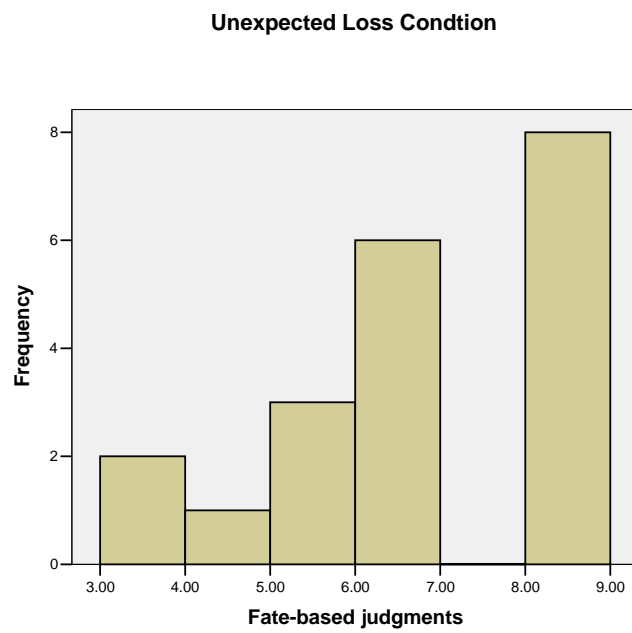


Figure 5. Study 4 Distribution of Fate-Based Judgment Scores by Condition

Study 4 began to delineate some contextual elements that moderate the meaning-making function of counterfactual thinking. When participants expected BC to lose, they reported engaging in less sense making than when participants expected BC to win. Additionally, BC's unexpected loss was perceived as more meaningful than was BC's expected loss. In all, these results provide initial evidence for the motivational nature of the proposed retrospective reasoning process.

Study 5

The previous studies have demonstrated that subsequent events that elicit counterfactual thinking can imbue prior outcomes and events with a sense of meaning and purpose. The resulting sense of explanatory coherence derives from a close-call counterfactual that engenders meaning-as-significance and initiates meaning-as-comprehensibility. Like Study 4, Study 5 sought to delineate contextual elements that moderate the ability of counterfactuals to provide explanatory coherence. Specifically, Study 5 examined the relative ability of downward versus upward counterfactuals to evoke explanatory coherence and thereby imbue surprising events with a sense of meaning and purpose.

McAdams' (2001) work on personal narratives demonstrates that individuals seek to integrate the diversity of life experiences to make sense and find purpose in their lives, and to create a coherent self-identity. One of the more significant features of life narratives is the coherence of the story (McAdams, 2006). Baerger and McAdams (1999) coded life narratives for coherence and found that higher levels of coherence were associated with higher levels of psychological well-being. McAdams (1985) suggested that the stories that individuals construct are not objective assessments of the past, but rather constructed under the influence of ideological assumptions regarding how the world should work. Part of what makes life stories coherent is that they follow the assumptions of a meaningful world (McAdams, 2006).

Relevant to the current discussion of meaning-as-significance, McAdams and colleagues have identified two narrative strategies employed to construct a life story out

of positive and negative life events: a redemption sequence and a contamination sequence (McAdams, Diamond, de St. Aubin, & Mansfield, 1997). A redemption sequence entails identifying the progression from a negative life event to a subsequent positive event. McAdams, Reynolds, Lewis, Patten, and Bowman (2001) describe a redemption sequence as when “the bad is redeemed, salvaged, mitigated, or made better in light of the ensuing good” (p.474). In contrast, a contamination sequence involves a downward progression from a positive life event to a subsequent negative event. Contamination sequences identify how a previously positive event is tarnished or undermined by subsequent negative events. McAdams et al. (2001) found that redemption sequences are much more common than contamination sequences and are positively associated with psychological well being, whereas contamination sequences are negatively associated with well being.

The work of McAdams and colleagues indicates that a downward counterfactual scenario should enhance explanatory coherence because it is a type of redemption sequence. Although BC’s surprising loss was negative, it was followed by a positive event, the avoidance of the nightclub fire. On the other hand, an upward counterfactual scenario (i.e., a disappointing loss followed by a tragedy at the nightclub), should fail to provide the same level of explanatory coherence because it is a type of contamination sequence. In other words, the outcome of the game will not be perceived as meaningfully within the context of an upward counterfactual scenario as it will be within the context of a downward counterfactual scenario.

An additional goal of Study 5 was to explore the extent to which participants are implicating an extrapersonal force when they endorse fate-based ascriptions. The perception of the involvement of an extrapersonal force is indirectly measured in Study 5 by assessing how much control the teams are perceived to have had over the outcome of the game. To the extent that participants view the game as being influenced by fate or predestination, the less control BC and HC should be perceived as having had in affecting the game outcome.

Method

Participants and Design

Thirty-seven male and fifty-five female introductory psychology students at Ohio University were recruited in exchange for course credit and were randomly assigned to either an *upward* or *downward* counterfactual condition.

Procedure

The *Boston Globe* article was modified in order to manipulate the events that transpired at the Cocoanut Grove nightclub (see Appendix E). In all cases, BC is expected to win, suffers a thorough defeat, and changes plans for the evening. In the *upward* condition, the BC players and staff perish in the fire. In the *downward* condition, the BC players and staff avoid the fire. After reading their version of the article, participants completed the same fate-based measures used in the previous studies. Subsequently, participants responded to two questions assessing their perceptions of each team's control over the outcome of the football game: "To what extent do you believe

that Boston College [Holy Cross] had control over the outcome of the game?” along 9-point scales ranging from 1 (“not at all”) to 9 (“very much”).

Results

Meaning making. Consistent with predictions, participants in the *downward* condition endorsed higher levels of fate-based ascriptions for HC’s victory ($M = 5.88$, $SD = 2.41$) than did participants in the *upward* condition ($M = 4.92$, $SD = 2.04$), $t(90) = 2.05$, $p < .05$, $d = 0.43$ (see Figure 6 for distribution of fate-based judgments by condition).

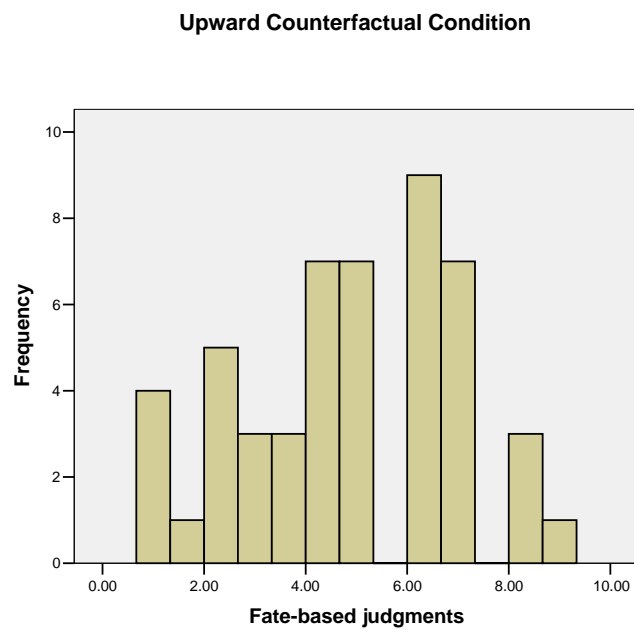
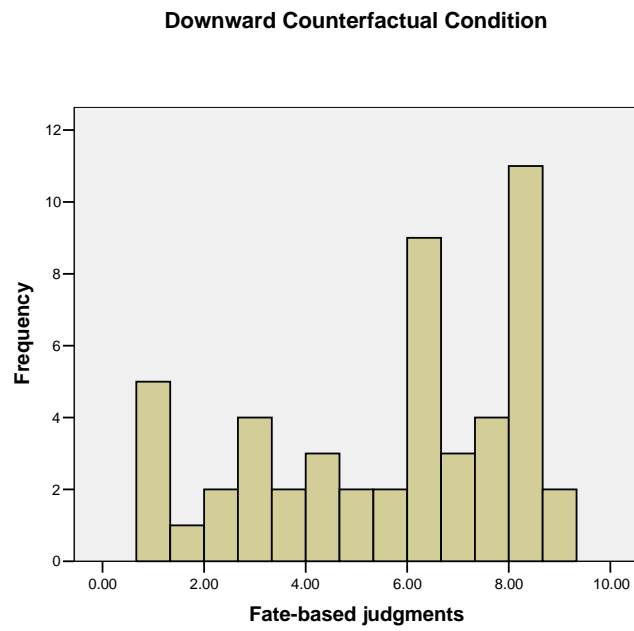


Figure 6. Study 5 Distribution of Fate-Based Judgment Scores by Condition

Mediational analyses. A composite measure of control was created by combining participants' perceptions of BC's and HC's control over the outcome of the game ($\alpha = .82$). Regression analyses were then employed to examine whether perceptions of control mediated the relationship between counterfactual direction (*upward* vs. *downward*) and endorsement of fate-based ascriptions (see Figure 7).

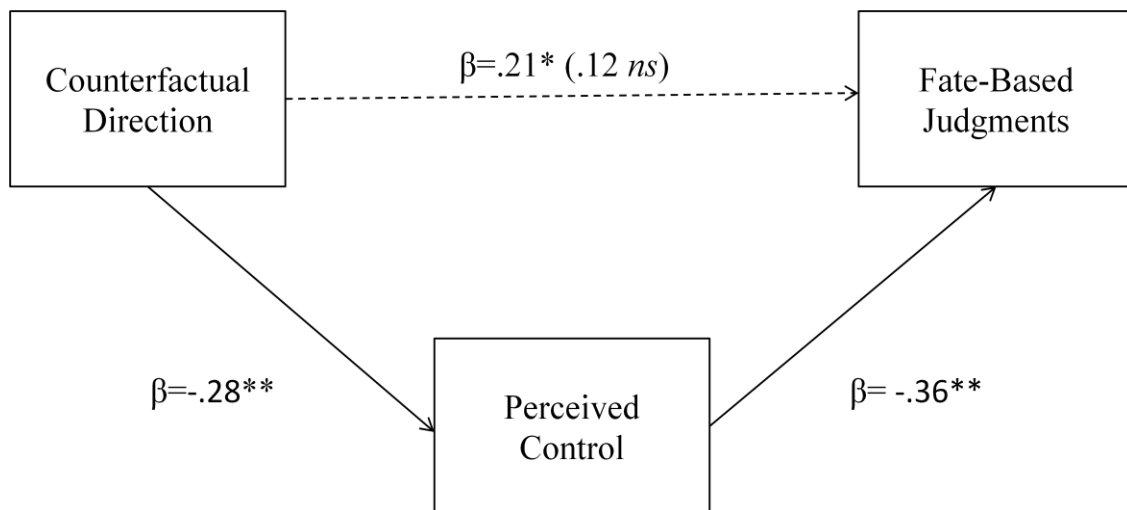


Figure 7. Perceived Control as the Mediator for the Effect of Counterfactual Direction on Fate-Based Judgments. Upward counterfactual condition coded 0 and downward counterfactual coded as 1. * $p < .05$. ** $p < .01$.

As noted above, participants in the *downward* condition endorsed stronger fate-based ascriptions than did participants in the *upward* condition. Moreover, counterfactual direction (dummy coded as upward = 0, downward = 1) significantly predicted control perceptions such that participants in the *downward* condition believed that the teams had less control over the game than did participants in the *upward* counterfactual condition, β

$= -.28, t(90) = -2.78, p < .01$. Additionally, control perceptions were found to uniquely predict fate-based ascriptions, with higher control perceptions predicting lower perceptions of fate and predetermination, $\beta = -.36, t(90) = -3.71, p < .01$. Importantly, however, when control perceptions were simultaneously included with counterfactual direction in the regression model, the relationship between counterfactual direction and fate-based ascriptions dropped below conventional levels of significance, $\beta = .12, t(90) = 1.15, p = .25$, and a Sobel test (Sobel, 1982) confirmed that this drop in the corresponding beta weight was significant, $z = 2.11, p = .03$.

Discussion

The goal of Study 5 was to explore the mechanism by which downward close-call counterfactuals retrospectively make an event seem more meaningful. Participants who read that the BC players avoided dying in the fire after changing their plans believed that BC had less control over the outcome of the game than did participants who read that the BC players died in the fire after changing their plans. Moreover, the differences in perceptions of control over the game were found to mediate the relationship between counterfactual direction and ascriptions of fate and predetermination. These results provide further evidence of the explanatory coherence that counterfactual thinking can lend to unexpected events. The surprising loss by BC explains why the players avoided the fire at the nightclub, but a subsequent explanation is also needed to account for why BC lost when they “should have” won. Apparently, by using knowledge of the fire, participants came to believe that some external force - with knowledge, perhaps, of the future event - facilitated BC’s loss.

Despite having the same event structure – the outcome of the game leads to a change in plans – the upward counterfactual does not provide as satisfying an explanation for the event as does the downward counterfactual. This may be accounted for by the different implications that redemption and contamination sequences have for constructing coherent narratives. Individuals may be motivated to consider divine intervention when such intervention would protect life, but are reluctant to do so when it claims life. Inherent in the search for meaning as comprehensibility is the attempt to assimilate events with assumptive worldviews. The counterfactual that the BC players would have lived if fate had not intervened does little to support the assumption that the world functions according to principles of fairness and justice (Janoff-Bulman, 1992).

Meaning-making Function

The previous studies offer initial support for the proposed meaning-making function of counterfactual thinking. Studies 1-3 demonstrated the importance of subsequent information in eliciting retrospective reasoning, as engaging in counterfactual thinking regarding subsequent events increased fate-based ascriptions regarding the focal event. Studies 4 and 5 demonstrated the importance of meaning in the construction of explanatory coherence. Building on the role of expectations in generating causal attributions, Study 4 found that an unexpected outcome instigates more sense making than does an expected outcome. Study 5 demonstrated the importance of meaning-as-significance in creating a sense of explanatory coherence. When events elicit downward counterfactuals, one is led to perceive benefit in the outcome, and this sense of meaning is then used to form a coherent narrative. In all, the studies reported thus far provide support for the meaning-making function of counterfactual thinking.

Epstude and Roese (2008) propose that the two defining features of a functional interpretation of a psychological process are that: “(a) the process is activated by a particular deficit or need and (b) the process produces changes that end the deficit or fulfill the need” (p.170). In proposing a meaning-making function for counterfactual thinking, it has been suggested that the need to make sense of and find benefit in an unexpected event triggers counterfactual thinking. Moreover, to the extent that counterfactual thinking lends explanatory coherence to a sequence of events, meaning perceptions should be enhanced. The results of Studies 1-3 and Study 5 suggest that counterfactual thinking satisfies a need for meaning. Study 4 indirectly demonstrated that

counterfactual thinking is employed to satisfy a need for meaning following an unexpected outcome. The goal of Study 6 was to more directly demonstrate that the meaning-making function of counterfactual thinking is activated in response to a meaning threat.

Recently, Heine, Proulx, and Vohs (2006) proposed a Meaning Maintenance Model (MMM) to integrate a range of psychological motivations as subserving a more general motivation to establish and maintain a sense of meaning. According to the MMM, humans seek to establish meaning through the construction of expected relationships within the external world, within themselves, and between themselves and the external world. Being adept at the identification and construction of meaning, humans are particularly sensitive to breakdowns in expectations and meaning. Having identified a disruption to a meaning framework, humans experience an arousal state that motivates them to reaffirm alternative existing frameworks of meaning through a process termed *fluid compensation* (Heine et al., 2006; Proulx, 2009; Proulx & Heine, 2006). For instance, Proulx and Heine (2006) suggested that the basking-in-reflected-glory effect identified by Cialdini et al. (1976) represents fluid compensation for the self-esteem threat of failing a trivia test. Fluid compensation is also demonstrated when individuals inflate self-assessments unrelated to domains in which they receive negative feedback (Baumeister & Jones, 1978).

A state of certainty signals that frameworks of expected relationships are consistent with perceptions, allowing individuals to have a sense of predictive control over events. The experience of uncertainty challenges the sense of meaning that certainty

provides. Proulx and Heine (2006) describe how the work of McGregor, Zanna, Holmes, and Spencer (2001) and Grieve and Hogg (1999) lends support for the MMM assertion that the experience of uncertainty threatens meaning and leads individuals to reaffirm alternative meaning frameworks. McGregor et al. (2001) found that a self-integrity threat led participants to exaggerate certainty and convictions regarding attitudes unrelated to the threat (e.g., capital punishment). Grieve and Hogg (1999) found that participants engaged in more intergroup discrimination when in a state of uncertainty. Additionally, van den Bos (2001) has demonstrated that when participants reflect on experiencing uncertainty they become more concerned about issues of justice and fairness. In all, this work suggests that threats to meaning stemming from heightened uncertainty concerns lead individuals to bolster meaning in other domains.

Study 6

According to the MMM, heightened uncertainty concerns evoke attempts at fluid compensation. The goal of the current study was to demonstrate that heightened uncertainty concerns activate counterfactual thinking in the service of providing meaning. Implicit in the studies reported thus far is the assumption that participants experience uncertainty while reading the description of BC's unexpected loss, and that the subsequent consideration of counterfactuals imbues the surprising loss with greater meaning. In Study 6, uncertainty concerns were experimentally manipulated by a priming task (e.g., Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trotschel, 2001). Counterfactual thinking is proposed to reduce feelings of uncertainty by creating an explanatory coherence that combines both the comprehensibility and significance aspects of meaning. Thus, and consistent with the notion of fluid compensation, it was hypothesized that participants would use counterfactuals to provide meaning when they are in a heightened state of uncertainty.

The experience of uncertainty and the inability to reduce it can be a particularly distressing and aversive, leading people to question how to behave and even what to expect from the social and physical world around them (Hogg, 2007; Kagan, 1972; Van den Bos & Lind, 2002). In order to explore the role of affect in the meaning making process, the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) was included in Study 6. The PANAS is a 20-item scale that contains 10 positive emotion descriptors and negative emotion descriptors which yields positive affect (PA) and negative affect (NA) subscales. The PANAS can be modified to measure

affect over a multitude of time periods. The current administration focused on emotions that were being experienced “right now”.

The current study also examined individual differences that were hypothesized to moderate the meaning-making function of counterfactuals. Weary and Edwards (1994) proposed that individuals differ in their beliefs regarding how well they understand causal relationships, and such chronic differences differentially impact their motivation to reduce uncertainty. Differences in causal uncertainty (CU) have been found to impact how responsive individuals are to the temporary activation of uncertainty (Wichman, Brunner, & Weary, 2008; van den Bos, van Ameijde, & van Gorp, 2006). Wichman et al. (2008) found that individual differences in causal uncertainty, as measured by the Causal Uncertainty Scale (Weary & Edwards, 1994), moderated the effects of an uncertainty prime. In the current study, it was hypothesized that the uncertainty prime would have a stronger influence on participants who endorse relatively higher causal uncertainty beliefs.

Religious and spiritual beliefs have been found to aid in finding meaning-as-comprehensibility and may influence the endorsement of fate-based judgments. Norenzayan and Hansen (2006) found that mortality salience heightened beliefs in supernatural agents (e.g., the divine Buddha and shamanic spirits), although this effect was primarily found among those who were religiously affiliated. The fate-based judgment measures used in the present studies, by contrast, were selected specifically for their potential to appeal to individuals who espouse a wider range of spiritual and religious beliefs. In Study 6 religiosity was assessed with the Family Religious Values

Questionnaire (FRVQ; Rohrbaugh & Jessor, 1975). The FRVQ is an 8-item scale assessing religiosity on four dimensions: ritual, experiential, consequential, and theological religiosity. The ritual dimension is assessed as the number of times one attends religious services in a year and the role of prayer or religious meditation. Consequential religiosity is measured by how often one takes religious advice or teaching into consideration and how much influence religion has on how one chooses to act. The ideological dimension focuses on beliefs about God and life after death. The experiential dimension focuses on how often one feels religious reverence and the extent to which religion provides one with comfort and security. Although the results of the previous studies suggest that the effect of counterfactual thinking on evoking fate-based judgments is fairly global, the inclusion of the FRVQ should allow for the examination of any moderating influences of the four types of religiosity.

In addition to measuring religiosity, the current study measured more secular views of causality and determinism using the Free Will and Determinism Scale (FAD; Paulhus & Carey, 2009). The FAD is a 27-item scale that assesses lay beliefs of free will and determinism on four subscales; Free Will, Scientific Determinism, Fatalistic Determinism, and Unpredictability. The Free Will subscale focuses on personal responsibility and control over one's actions and outcomes, as measured by agreement with statements such as "People have complete control over the decisions they make." The Scientific Determinism subscale is comprised of statements focused on the scientific causes of human behavior such as "Science has shown how your past environment created your current intelligence and personality." The Fatalistic Determinism subscale

captures the belief that the future is pre-determined by unknown forces, as measured by agreement to such statements as “Whether people like it or not, mysterious forces seem to move their lives.” The final subscale, Unpredictability, offers an alternative to both free will and determinism, and measures a general skepticism about the ability to fully explain human behavior. Unpredictability beliefs are measured by agreement to statements such as “Chance events seem to be the major cause of human history.” The FAD was designed to provide a measure of lay beliefs regarding free will and multiple distinctions of determinism free of religious and philosophical jargon.

Finally, the MMM assumes that to the extent that one is more secure in their sense that life has meaning, the more bolstered one will be against any given meaning threat. To examine the moderating influence of perceived presence of meaning in life, the Meaning in Life Questionnaire (MLQ; Steger, Frazier, Oishi, & Kaler, 2006) was administered. The MLQ is a 10-item measure of both perceived presence of meaning in life as well as the extent to which one is currently searching for meaning in life.

Method

Participants and Design

Fifty-one male and forty-three female introductory psychology students at Ohio University were recruited in exchange for course credit. Participants were randomly assigned to one of two conditions: *uncertainty prime* or *neutral prime*.

Procedure

Prior to beginning the experiment, participants were led to believe that they were piloting materials for another research lab. Participants then received a puzzle instructing

them to search for a list of 20 words. Half of the participants received a puzzle that contained 15 words related to uncertainty; whereas the other half received a puzzle that contained 20 neutral words (see Appendix F). Participants were given five minutes and instructed to find as many words as possible. After completing the puzzle, all participants received the counterfactual version of the football game description. After reading the article, participants completed the PANAS assessing their current emotions. Following the PANAS, participants completed the same fate-based measures used in the previous studies. In addition to the counterfactual questions used in Study 3, participants also responded to a question regarding the influence of the fire on thinking (“To what extent did you find yourself thinking about the fire as you reflected on Boston College’s loss to Holy Cross?”). Following the measures of counterfactual thinking, participants completed the perceptions of control measures used in Study 5, and then the FRVQ, CUS, FAD, and MLQ.

Results

Counterfactual thinking. Consistent with fluid compensation, participants responded to the uncertainty prime by engaging in more antecedent-consequent counterfactual thinking ($M = 5.88$, $SD = 2.16$) than participants receiving the neutral prime ($M = 5.02$, $SD = 2.44$), $t(92) = 1.79$, $p = .076$, $d = 0.37$. Using the three consequent-subsequent counterfactual thinking questions used in study 3 as well as the consequent-subsequent question focusing on the fire were combined to create a single consequent-subsequent counterfactual measure ($\alpha = .76$). Participants primed with uncertainty reported engaging in more counterfactual thinking ($M = 0.28$, $SD = 0.56$)

than participants receiving the neutral prime ($M = -0.29$, $SD = 0.83$), $t(92) = 3.91$, $p < .001$, $d = 0.81$ (see Figure 8 for distribution of fate-based judgments by condition). There were no differences between participants primed with uncertainty and the neutral prime on perceptions of each teams control over the outcome of the game, $t's < 1$.

Meaning-making. Inconsistent with predictions, participants primed with uncertainty did not differ in their fate-based ascriptions for HC's victory ($M = 5.02$, $SD = 2.58$) than participants in the neutral prime ($M = 5.01$, $SD = 2.58$) (see Figure 9 for distribution of fate-based judgments by condition). No significant differences were found using both an independent samples t-test ($t < 1$) and the non-parametric Mann-Whitney test ($p = .94$). Although there was no difference in fate-based judgments, there was a significant positive correlation between counterfactual thinking and fate-based judgments, $r(92) = .34$, $p = .001$.

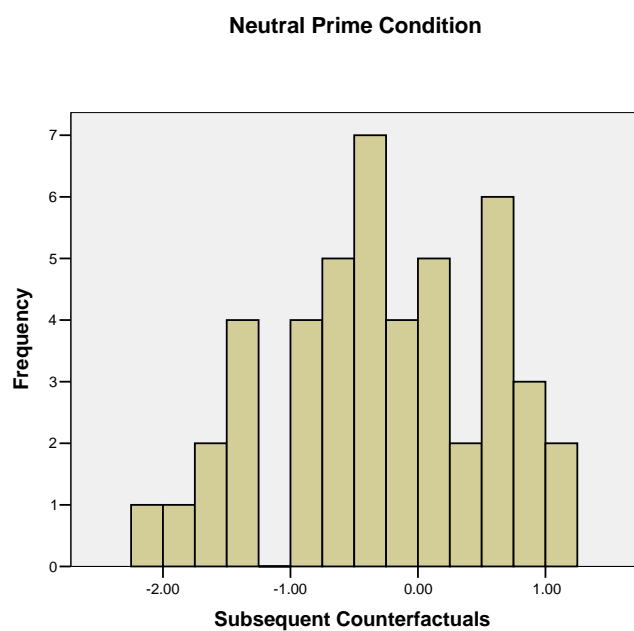
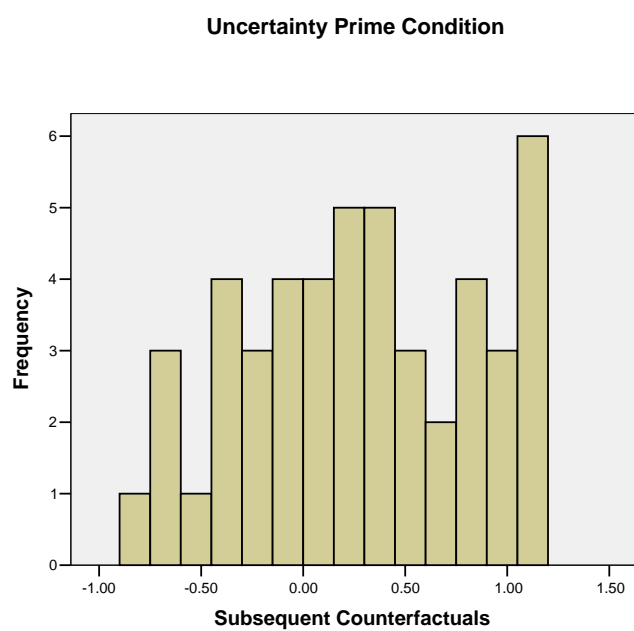


Figure 8. Study 6 Distribution of Subsequent Counterfactual Thinking by Condition

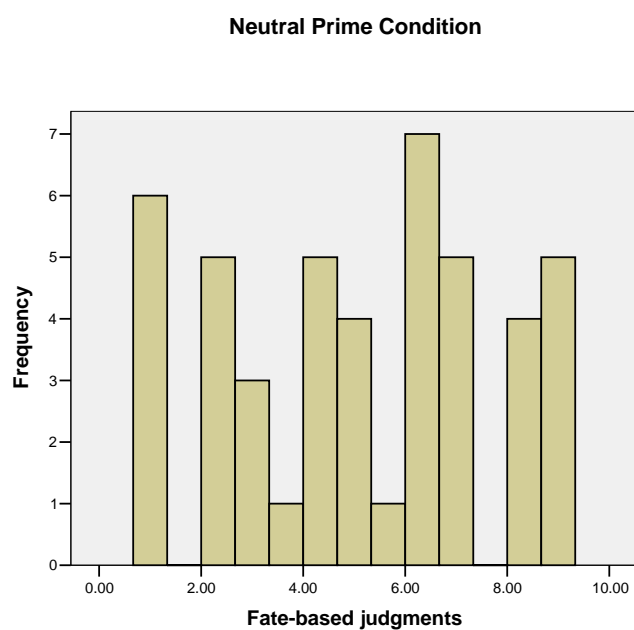
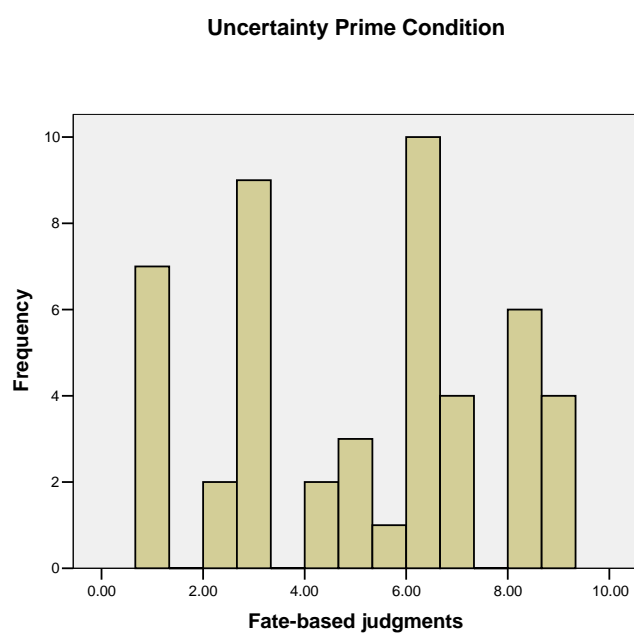


Figure 9. Study 6 Distribution of Fate-Based Judgment Scores by Condition

PANAS. Responses to the 20-item PANAS were combined to create two subscales; positive affect ($\alpha = .82$) and negative affect ($\alpha = .83$). There were no differences between participants receiving the uncertainty prime and neutral prime on either positive or negative affect, t 's < 1 . In addition, there was no relationship between either positive or negative affect and fate-based judgments. There was however a significant positive correlation between positive affect and counterfactual thinking, $r(92) = .27, p < .01$, such that participants feeling more positive at the present moment also reported engaging in more counterfactual thinking.

Religiosity. There were no significant differences between participants in the uncertainty and neutral prime conditions on any of the four dimensions of religiosity, t 's < 1 . Each of the four dimensions of religiosity demonstrated a significant positive correlation with fate-based judgments: Ritual religiosity $r(92) = .24, p < .05$, Consequential religiosity $r(92) = .42, p < .001$, Ideological religiosity $r(92) = .35, p < .001$, and Experiential religiosity $r(92) = .41, p < .001$. In addition to correlations with fate-based judgments, the Consequential and Experiential dimensions of religiosity were both positively correlated with the composite measure of counterfactual thinking, $r(92) = .25, p < .05$. There was no significant relationship between either Ritual or Ideological religiosity and counterfactual thinking. There were no significant interactions between primes and any of the dimensions of religiosity.

Causal uncertainty. There was a significant positive correlation between causal uncertainty and fate-based judgments $r(92) = .25, p < .05$, such that increases in chronic causal uncertainty corresponded with increases in fate-based judgments. Participants in

the uncertainty prime condition did not significantly differ on causal uncertainty from those participants in the neutral prime condition. Although the strength of the correlation between CUS and fate-based judgments differed between the primes, uncertainty prime $r(46) = 0.31, p < .05$ and neutral prime $r(44) = 0.19, p = .21$, there was not a significant interaction between causal uncertainty and primes.

Free will and determinism scale. Of the four subscales of the FAD, Fatalistic determinism was the only one found to be related to ascriptions of fate and ‘meant to be’. There was a significant positive correlation between beliefs in fatalistic determinism and fate-based judgments, $r(92) = 0.62, p < .001$. There was not a significant difference between uncertainty prime and neutral prime on the Fatalistic determinism, Scientific determinism, or the Unpredictability factor of the FAD, t 's < 1 . There was however a significant difference between the uncertainty and neutral prime conditions on the Free will factor. Participants exposed to the uncertainty prime endorsed stronger beliefs in free will ($M = 26.58, SD = 4.00$) than did participants exposed to the neutral prime ($M = 24.43, SD = 5.15$), $t(92) = 2.26, p < .05, d = 0.47$. With the differences previously reported between uncertainty and neutral primes in amount of counterfactual thinking, regression analyses were conducted to explore whether the differences in counterfactual thinking mediate the differences in endorsement of free will (see Figure 10). Type of prime (dummy coded as neutral prime = 0, uncertainty prime = 1) significantly predicted counterfactual thinking such that participants primed with uncertainty reported engaging in more counterfactual thinking than participants receiving the neutral prime, $\beta = .38, t(92) = 3.91, p < .001$. Additionally, the composite measure of counterfactual thinking was

found to uniquely predict beliefs of free will, with higher counterfactual thinking predicting higher beliefs in free will, $\beta = .33$, $t(92) = 3.35$, $p < .001$. Importantly, however, when counterfactual thinking was simultaneously included with type of prime in the regression model, the relationship between type of prime and beliefs in free will dropped below conventional levels of significance, $\beta = .12$, $t(90) = 1.16$, $p = .25$, and a Sobel test (Sobel, 1982) confirmed that this drop in the corresponding beta weight was significant, $z = 2.20$, $p = .03$.

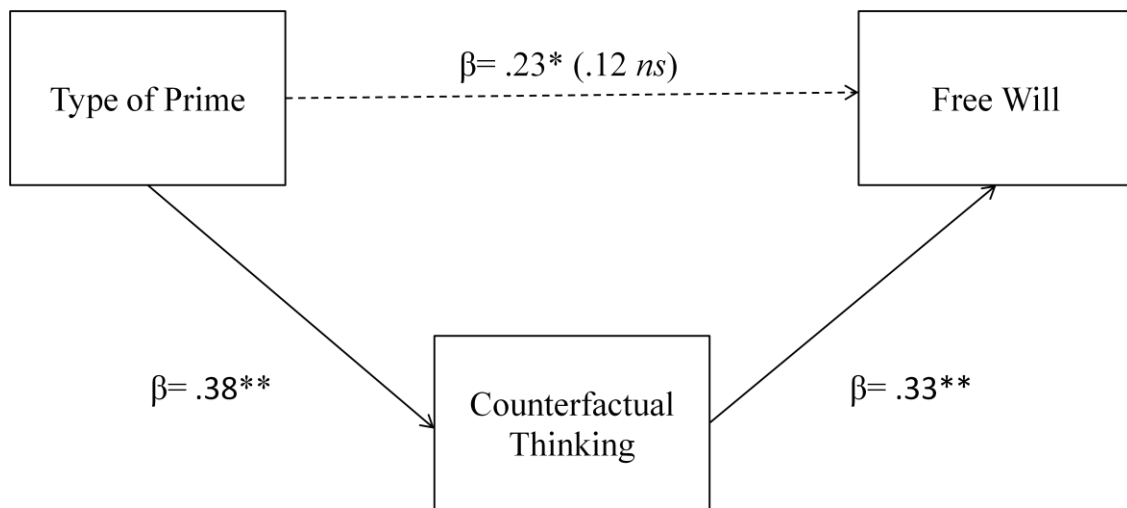


Figure 10. Counterfactual Thinking as the Mediator for the Effect of Prime on Beliefs in Free Will. Neutral prime condition coded 0 and Uncertainty prime condition coded as 1. * $p < .05$. ** $p < .01$.

In addition to counterfactual thinking, there was also a positive correlation between beliefs in free will and positive affect, $r(92) = .28$, $p < .01$. In order to explore the relationship between positive affect, counterfactual thinking, and beliefs in free will, a series of regression analyses were conducted to explore possible models of mediation (See Figure 11 and 12).

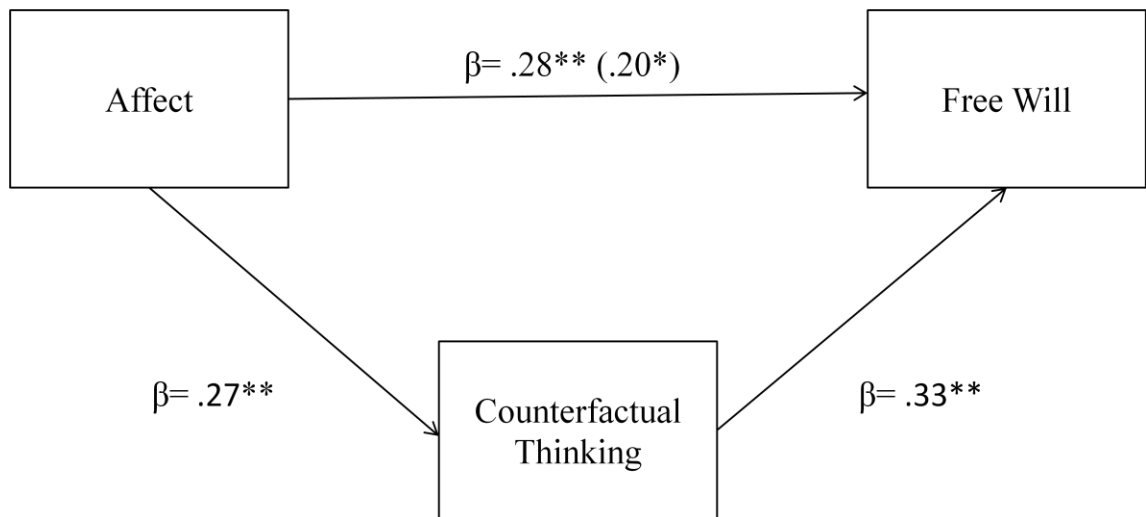


Figure 11. Counterfactual thinking as the partial mediator for the effect of positive affect on beliefs in free will.* $p < .05$. ** $p < .01$.

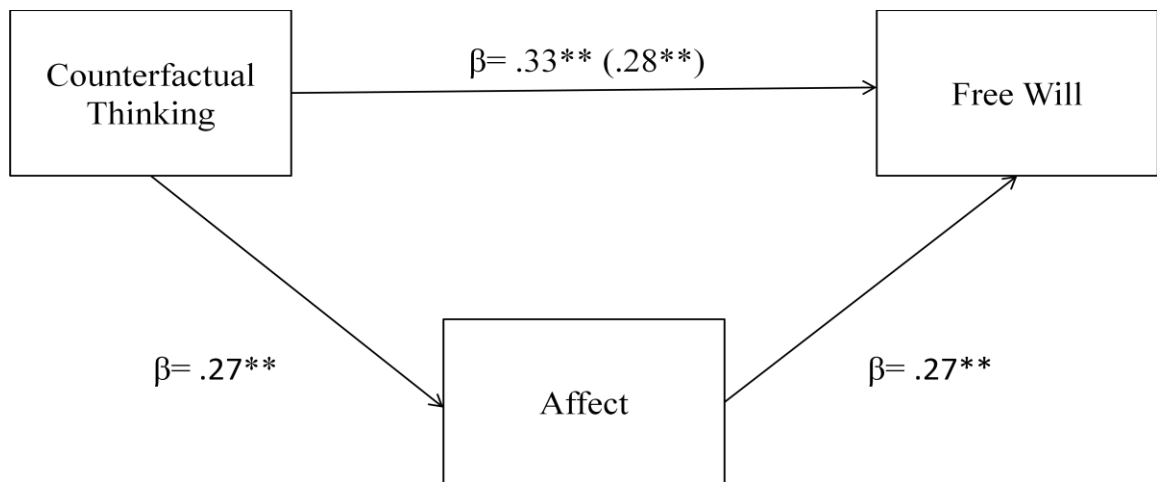


Figure 12. Positive affect as the partial mediator for the effect of counterfactual thinking on beliefs in free will.* $p < .05$. ** $p < .01$.

The first mediation model explored the mediating effect of counterfactual thinking on the relationship between positive affect and beliefs in free will. When counterfactual thinking was simultaneously included with positive affect in the regression

model, the relationship between positive affect and beliefs in free will dropped although remained significant, $\beta = .20$, $t(91) = 2.02$, $p < .05$, and a Sobel test (Sobel, 1982) revealed that this drop in the corresponding beta weight was marginally significant, $z = 1.91$, $p < .075$. The second mediation model tested whether positive affect mediated the relationship between counterfactual thinking and free will. When positive affect was simultaneously included with counterfactual thinking in the regression model, the relationship between counterfactual thinking and beliefs in free will dropped although remained significant, $\beta = .28$, $t(91) = 2.73$, $p < .01$, and a Sobel test (Sobel, 1982) revealed that this drop in the corresponding beta weight was marginally significant, $z = 1.91$, $p < .10$.

Meaning in life questionnaire. The MLQ was divided into the two subscales measuring presence of meaning ($\alpha = .89$) and search for meaning ($\alpha = .89$). There was no relationship between the presence of meaning in one's life and fate-based judgments; however there was a significant positive correlation between searching for meaning and fate-based judgments, $r(92) = .29$, $p = .005$. Although the strength of the correlation between searching for meaning and fate-based judgments differed between the primes, uncertainty prime $r(46) = 0.38$, $p < .01$ and neutral prime $r(44) = 0.19$, $p = .20$, there was not a significant interaction between search for meaning and primes.

Supplemental analysis. The preceding analyses demonstrated that each scale, with the exception of the PANAS, included at least one factor that was significantly correlated with fate-based judgments. A correlation matrix was created in order to explore how each of these factors were related to each other (see Table 2).

Table 2 *Correlation Matrix Study 6*

Variable	1	2	3	4	5	6	7	8	9	10
1. Fate /Meant										
2. Prime	.00									
3. Positive (PANAS)	.10	.12								
4. Negative (PANAS)	.08	.06	.04							
5. Antecedent CF	.10	.18†	.23*	.09						
6. Subsequent CFs	.34**	.38**	.27**	.11	.45**					
7. Make Sense	.19†	.15	.09	.26*	.46**	.18†				
8. BC Cause	.20†	.13	-.07	.00	.07	.46**	-.14			
9. HC Cause	.21*	.14	-.14	-.04	.16	.48**	.10	.71**		
10. BC Control	-.28**	.01	.00	-.26*	.09	.04	-.14	.18†	.04	
11. HC Control	-.13	.05	.04	-.16	.20	.10	.05	.24*	.21*	.72**
12. Consequential (FRVQ)	.42**	-.02	.23*	.23*	.23*	.25*	.23*	.06	.08	-.15
13. Ideological (FRVQ)	.35**	.01	.20	.09	.07	.08	.11	-.02	-.09	-.17
14. Experiential (FRVQ)	.41**	.03	.32**	.18	.18†	.25*	.18†	-.02	-.02	-.18†
15. Ritual (FRVQ)	.24*	-.03	.27**	.04	.09	.07	.08	.02	-.01	-.05
16. Causal U. (CUS)	.25*	.13	-.19†	.14	-.12	.06	-.06	.12	.17	-.16
17. Free Will (FAD)	.13	.23*	.28**	.00	.28**	.33**	.14	.17	.21*	.05
18. Scientific D. (FAD)	.06	.11	.05	.06	.17	.19†	.10	.06	.07	-.07
19. Fatalistic D. (FAD)	.62**	.01	.13	.06	.11	.21*	.11	.16	.21*	-.20
20. Unpredictability (FAD)	.06	-.09	.06	-.10	.10	.06	.05	.04	-.02	.08
21. Presence (MLQ)	-.09	.11	.41**	-.16	.22*	.11	-.01	-.21*	-.18†	.13
22. Search (MLQ)	.29**	.10	-.05	.03	-.04	.12	-.02	.13	.13	.07

† $p < .10$. * $p < .05$. ** $p < .01$.

Table 2 *Cont.*

Variable	11	12	13	14	15	16	17	18	19	20	21
1. Fate /Meant											
2. Prime											
3. Positive (PANAS)											
4. Negative (PANAS)											
5. Antecedent CF											
6. Subsequent CFs											
7. Make Sense											
8. BC Cause											
9. HC Cause											
10. BC Control											
11. HC Control											
12. Consequential (FRVQ)	-.15										
13. Ideological (FRVQ)	-.14	.63**									
14. Experiential (FRVQ)	-.21*	.87**	.70**								
15. Ritual (FRVQ)	-.08	.75**	.61**	.72**							
16. Causal U. (CUS)	-.07	-.01	.04	.06	-.07						
17. Free Will (FAD)	.27**	.22*	.09	.18†	.12	-.08					
18. Scientific D. (FAD)	-.08	-.05	-.15	-.07	-.11	.11	.11				
19. Fatalistic D. (FAD)	-.2*	.40**	.38**	.41**	.25*	.29**	.16	.21*			
20. Unpredictability (FAD)	.15	-.13	-.10	-.13	-.14	.16	.22*	.22*	.09		
21. Presence (MLQ)	.02	.27**	.17	.32**	.30**	-.42**	.17	-.06	.03	-.26*	
22. Search (MLQ)	.00	.12	.06	.11	-.07	.15	.11	.04	.25*	.18†	-.14

† $p < .10$. * $p < .05$. ** $p < .01$.

Although there is considerable criticism for the stepwise procedure (Thompson, 2001), Thayer (2002) argued that stepwise regression is valuable and acceptable as exploratory data analysis procedure. In order to explore the unique contribution of subsequent counterfactual thinking on fate-based judgments, a stepwise regression was conducted. A forward stepwise regression was conducted with the inclusion criterion set to $p=.05$. Fate-based judgments were entered into the model as the dependent variable and type of prime, antecedent counterfactual thinking, composite of subsequent counterfactual thinking, perceptions of control, perceptions of cause, PANAS, FRVQ, CUS, FAD, and MLQ were entered as potential predictor variables. Table 3 displays the three models created. The Fatalistic determinism factor was the first predictor to be included and accounted for 37.8% of the variability in fate-based judgments. The second predictor included was the composite measure of subsequent counterfactual thinking, which accounted for an additional 4.5% of variability, $\Delta R^2 = .045$, $F(1, 91) = 7.15$, $p < .01$. The last predictor to be included was perceived control BC had over the outcome of the game, $\Delta R^2 = .033$, $F(1, 90) = 5.49$, $p < .05$. The final regression indicated that these three predictors explained 46% of the variance in fate-based judgments, $R^2 = .46$, $F(3, 90) = 25.21$, $p < .001$. It was found that higher BC control perceptions predicting lower perceptions of fate and predetermination ($\beta = -.19$, $p < .05$). Higher beliefs in fatalistic determinism predicted higher perceptions of fate and predetermination ($\beta = .53$, $p < .001$), as did increases in counterfactual thinking ($\beta = .23$, $p < .005$).

Table 3

Incremental Explained Variance in Forward Stepwise Regression Analysis

Model	R ²	ΔR ²
1	0.38	0.38**
2	0.42	0.05**
3	0.46	0.03**

Model 1: (Constant), Fatalistic Determinism

Model 2: (Constant), Fatalistic Determinism, Subsequent CF

Model 3: (Constant), Fatalistic Determinism, Subsequent CF, BC Control

In order to further explore the contribution of counterfactual thinking, an additional stepwise regression was conducted. A less conservative backward stepwise regression was conducted using $p < .10$ as the removal criterion. All of the predictors, with the exception of counterfactual thinking, were entered into the regression predicting fate-based judgments. This allowed for the stepwise procedure to generate a model that best predicted fate-based judgments in the absence of counterfactual thinking. Subsequently, the composite measure of counterfactual thinking was added to explore the unique contribution of variance accounted for. The backward stepwise procedure began with 21 predictors and removed one at a time until ending with a model that contained control perceptions for both BC and HC, perceptions of BC loss causing the team not to go to the nightclub, search for meaning in life (MLQ), experiential religiosity (FRVQ), and beliefs in fatalistic determinism (FAD) (See Table 4 for models).

Table 4

Incremental Explained Variance in Backward Stepwise Regression Analysis

Model	R^2	ΔR^2
1	0.49	0.49**
2	0.52	0.03*

Model 1: (Constant), Fatalistic Determinism, BC Control, HC Control, MLQ Search, Consequential Religiosity

Model 2: (Constant), Fatalistic Determinism, BC Control, HC Control, MLQ Search, Consequential Religiosity, Subsequent CF

The final regression model indicated that these six predictors explained 49% of the variance in fate-based judgments, $R^2 = .49$, $F(5, 88) = 16.95$, $p < .001$. Adding the composite measure of counterfactual thinking to this regression model resulted in a significant change in variance accounted for, $\Delta R^2 = .027$, $F(1, 87) = 4.83$, $p < .05$. Even in the presence of measures of control, causality, search for meaning, experiential religiosity, and beliefs in fatalistic determinism, measures of counterfactual thinking accounts for a significant amount of additional variance in fate-based judgments.

Discussion

Based on the theorizing of the Meaning Maintenance Model (MMM) that heightened uncertainty concerns evoke attempts at fluid compensation, the goal of Study 6 was to further demonstrate the meaning making function of counterfactual thinking by manipulating a meaning threat. More specifically, the goal was to demonstrate that threatening meaning by priming uncertainty would (1) activate counterfactual thinking and (2) provide support that counterfactual thinking serves to reduce uncertainty and provide meaning. All participants read the same story; however, participants primed with

uncertainty reported engaging in more consequent-subsequent counterfactual thinking than participants who received the neutral prime. These results support the first feature of a functional interpretation; namely, that counterfactual thinking was activated by a state of uncertainty. However, the second feature, that counterfactual thinking serves to reduce uncertainty and provide meaning, was not fully supported. Although participants primed with uncertainty engaged in more counterfactual thinking, this did not correspond with an increase in fate-based judgments regarding the outcome of the football game. Although there was not a difference between prime conditions in fate-based judgments, the significant positive relationship found between counterfactual thinking and fate-based judgments does offer indirect support for the second feature of a functional interpretation—that counterfactual thinking produces changes that fulfill the need for meaning. Indeed, the positive relationship between counterfactual thinking and fate-based judgments remained significant even after controlling for individual differences of religiosity, fatalistic determinism, and search for meaning which suggests that subsequent counterfactual thinking did play a role in the meaning-making process.

Tests of mediation for the relationship between positive affect, counterfactual thinking, and beliefs in free will suggest a relationship between positive affect and counterfactual thinking; however the marginal significance of the partial mediation suggests that each accounts for unique variance in beliefs in free will. No differences were found between primes on either positive or negative affect which may suggest the uncertainty prime was not impactful. However, these null findings should not be overstated due to experimental design. Participants were instructed to respond to the

emotion descriptors of the PANAS in terms of what they were feeling “*right now, that is, at the present moment.*” Participants had already completed reading the story when they were responding to the PANAS. Given the results of Study 1 and Study 2a, in which participants spontaneously engaged in counterfactual thinking and used words related to fate, purpose, and meaning in responding to the article, any change in emotion that either the prime or parts of the article elicited in Study 6 may have been attenuated by the time participants finished reading the article. Thus, future research that explores the role of affect at different stages in the meaning-making process may be helpful to determine how affect serves to initiate the meaning-making process as well as what type of emotions signify the construction of meaning through a counterfactual process.

Religiosity, causal uncertainty, fatalistic determinism, and one’s search for meaning in one’s life were all found to be positively correlated with fate-based judgments. Each of these individual difference measures captures a belief system that could potentially explain why one would perceive an event to be fated or meant to be, independent of circumstances and subsequent events. Although some of these measures differed in strength of relationship with fate-based judgments across primes—specifically CUS and search for meaning—these interactions failed to reach significance. This suggests that they could potentially moderate the relationship between counterfactual thinking and meaning-making, but failed to reach significance in the current study.

One unexpected finding that warrants future exploration is the significant difference between the uncertainty prime and neutral prime condition in beliefs in free will. One explanation for this unexpected finding could be a failure of random

assignment to evenly distribute individual differences; however this is unlikely given that the other scales and individual differences did not differ across conditions. It is intriguing that counterfactual thinking mediated the relationship between the primes and free will. In Study 3 counterfactual thinking was found to mediate the relationship between subsequent information and fate-based judgments. Although there was not a significant difference in fate-based judgments between prime conditions in the current study, across conditions counterfactual thinking was positively correlated with both fate-based judgments and free will. This would seemingly suggest that counterfactual thinking increases fate-based judgments, which in turn may lead participants to attempt to assert their own control over their own lives by endorsing stronger beliefs in free will. Unfortunately, the data does not support this interpretation as there was no relationship between fate-based judgments and beliefs in free will. Future research will be needed to further understand the relationship between these three variables.

The goal of Study 6 was to demonstrate that being primed with uncertainty would lead to even higher levels of counterfactual thinking and that the increase in counterfactual thinking would provide meaning via fluid compensation for the threat of uncertainty. Although the first step of a functional interpretation was supported, the second step was only partially supported. Thus, one limitation to the current study was that no differences in fate-based judgments were found between the two conditions. One possible explanation for this may be because of a ceiling effect for the fate and meant to be dependent variables. The previous studies demonstrate that aspects of the story can be manipulated that influence fate-based judgments. The article used in Study 6 had the

highest means in fate-based judgments in each of the previous studies. Thus, a corresponding increase in fate-based judgments may not have been feasible. Although the null results suggest that the prime may not have been strong enough, the significant differences in counterfactual thinking between conditions when the article was the same in both conditions suggest that the prime did have an influence. Future research should explore other methods of priming uncertainty as well as indirect meaning threats that elicit fluid compensation. Research by Proulx and colleagues have found fluid compensation, the affirmation of alternative meaning frameworks, following such varied and novel meaning threats as perceptual anomalies (Proulx & Heine, 2008), absurdist literature (Proulx & Heine, 2009), and absurdist art (Proulx, Heine, & Vohs, 2010). Such manipulations may provide a means to threaten meaning without alerting the participant to the goals of the study.

General Discussion

Research on responses to trauma, victimization, and the loss of a loved one has demonstrated the importance of finding meaning for recovery and psychological well-being (Bulman & Wortman, 1977; Davis & Nolen-Hoeksems, 2001; Taylor, 1983). Janoff-Bulman and Frantz (1997) proposed a two-stage cognitive account of the process individuals take in the search for meaning. The first stage, meaning-as-comprehensibility, is marked by attempts to develop a comprehensible account of how the events are consistent with preexisting worldviews. However, some especially tragic events seem to defy comprehension and sense-making. The second stage, meaning-as-significance, involves identifying or constructing benefits from the experience. Although these two construals of meaning have been argued to be two independent processes (Davis et al., 1998), the current research sought to demonstrate that counterfactual thinking can bridge both construals of meaning.

Research on counterfactual thinking and meaning has traditionally focused on either the preparative function or affective function of counterfactual thinking, leading to disparate conclusions regarding the role counterfactual thinking plays in the meaning making process. Much of the research on counterfactual thinking and meaning-as-comprehensibility has focused on the preparative function of counterfactual thinking. In this line of research, counterfactual thinking focuses on upward counterfactuals that demonstrate preventability and how to undo the event. This type of counterfactual thinking may lead to identifying causes that may prevent a similar outcome in the future, but does little for providing meaning and often results in self-blame and poorer coping

(Davis et al., 1995). Research on the affective function of counterfactual thinking has demonstrated that downward counterfactual comparisons or simulations may be generated in order to make one feel better about one's circumstance (e.g., Markman, Gavanski, Sherman, & McMullen, 1993; Roese, 1994). In terms of meaning-as-significance, downward counterfactuals may provide one with an opportunity to identify personal growth or identify the "silver lining" in a negative experience by demonstrating how worse it could have been. The goal of the current research was to demonstrate how counterfactual thinking could serve a broader meaning-making function that provides explanatory coherence to a series of events which bridges both construals of meaning.

I proposed a model of retrospective reasoning in which the consideration of subsequent counterfactual events provides meaning as benefit finding while additionally providing meaning as sense making to a previously inexplicable outcome. Specifically, when faced with an unexpected or particularly disturbing event, one will be prone to engage in upward counterfactual thinking, reflecting on how the event could have turned out better. However, when this upward counterfactual focal event is followed by a subsequent downward counterfactual event, the consideration of the subsequent counterfactual provides meaning as benefit finding to the focal event by demonstrating how a worse subsequent event could have occurred if the more desirable upward counterfactual focal event had occurred. In addition to providing meaning as benefit finding, the subsequent downward counterfactual also is used to explain why the less desirable focal event had to occur, giving one the sense that *things happen for a reason*.

The first set of studies focused on the importance of subsequent information in eliciting retrospective reasoning; more specifically, the role of subsequent counterfactual thinking in eliciting fate-based judgments. Accordingly, Study 1 found that the generation of counterfactuals was positively correlated with the tendency to endorse fate-based judgments. Study 2a and 2b found that the presence of a counterfactual eliciting subsequent event spontaneously elicits words related to fate, purpose, and meaning, and that these words focus meaning-as-comprehensibility on an earlier focal event. Study 3 further demonstrated that the explanatory coherence created by counterfactual thinking is the result of counterfactuals mutating the relationship between consequent-subsequent events, rather than the more traditional antecedent-consequent relationship in which counterfactuals are typically explored. Combined, these studies also demonstrate a temporal aspect to finding meaning, such that events and experiences subsequent to a focal event are utilized in reasoning and meaning construction involved in processing earlier events.

Having demonstrated the role of subsequent counterfactual thinking in the meaning making process, the second set of studies identified contextual factors that render events conducive to the meaning making function of counterfactual thinking. Drawing on research demonstrating that unexpected events elicit more sense-making and motivation to generate explanations, Study 4 revealed that participants were less motivated to process and utilize subsequent events following an expected outcome than an unexpected outcome. Namely, although the same subsequent counterfactual events could have been employed to find meaning in BC's loss, when the outcome of the game

was expected, the impact of subsequent events was reduced. Study 4 also offered initial evidence that the meaning-making function of counterfactual thinking is not purely a cognitive process, but rather a desire to make sense or explain why a focal event occurred is necessary to initiate the retrospective reasoning process. Subsequent events may be used to construe meaning as benefit finding, however if there is no motivation to explain why the focal event occurred, then the impact of subsequent counterfactual events will be reduced.

Study 5 further supported a motivational component of the meaning-making function of counterfactual thinking by demonstrating the importance of meaning as benefit finding in creating a sense of explanatory coherence. Even though both conditions had the same contingency between outcome of the game and subsequent counterfactual events at the nightclub, Study 5 found that a subsequent upward counterfactual event does not provide the same explanatory coherence as a subsequent downward counterfactual event. A subsequent downward counterfactual implies that something worse would and should have happened had the focal event not occurred the way that it did, which imbues the focal event with meaning and purpose. However, a subsequent upward counterfactual event suggests that something better could and should have happened had the focal event not occurred the way that it did. In other words, it appears that the perception of divine intervention to cause good serves to make more sense than the perception of divine intervention to cause harm. Study 5 also demonstrated that participants' perceptions of fate and meaning are of a more fatalistic nature as opposed to the more colloquial expression regarding teams that "control their fate." The negative

relationship between control over the outcome of the game and fate-based judgments suggest that some external force influenced the outcome of the game. In other words, not only did the game turn out the way it did, but the players were powerless in affecting any other outcome.

Having demonstrated the role of counterfactual thinking in meaning-making, as well as event factors that make events particularly amenable to the counterfactual meaning-making process, Study 6 was designed to focus on providing evidence for a functional interpretation of the counterfactual meaning-making process. There was direct support that a meaning threat elicited more counterfactual thinking. Additionally, Study 6 offered indirect support that this increase in counterfactual thinking led to an increase in fate-based judgments. These results offer initial evidence that the relationship between counterfactual thinking and meaning found in the previous studies fits a functional interpretation of the counterfactual thinking process.

Although the current research is not the first to propose a link between counterfactual thinking and meaning-making, it is the first to empirically demonstrate that the consideration of counterfactuals of subsequent events can lead to perceptions of fate and predeterminism (c.f., Davis et. al., 1996; Kray et al., 2010). Davis and colleagues have demonstrated that upward counterfactual thinking following trauma or the loss of a loved one leads to perceptions that it was preventable (Davis et. al., 1995; Davis et. al., 1996). In this role, counterfactual thinking has a negative relationship to meaning and determinism. This negative relationship is evident in the self-blame that follows the upward counterfactual thinking that demonstrates the past was avoidable and could have

been better. Outside the realm of trauma, Kray et al. 2010 found a positive relationship between counterfactual thinking and personal meaning and fate. Kray et al. (2010) proposed a *defying the odds* account by which counterfactual thinking serves to highlight the improbability of life events and finding meaning and perceiving fate amounts to a rejection of counterfactual possibilities. From this perspective, counterfactual thinking plays an indirect role in creating meaning, in which counterfactuals serve to demonstrate the indeterminacy of events and requires the individual to override the implications of the counterfactuals and conclude that events are the product of fate.

The results of the current studies support a different and more direct relationship between counterfactual thinking and fatalistic views. An upward counterfactual of a focal event leads to the consideration of a downward counterfactual regarding a subsequent event. The downward counterfactual provides meaning as benefit finding by demonstrating that something worse could have happened had the focal event turned out better. Rather than use traditional antecedent-consequent causal analysis to account for the focal outcome, the current studies demonstrated that people will make use of the downward subsequent counterfactual to explain why the focal outcome occurred. The counterfactuals generated are serving a meaning-making function that answers existential questions of *why* an event occurred, rather than a more causal analysis of *how* the event occurred. Although this process amounts to embracing the downward counterfactual, it also suggests a rejection of counterfactual alternatives of the focal event, as evidenced by the endorsement of fate-based judgments as well as reductions in perceived control over

the outcome of the game. Assumed in this process is a motivation to explain the outcome of events in a manner consistent with pre-existing worldviews.

Embracing vs. Inhibiting Counterfactuals

Evidence for the motivated rejection of upward counterfactuals has been found in the research on *Retroactive Pessimism* by Tykocinski and colleagues (Tykocinski, 2001; Tykocinski, Pick, & Kedmi, 2002; Tykocinski & Steinberg, 2005). Retroactive pessimism is a motivated form of hindsight bias in which people seek to minimize the sting of disappointment by shifting perceived probabilities of the outcome, after the outcome is known, such that the outcome appears inevitable and easier to accept. Tykocinski and Steinberg (2005) suggest that one way people engage in retrospective pessimism is by inhibiting the consideration of upward counterfactuals. Tykocinski and Sternberg (2005) found that a near missed goal was considered retrospectively to be even less likely to have been successfully achieved than a goal that was a far miss, and this difference was found to be mediated by the generation of fewer upward counterfactuals as well as lower probability of those counterfactuals. Further evidence for a motivational explanation for retroactive pessimism was found in earlier work by Tykocinski and colleagues demonstrating that the effect of retroactive pessimism can be attenuated when the loss is not personal or when the disappointment was mitigated by future opportunity (Tykocinski, Pick, & Kedmi, 2002). Although the current studies were of a non-personal historical nature, they did involve aspects of life and death and may still have been motivating to participants to make a coherent narrative of the events. Drawing on the work of Tykocinski and Sternberg (2005), future research on the meaning-making

function of counterfactual thinking should further explore the proposed pairing of embracing of subsequent counterfactuals and the inhibition of antecedent counterfactuals, as well as the motivation some may have to see events as fated.

In addition to situational motivations, the inhibition or unwillingness to consider certain counterfactuals has been found to be determined by one's theoretical orientation (Tetlock, 1998; Tetlock & Visser, 2000), religious views (Tetlock, Kristel, Elston, Green, & Lerner, 2000), and existing attitudes (Crawford & McCrea, 2004). Tetlock (1998) demonstrated that experts of diplomatic and military history rejected counterfactuals that challenged their theoretical orientation of historical events, which led Tetlock to suggest that people use counterfactual reasoning to bolster existing belief systems. Similarly, Tetlock and Visser (2000) found that experts on the Soviet Union judged the plausibility of counterfactual statements regarding Russian history according to political ideology. Further demonstrating that attitudes and beliefs influence the acceptability of certain counterfactuals, Tetlock and colleagues found that Christian Fundamentalists rejected counterfactuals that applied acceptable causal schemata of everyday events to the life of Christ (Tetlock, Kristel, Elston, Green, & Lerner, 2000). There was no relationship between fundamentalism and the acceptability of an antecedent and the antecedent-consequent linkage of counterfactuals when applied to secular counterfactuals. However when the same causal schemata were applied to aspects of the life of Jesus described in the Bible, such as "If Jesus had not chosen Judas as one of his 12 disciples, Jesus would not have been betrayed or crucified," fundamentalist were more likely to challenge the mutability of the antecedent and the soundness of the antecedent-consequent linkage,

display more disgust, and more prone to penalize those who entertain such counterfactuals (Tetlock, Kristel, Elston, Green, & Lerner, 2000). Crawford and McCrea (2004) found that the biasing effects of existing attitudes are not limited to the rating and judging of counterfactual statements, but rather can bias the generation of both the content and quantity of counterfactual statements. In addition to motivating factors of a given situation, this research also demonstrates that individual differences can bias the consideration of counterfactuals.

Counterfactuals, Free will, and Determinism

Throughout the current studies, I have argued that counterfactual thinking can serve a meaning-making function. However, this is not intended to imply that counterfactual thinking will always lead to a deterministic or even fatalistic view. Rather, when faced with an unexpected outcome, a traumatic event, or a meaning threat, counterfactual thinking can be used to find meaning-as-significance and meaning-as-comprehensibility. Counterfactual thinking has been found to both reduce and enhance the creeping determinism of the hindsight bias depending on the goals of the individual, whether one wanted to consider how the event could have turned out differently or explain how it happened the way that it did (Fischhoff, 1976; Roese & Maniar, 1997; Roese & Olson, 1996; Slovic & Fischhoff, 1977). The relationship between counterfactual thinking and fate-based judgments is likely no different. It appears that counterfactual thinking that explores “*why*” questions may enhance deterministic views whereas counterfactual thinking that explores “*how*” questions may reduce determinism. Baumeister and colleagues have argued that the presence of counterfactual thinking may

aid in the understanding and exploration of free-will (Alquist & Baumeister, 2008; Baumeister, Crescioni, & Alquist, 2010). Baumeister, Crescioni, and Alquist (2010) argue that from the standpoint that free will is essentially the belief that one could act differently, then counterfactual thinking is inherently linked to free-will. Alquist, Daly, Stillman, & Baumeister (2009) induced participants to either believe in free will or the absence of free will and had them recall a time in their life when they hurt someone and list up to 10 things they could have done to produce a different outcome. Participants in the no free-will condition generated fewer counterfactuals than those in the free-will condition. Whether the difference in counterfactual generation is the result of philosophical reasoning in the no free-will condition or a change in motivation remains to be determined, but the results suggest that a lack of free will means there were less alternative actions to take. The difference in whether counterfactual thinking will lead to perceptions of free will or determinism will, similar to the hindsight bias, likely be determined by the goals or function that the counterfactuals are serving.

Future Research

The current research focused on demonstrating the meaning-making function of counterfactual thinking by proposing a model of retrospective reasoning in which past events are re-evaluated with respect to subsequent events. A more complete model of the meaning-making function of counterfactual thinking may contain both *retrospective* and *prospective* reasoning. Future research may explore how attempts to find meaning in past events through counterfactual thinking influence the expectations regarding the outcomes of future events. The influence of counterfactual thinking on future expectations could be

a process similar to the gambler's fallacy (Tune, 1964) or the conjunction fallacy (Tversky & Kahneman, 1983). The gambler's fallacy is typically the result of people thinking that streaks in a random sequence will be shorter than they are (Oskarsson, Van Boven, McClelland, & Hastie, 2009). Specifically people believe that the probability of flipping a coin and landing on heads increases above .5 if following three successive tails. The conjunction fallacy is typically demonstrated when people assign a higher probability to the joint occurrence of two events than the probability of either of the events separately. In this line, counterfactual thinking could be used to identify probabilities of independent events and influence the perceived likelihood of some other future event. Potentially a series of improbable events, as determined by counterfactual thinking, could make a future event be perceived as more probable. Whether viewed as a string of events (e.g., gambler's fallacy) or the joint occurrence of improbable events (e.g., conjunction fallacy) counterfactual thinking could suggest that future events will happen because fate is on one's side.

Previous research with trauma victims and individuals coping with the loss of a loved one have demonstrated that cognitive appraisals that lead to concluding the event was inevitable, fated, or predetermined demonstrate better psychological adjustment (Bulman & Wortman, 1977; Davis et al. 1998). Drawing heavily on this research, the current studies demonstrated how counterfactual thinking could serve a meaning making function. One limitation of the current studies was the reliance on vignettes for materials and college students for participants. While this was a limitation, it also provided the most flexibility in the manipulation of factors to explore the conditions under which

events are particularly amenable to the counterfactual meaning-making process.

Additionally, by selecting a historical event that was not self-relevant, the current studies were able to explore the meaning-making process while reducing the influence of personal motivation.

With the importance of subjective interpretation of traumatic events, Currier et al. (2006) suggested the structuring of interventions towards meaning-making and encouraged therapies that feature meaning-making as the primary goal. Although the current research demonstrated how counterfactual thinking could aid in the creation of meaning, this meaning was of a fatalistic nature. Even though this type of meaning has been found to be positively related to psychological well-being and coping (Davis et al. 1998), recent research on perceptions of determinism and free-will suggest caution is warranted before advocating for the construction of this type of meaning. For example, Vohs and Schooler (2008) found that reducing beliefs in free will by having participants read an article on genetic determinism led to an increase in cheating behavior. Additionally, Baumeister, Masicampo, and DeWall (2009) suggest that a lack of belief in free will is associated with decreases in helping behavior, increases in aggression, and a general decrease in pro-social behavior. Baumeister, Crescioni, & Alquist (2010) propose that the connection between disbelief in free will and antisocial behavior is the lack of moral responsibility that a sense of fatalism produces. Stillman and Baumeister (2008) found that reducing beliefs in free will led participants to express less guilt regarding past transgressions, and that making people feel guilty reduced their endorsement of beliefs in free will. Thus, although research suggests that imbuing external meaning to an event

may lead to better coping and psychological well being, manipulating the construction of meaning through counterfactual thinking may also lead to negative and somewhat unexpected consequences to how one acts in the future.

Coda

Traditionally counterfactuals have been explored in the objective realm in which counterfactuals serve to identify causal antecedents to focal events. However, objective causal explanations may be insufficient to account for why an event occurred. The current research was designed to demonstrate how counterfactual thinking could serve a meaning-making function and explore the mechanisms underlying this function. The current studies demonstrated that counterfactual thinking can serve a meaning-making function by instilling an unexpected outcome with meaning. Apart from spontaneous counterfactuals that occur immediately after an event, the mental simulation of past events is afforded the luxury of placing the event in the context of antecedent as well as subsequent events. Furthermore, these studies demonstrated the importance of subsequent counterfactual events in the creation of meaning through a retrospective reasoning process. In addition, these studies also provided support for a motivated account of the meaning-making function. It was found that subsequent counterfactuals will be utilized to the extent that they are needed to explain a focal event, as well as to the extent that it provides meaning consistent with pre-existing worldviews. More importantly, this research suggests that counterfactual thinking may be a useful tool in creating satisfactory answers to the question of why an event occurred, leading one to conclude that “things happen for a reason.”

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Appendix A: Study 1 Story

In 1942, the undefeated Boston College (9-0) football team was set to finish their season against in-state rival Holy Cross (4-4-1). Records, however, don't mean much when it comes to a rivalry as long, as spirited and as contentious as the rivalry between Boston College and Holy Cross. One game, saved for the end of the season, could make up for whatever shortcomings a team committed the rest of the season. Much the way it does in such other cherished rivalries as Harvard- Yale and Red Sox-Yankees.

Boston College began facing off against Holy Cross in football in 1896, and the contest became an annual event in 1920. Even today, mere mention of the rivalry can touch off animated discussion and heated debate.

Part of the intensity back in the 1940s had to do with the fact that "Holy Cross looked down on Boston College," explained William Commene, a fullback on the '42 Eagles squad. "BC was a small day school started by immigrants to teach their sons. Holy Cross was a boarding school, serving the elite."

The face-off in 1942 spawned even more interest and hype -- partly because it took place just a year after the United States declared war against Germany and Japan. A war that most players from both schools were about to join and that had Americans here and elsewhere drawing their shades at night, pinching their pennies and looking to a big football game like this as a momentary diversion from the upheaval around them. Many insist the Boston College squad of 50 years ago, with its unyielding defense and unstoppable attack, was the best ever assembled at the Jesuit school.

Consider Boston College's record going into the traditional season-ender against Holy Cross: It had edged powerhouses such as Clemson and the North Carolina Naval Flight School and slaughtered teams such as West Virginia, Wake Forest, Fordham and Georgetown. All told, Boston College outscored opponents, 249-19, posted shutouts in five of its eight contests and surrendered an average of just 29 yards per game.

Holy Cross, by contrast, neared the end of its season with a 4-4-1 record. Each of its wins were shutouts, but it also lost to four mediocre teams and hadn't cracked the national rankings.

Then there were the rumors, ripe even as the game got under way at Fenway Park, that nailing down a win against Holy Cross would ensure Boston College a place at the all-important Sugar Bowl, and with it a chance for Boston College's first national title. And, with odds makers favoring Boston College 4-1, Eagles fans were already planning their New Year's trip to New Orleans. However, the game did not proceed as odds makers predicted.

Holy Cross manhandled Boston College's vaunted defense, running over and around its linemen and peppering its secondary with passes. It got on the board first with a 48-yard drive, capped by a 1-yard plunge by fullback Bobby Sullivan, and ran the score to 55-6 before Boston College managed their second touchdown.

While Holy Cross repeatedly made its tackles stick, Boston College had to gang up on Crusader runners to bring them down. And while Holy Cross proudly showed off its new single-wing offense, Boston College's highly-touted T-formation didn't give the Boston College fans in the sellout crowd of 41,350 much reason to cheer. By the end of the game Boston College was defeated by Holy Cross by a score of 55-12.

Some attributed the win to the shrewd strategy of Holy Cross coach Ank Scanlan; others blamed lapses in Boston College's planning and preparation. Whatever the reason, the result, as Globe sportswriter Jerry Nason wrote the next day, was that Holy Cross played the kind of football Boston College had been playing all season long. And vice versa.

The loss to Holy Cross ruined Boston College's plans to celebrate an undefeated season. The team had reserved tables for the entire team at the most popular nightclub in Boston, the Cocoanut Grove. Following the defeat, none of the Boston College players or staff members felt like celebrating, much less going to the Cocoanut Grove for the end of the season party, where the team had planned on celebrating an undefeated season. Rather, the team decided to change plans and have the team meet up at a smaller and more private venue, The Savoy nightclub on Shawmut Street.

The evening was chilly in Boston, but that didn't stop about 1,000 partygoers from jamming into the Cocoanut Grove nightclub. By 10 p.m., there were more than 1,000 people in the first-floor Cocoanut Grove nightclub and basement-level Melody lounge. Less than an hour later, 492 of them would be dead and 166 injured in a fire that started in the Melody lounge, ostensibly after a busboy lit a match as he tried to replace a light bulb in an artificial palm tree.

No Boston College players went to the Cocoanut Grove that night, and the next morning all of the players were alive to read in the newspaper about the fire that had broken out at the Cocoanut Grove, killing almost 500 people.

Appendix B: Study 2a Story Materials

Counterfactual condition ending:

The evening was chilly in Boston, but that didn't stop about 1,000 partygoers from jamming into the Cocoanut Grove nightclub. By 10 p.m., there were more than 1,000 people in the first-floor Cocoanut Grove nightclub and basement-level Melody lounge. Less than an hour later, 492 of them would be dead and 166 injured in a fire that started in the Melody lounge, ostensibly after a busboy lit a match as he tried to replace a light bulb in an artificial palm tree.

No Boston College players went to the Cocoanut Grove that night, and the next morning all of the players were alive to read in the newspaper about the fire that had broken out at the Cocoanut Grove, killing almost 500 people.

Control condition ending:

No Boston College players went to the Cocoanut Grove that night. Despite the loss of business from BC players and fans, the Cocoanut Grove was still filled to capacity. The evening was chilly in Boston, but that didn't stop about 1,000 partygoers from jamming into the Cocoanut Grove nightclub on Shawmut Street. By 10 p.m., there were more than 1,000 people in the first-floor Broadway lounge and basement-level Melody lounge.

Appendix C: LIWC Custom Dictionary

Fate, destiny, purpose, meaning, karma, fortune, chance, providence, luck, vocation, fortu*, reason, happen*, unpredictable, coincid*, luck*, mirac*

Appendix D: Study 4 Story Materials

Boston College Unexpected Loss:

In 1942, the undefeated Boston College (9-0) football team was set to finish their season against in-state rival Holy Cross (4-4-1). Records, however, don't mean much when it comes to a rivalry as long, as spirited and as contentious as the rivalry between Boston College and Holy Cross. One game, saved for the end of the season, could make up for whatever shortcomings a team committed the rest of the season. Much the way it does in such other cherished rivalries as Harvard- Yale and Red Sox-Yankees.

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While Holy Cross repeatedly made its tackles stick, Boston College had to gang up on Crusader runners to bring them down. And while Holy Cross proudly showed off its new single-wing offense, Boston College's highly-touted T-formation didn't give the Boston College fans in the sellout crowd of 41,350 much reason to cheer. By the end of the game Boston College was defeated by Holy Cross by a score of 55-12.

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The loss to Holy Cross ruined Boston College's plans to celebrate an undefeated season. The team had reserved tables for the entire team at the most popular nightclub in Boston, the Cocoanut Grove. Following the defeat, none of the Boston College players or staff members felt like celebrating, much less going to the Cocoanut Grove for the end of the season party, where the team had planned on celebrating an undefeated season. Rather, the team decided to change plans and have the team meet up at a smaller and more private venue, The Savoy nightclub on Shawmut Street.

The evening was chilly in Boston, but that didn't stop about 1,000 partygoers from jamming into the Cocoanut Grove nightclub. By 10 p.m., there were more than 1,000 people in the first-floor Cocoanut Grove nightclub and basement-level Melody lounge. Less than an hour later, 492 of them would be dead and 166 injured in a fire that started in the Melody lounge, ostensibly after a busboy lit a match as he tried to replace a light bulb in an artificial palm tree.

No Boston College players went to the Cocoanut Grove that night, and the next morning all of the players were alive to read in the newspaper about the fire that had broken out at the Cocoanut Grove, killing almost 500 people.

Boston College Expected Loss:

In 1942, the undefeated Holy Cross (9-0) football team was set to finish their season against in-state rival Boston College (4-4-1). Records, however, don't mean much when it comes to a rivalry as long, as spirited and as contentious as the rivalry between Holy Cross and Boston College. One game, saved for the end of the season, could make up for whatever shortcomings a team committed the rest of the season. Much the way it does in such other cherished rivalries as Harvard- Yale and Red Sox-Yankees.

Holy Cross began facing off against Boston College in football in 1896, and the contest became an annual event in 1920. Even today, mere mention of the rivalry can touch off animated discussion and heated debate.

Part of the intensity back in the 1940s had to do with the fact that "Holy Cross looked down on Boston College," explained William Commene, a fullback on the '42 Eagles squad. "BC was a small day school started by immigrants to teach their sons. Holy Cross was a boarding school, serving the elite."

The face-off in 1942 spawned even more interest and hype -- partly because it took place just a year after the United States declared war against Germany and Japan. A war that most players from both schools were about to join and that had Americans here and elsewhere drawing their shades at night, pinching their pennies and looking to a big football game like this as a momentary diversion from the upheaval around them.

Many insist the Holy Cross squad of 50 years ago, with its unyielding defense and unstoppable attack, was the best ever assembled at the Jesuit school.

Consider Holy Cross' record going into the traditional season-ender against Boston College: It had edged powerhouses such as Clemson and the North Carolina Naval Flight School and slaughtered teams such as West Virginia, Wake Forest, Fordham and Georgetown. All told, Holy Cross outscored opponents, 249-19, posted shutouts in five of its eight contests and surrendered an average of just 29 yards per game.

Boston College, by contrast, neared the end of its season with a 4-4-1 record. Each of its wins were shutouts, but it also lost to four mediocre teams and hadn't cracked the national rankings.

Then there were the rumors, ripe even as the game got under way at Fenway Park, that nailing down a win against Boston College would ensure Holy Cross a place at the all-important Sugar Bowl, and with it a chance for Holy Cross' first national title. And, with odds makers favoring Holy Cross 4-1, fans were already planning their New Year's trip to New Orleans.

Holy Cross manhandled Boston College's vaunted defense, running over and around its linemen and peppering its secondary with passes. It got on the board first with a 48-yard drive, capped by a 1-yard plunge by fullback Bobby Sullivan, and ran the score to 55-6 before Boston College managed their second touchdown.

While Holy Cross repeatedly made its tackles stick, Boston College had to gang up on Crusader runners to bring them down. And while Holy Cross proudly showed off its new single-wing offense, Boston College's touted T-formation didn't give the Boston College fans in the sellout crowd of 41,350 much reason to cheer. By the end of the game Boston College was defeated by Holy Cross by a score of 55-12.

Some attributed the win to the shrewd strategy of Holy Cross coach Ank Scanlan; others blamed lapses in Boston College's planning and preparation. Whatever the reason, the result, as Globe sportswriter Jerry Nason wrote the next day, was that Holy Cross played the kind of football Holy Cross had been playing all season long.

The loss to Holy Cross ruined Boston College's plans to celebrate the end of the season. The team had reserved tables for the entire team at the most popular nightclub in Boston, the Cocoanut Grove. Following the defeat, none of the Boston College players or staff members felt like celebrating, much less going to the Cocoanut Grove for the end of the season party, where the team had planned on celebrating the end of the season. Rather, the team decided to change plans and have the team meet up at a smaller and more private venue, The Savoy nightclub on Shawmut Street.

The evening was chilly in Boston, but that didn't stop about 1,000 partygoers from jamming into the Cocoanut Grove nightclub. By 10 p.m., there were more than 1,000 people in the first-floor Cocoanut Grove nightclub and basement-level Melody lounge. Less than an hour later, 492 of them would be dead and 166 injured in a fire that started in the Melody lounge, ostensibly after a busboy lit a match as he tried to replace a light bulb in an artificial palm tree.

No Boston College players went to the Cocoanut Grove that night, and the next morning all of the players were alive to read in the newspaper about the fire that had broken out at the Cocoanut Grove, killing almost 500 people.

Appendix E: Study 5 Story Materials

Upward Counterfactual Condition:

The loss to Holy Cross ruined the team's plans to celebrate an undefeated season. The players had reserved tables for all the players and staff at the most popular nightclub in Boston, The Savoy. Following the defeat, no Boston College player or staff member felt like celebrating, much less going to The Savoy for the end of the season party, where the team had planned on celebrating an undefeated season. Rather, the players as a whole decided to change plans and have the team meet up at a smaller and more private venue, the basement-level Melody Lounge that was below the larger Cocoanut Grove nightclub on Shawmut Street.

The evening was chilly in Boston, but that didn't stop about 1,000 partygoers from jamming into the Cocoanut Grove nightclub. By 10 p.m., there were more than 1,000 people in the first-floor Cocoanut Grove nightclub and basement-level Melody lounge. Less than an hour later, 492 of them would be dead and 166 injured in a fire that started in the Melody lounge, ostensibly after a busboy lit a match as he tried to replace a light bulb in an artificial palm tree.

No Boston College player made it out in time. The next morning, the newspaper headlines were about the fire that had broken out at the Cocoanut Grove, killing almost 500 people, many of whom were the Boston College players and staff that had been trapped in the Cocoanut Grove.

Downward Counterfactual Condition:

The loss to Holy Cross ruined the team's plans to celebrate an undefeated season. The players had reserved tables for all the players and staff at the most popular nightclub in Boston, the Cocoanut Grove. Following the defeat, no Boston College player or staff member felt like celebrating, much less going to the Cocoanut Grove for the end of the season party, where the team had planned on celebrating an undefeated season. Rather, the players as a whole decided to change plans and have the team meet up at a smaller and more private venue, The Savoy nightclub on Shawmut Street.

The evening was chilly in Boston, but that didn't stop about 1,000 partygoers from jamming into the Cocoanut Grove nightclub. By 10 p.m., there were more than 1,000 people in the first-floor Cocoanut Grove nightclub and basement-level Melody lounge. Less than an hour later, 492 of them would be dead and 166 injured in a fire that started in the Melody lounge, ostensibly after a busboy lit a match as he tried to replace a light bulb in an artificial palm tree.

No Boston College players went to the Cocoanut Grove that night, and the next morning all of the players were alive to read in the newspaper about the fire that had broken out at the Cocoanut Grove, killing almost 500 people.

Appendix F: Uncertainty and Neutral Puzzle Primes

Uncertainty Prime

c	e	r	m	i	n	i	a	t	u	r	i	z	e
b	e	w	i	l	d	e	r	e	d	e	e	u	u
o	m	y	s	t	i	f	i	e	d	d	o	r	u
u	i	m	i	s	t	u	d	i	e	d	d	i	n
n	s	i	n	c	o	n	c	l	u	s	i	v	e
c	t	r	t	p	i	s	u	u	a	t	e	p	x
e	a	r	e	r	m	u	n	e	i	u	t	e	p
r	k	o	r	o	r	r	d	a	b	m	u	r	l
t	e	r	p	d	e	e	e	s	i	p	a	p	a
a	n	e	r	u	p	i	c	k	l	e	d	l	i
i	n	d	e	c	i	s	i	v	e	d	e	e	n
n	d	i	t	e	l	p	d	o	u	b	t	x	e
x	e	i	i	u	n	r	e	s	o	l	v	e	d
c	o	n	f	u	s	e	d	o	c	e	t	d	i

mirrored
 perplexed
 undecided
 mystified
 stumped
 pickled
 mistaken
 unexplained
 misinterpret
 bewildered

unsure
 uncertain
 studied
 unresolved
 confused
 produce
 doubt
 indecisive
 miniaturize
 inconclusive

Neutral Prime

p	b	r	o	u	g	h	t	c	o	l	u	m	n
r	o	r	l	m	u	n	l	i	m	i	t	e	d
o	p	h	c	o	n	v	e	r	g	e	i	a	l
d	i	s	h	e	d	f	l	o	w	e	r	n	e
u	n	a	l	t	e	r	e	d	r	i	e	d	v
c	m	o	d	e	r	n	i	z	e	d	d	e	z
e	d	b	m	a	n	e	u	v	e	r	p	r	e
u	d	o	n	h	e	m	i	r	r	o	r	e	d
n	r	u	k	h	a	p	i	c	k	l	e	d	e
m	i	n	i	a	t	u	r	i	z	e	l	d	e
o	l	c	c	l	h	r	i	n	o	u	o	v	m
r	l	e	o	e	i	d	d	e	l	r	a	e	e
c	g	d	r	r	b	l	o	o	m	e	d	i	n
e	e	u	n	u	z	e	d	d	r	e	d	e	c

converge

flower

pickled

bounced

preload

underneath

mirrored

dished

column

miniaturize

unaltered

maneuver

drill

modernized

bloomed

produce

brought

unlimited

meandered

dried