Written in the Stars or Just a Coincidence?:

Self-Construal Predicts

Gender Differences in FateCognition

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Abstract

We adopted a social cognitive approach to understand a gender difference in the tendency to attribute life events to fate. We predicted that women’s relatively interdependent self-construal results in a greater recognition of the social purpose underlying life events, which leads women more than men to attribute life events to fate. We discovered that women attribute life events more to fate than do men (Studies 1-2). Consistent with the interdependent fate hypothesis, interdependent life events were more likely to be attributed to fate than independent life events, particularly for women (Study 2). Belief in fate (e.g. teleological, purpose-driven explanations for life events) mediated the gender difference in fate attributions, apart from two known predictors of fate attributions (belief in God and causal complexity) (Study 3). Women’s relatively interdependent self-construal partially mediated the gender difference in fate cognition (Studies 4-5). Social status, another form of interdependence, also predicted fate cognition (Study 4). This tendency was particularly evident for men, whose self-construal is especially tied to their standing in social hierarchies. Our final study manipulated the salience of interdependence as a cause of life events, which in turn heightened fate cognition among both women and men (Study 5). Overall, the evidence suggests that gender differences in fate attribution emerge out of how the self is defined in relation to others.
Written in the Stars or Just a Coincidence?: Self-Construal Predicts Gender Differences in Fate Cognition

*Jamal Malik is one question away from winning 20 million rupees. How did he do it? (A) He cheated, (B) He’s lucky, (C) He’s a genius, and (D) It is written.*
--Slumdog Millionaire, 2008

In the opening scene of the critically acclaimed film, a title card appears on the screen to raise the possibility that fate has intervened to guarantee that an uneducated orphan from the slums of Mumbai will defy the odds and become a game show champion. Throughout the film, the possibility that Jamal’s quest would end in failure looms large. Ultimately, the sheer improbability of his success suggests the universe conspired to provide a set of questions that he was uniquely suited to answer. In so doing, Jamal was reunited with Latika, his first and only true love, fulfilling his romantic destiny. Viewers are left with the sense that something so improbable could not have happened by chance alone, and that the underdog’s fate must have been written in the stars. Indeed, the film’s immense popularity may well derive from its universally appealing storyline: Seemingly random and disconnected events are, in some unfathomable sense, influenced by fate.

Fate may be defined as an impersonal, supernatural force that pre-determines significant aspects of a person’s life (Pepitone & Saffioti, 1997). According to Greek mythology, the Fates were three elderly, supernatural women who created a person’s destiny at birth, determining particular life events to be experienced, and when and how death would occur (Bargdill, 2006). Across time, fate has proven to be an enduring multidisciplinary concept. Theologians, mythologists, philosophers, psychologists, biologists, and physicists alike have pondered how fate permeates existence. Fate
provides an explanation for the otherwise mysterious workings of human fortune – why bad things happen to good people, and vice versa.

Fate attributions are important because they predict beliefs of meaning in life, defined as a belief in the coherence, significance, and purpose of life in general (Heintzelman & King, 2014; Steger, Frazier, Oishi, & Kaler, 2006; Waytz, Hershfield, & Tamir, 2014). For example, manipulations of counterfactual simulations of past events (e.g., “I might easily have missed meeting my one true love”) heightened a sense of meaning in life events, and fate perceptions mediated this effect (Kray, George, Liljenquist, Galinsky, Tetlock, & Roese, 2010; see also Ersner-Hershfield, Galinsky, Kray, & King, 2010; Galinsky, Liljenquist, Kray, & Roese, 2005; Kray, Hershfield, George, & Galinsky, 2013; McAdams, 2004). People are especially likely to attribute life events that are seen as both important and improbable (Norenzayan & Lee, 2010; Pepitone & Saffiotti, 1997). Three quarters of American undergraduates claimed a belief in fate (Burrus & Roese, 2006), suggesting fate is a pervasive aspect of social perception. Even people who disavow the notion of fate are reluctant to tempt it by taking unnecessary risks or behaving with hubris (Risen & Gilovich, 2008). Thus, whether explicitly acknowledged or not, the notion of fate permeates lay causal explanation.

Attributing life events to fate need not imply unalterable predetermination. In fact, fate and personal agency are often perceived to be dual forces influencing life events in a complexly intertwined dance (Au et al., 2011, 2012; Burrus & Roese, 2006; Norenzayan & Lee, 2010; Young, Morris, Burrus, Krishnan, & Reggi, 2011). Norenzayan and Lee (2010) found that fate attributions are not simply a byproduct of an external locus of control (Rotter, 1966) and, as such, need not imply a fatalistic attitude. In fact,
supernatural explanations for life events often coexist alongside natural explanations (Legare, Evans, Rosengren, & Harris, 2012), negating the idea that supernatural beliefs are somehow a rejection of rational, scientific explanations for life events. Fate attributions may reflect an appreciation for the complex set of life events beyond an individual’s control influencing important life events.

The present research explores two interrelated aspects of fate cognition. Fate attributions refer to the belief that specific life events were influenced by fate. Fate attributions can be contrasted with chance attributions, which reflect the belief that life events simply result from a random convergence of multiple independent elements (Norenzayan & Lee, 2010; Pepitone & Saffioti, 1997). Belief in fate refers to the endorsement of a general fate-based framework that is inherently teleological (i.e. life events have underlying purpose and meaning). Teleological explanations imply that a life event happened for a reason caused by a non-human force beyond the individual’s control (Bering, 2002; Heywood & Bering, 2013). A teleological explanation for why Jamal won the game show might be because Latika was destined to find him; a non-teleological explanation would be that he won because he knew the answers to the questions posed. Waytz, Hershfield, and Tamir (2014) used a similar approach to examine effects of mental simulation on event-specific versus general conceptions of meaning in life. Here, by examining both event-specific versus general belief in fate, we test whether gender differences in fate attributions emerge because men and women differ in the degree to which life events are assumed a priori to have underlying purpose (i.e., belief in fate).

Building on past research suggesting features of life events trigger attributions to fate (Pepitone & Saffioti, 1997), the current research examines whether the degree of
interdependence characterizing life events influences fate cognition. For example, a man who is suddenly reunited with his long lost twin brother while on a vacation in a foreign country is thought to be touched by the hands of fate (Pepitone & Saffiotti, 1997). Because establishing and maintaining stable and strong interpersonal relationships is a fundamental human motive (Baumeister & Leary, 1995; Bowlby, 1969, 1973; Epstein, 1991; Kenrick, Griskevicius, Neuberg, & Schaller, 2010; Maslow, 1943; Maslow, 1968; McClelland, 1951), life events that shed light on important social connections, such as those involving pivotal moments affecting relationships with family members and romantic partners, may be particularly likely to activate fate cognition. As in the *Slumdog Millionaire* example, in which fate is interwoven into a movie’s plotline to bring two “soul mates” together, life events with implications for individuals’ most valued social connections may be particularly likely to be attributed to fate. We refer to this as the *interdependent fate hypothesis*.

**Gender Differences in Belief in Interdependent Fate**

If the degree of interdependence characterizing life events predicts fate attributions, as we have theorized, then individuals who are chronically disposed to filtering the social world through the lens of interdependence may be particularly prone to attributing life events to fate. Given gender differences in how the self is defined in relation to others (Cross & Madsen, 1997; Baumeister & Sommers, 1997), women may be more prone than men are to attributing life events to fate. We propose that self-construal (i.e. whether the self is conceived in independent versus interdependent terms) affects the perceived role of fate in causing life events to happen as they do, leading women to attribute more life events to fate than men do.
Self-construal provides for the individual an interpretive framework to make sense of life events (Greenwald & Pratkanis, 1984; Higgins, 1996; Kilstrom & Cantor, 1984; Markus, 1977; Markus & Conner, 2013; Markus & Wurf, 1987). Markus and Kitayama (1991) first identified two distinct self-construals to emerge from cultural beliefs about agency. In collectivistic cultures, the self is conceptualized as part of a larger whole that includes significant others and groups. In individualistic cultures, the self is experienced as relatively more autonomous and agentic. Brewer and Gardner (1996) offered a further distinction in which the interdependent self is broken out into relational (i.e., close personal relationships, especially dyadic connections to romantic partners and family relations) versus collective (i.e., connections with larger groups, such as employment-based, interest-based, and ethnic or religious groups) components.

Cross and Madsen (1997) applied this framework to gender, arguing that, even within a given culture, social, institutional, and cultural practices promote men’s independence and women’s interdependence. From a young age, for example, girls within the US culture are socialized towards forming and maintaining close relationships whereas boys are socialized towards dominance and competition (Maccoby, 1990; Maccoby & Jacklin, 1974). An interdependent self-construal defines the self by relationships, connectedness, and the pursuit of harmony with others. By contrast, an independent self-construal defines the self on the basis of unique characteristics that distinguish the self from others, by demonstrating uniqueness and dominance (Cross & Madsen, 1997; Markus & Kitayama, 1991). As a result, women tend to be more interdependent in their self-construals than are men (Cross & Madson, 1997; Gabriel & Gardner, 1999; Gardner, Gabriel, & Lee, 1999) and men’s interdependence hinges
particularly on their status in hierarchical groups rather than their close relationships (Baumeister & Sommers, 1997).

Self-construal influences a host of relational cognitions. By directing attention, this social filter influences how information is encoded and stored in memory (Cross, Morris, & Gore, 2002; Sedikides, Olsen, & Reis, 1993; Dean & Gardner, 2014; Gardner, Pickett, & Brewer, 2000). An interdependent self-construal predicts a positive association with relationship-relevant words and a tightly organized cognitive network of relationship terms (Cross et al., 2002), suggesting it may heighten awareness of signs of interdependence in the social world. Individuals with an interdependent self-construal may be prone to noticing fate’s role in life because they focus more attention towards social relationships than do individuals with independent self-construals (Cross & Madsen, 1997). Taken together, this leads to the prediction that women’s relatively interdependent self-construal partially explains the gender difference in fate cognitions.

**Juxtaposing Belief in Fate and Belief in God**

A final goal was to position the hypothesized gender difference in fate attributions within the broader context of supernatural beliefs, and specifically with respect to belief in God. As a general category, supernatural beliefs are those having a “leap of faith” persistence in the absence of direct, concrete evidence. Building on Dennett (1987), Young and colleagues (2004, 2011) distinguished between two kinds of supernatural belief, destiny and deity, which map onto belief in fate and belief in God, respectively. These two beliefs might tightly overlap and perhaps spring from the same, deeper cognitive source, a possibility suggested by recent research showing similar cognitive tendencies underlie belief in God, belief in the paranormal, and purpose in life; these
include mentalizing (the tendency to infer the mental states of others), dualism (the
tendency to see minds as separate from bodies), and teleology (the tendency to see
purpose in the design of natural objects) (Willard & Norenzayan, 2013). Moreover,
gender differences in belief in God have been widely reported (Buchko, 2004; Bryant,
2007; McAdams & Albaugh, 2008; Norenzayan, Gervais, & Trzesniewski, 2012; Stark,
2002; Willard & Norenzayan, 2013). Some argue that women are culturally conditioned
to embody traits consistent with religiosity (i.e. nurturance, submission; Francis, 1997;
Ochs, 1983; Ozorak, 1996; Randour, 1987). Given that the present research focus is on
gender differences in belief in fate, this previously reported gender difference in belief in
God lends further support to the idea that these two beliefs are cut from the same cloth.

Returning to Young et al (2004, 2011), however, there are also reasons to expect
that belief in fate and belief in God are unique constructs. Specifically, belief in God (but
not destiny) is defined with regard to an agentic, person-like being with omnipotent
powers but also a human-like personality and motives (Epley, 2014). This aspect of
seeing “God as a person” suggests a relatively straightforward connection between belief
in God and interdependence motives. For example, when a person’s need to belong is
threatened (as by an ostracism manipulation), belief in God is increased in an apparently
compensatory manner (Epley, Akalis, Waytz, & Cacioppo, 2008; Gebaur & Maio, 2012;
Nilufer, Fischer, & Frey 2010). By contrast, belief in fate is not defined by any focus on a
supernatural being with a personality and motives. The connection between belief in fate
and an interdependent self-construal, therefore, would be a surprising and less
straightforward relation than that between belief in God and interdependent self-
construal. Yet given the possibility of overlap between belief in fate and belief in God, it
was essential for the present research to measure both side-by-side and empirically distinguish them.

Overview

In six studies, we examined gender differences in fate attributions, belief in fate, and belief in God. We began by testing for a gender difference in fate attributions (Studies 1a and 1b). Study 2 then examined support for the interdependent fate hypothesis, whereby fate attributions are expected to be greater for interdependent life events than for independent life events. We also examined whether gender differences emerge particularly in attributions for interdependent life events. Study 3 examined whether belief in fate, a relatively general construct, explains the gender difference in fate attributions alongside two known predictors of fate attributions (belief in God and causal complexity). Study 4 explored three social-cognitive predictors of supernatural belief in fate and God, including self-construal, mentalizing ability, and social status. Study 5 manipulated self-construal by priming a life event that was caused by independent versus interdependent forces and then measured fate attributions, belief in fate, and belief in God.

The current research makes several important and novel contributions to the literature. Multiple data sets offer support for the interdependent fate hypothesis. We find that interdependent life events are attributed to fate more so than independent life events, suggesting fate is more strongly perceived when important social relationships are affected than when they are not. Also consistent with our key hypothesis, we find a robust gender difference in both fate attributions (about specific life events) and belief in fate (generalized beliefs about the existence of inherent purpose to life events). We
demonstrate that this gender difference emerges in interpretations of both hypothetical vignettes and autobiographical details of one’s own life. In combination, our studies shed light on when and why gender differences are likely to emerge in the interpretation of life events.

Studies 1a and 1b

Our first set of studies offered an initial demonstration of gender differences in fate attributions (i.e., causal explanations for specific events). Participants read a brief vignette and then made causal attributions; fate attribution was assessed by way of asking participants whether the focal event in the vignette was “meant to be” or “just a coincidence.”

Study 1a

Method

Participants were 221 Mechanical Turk workers (129 women, 92 men) who were paid $1 for participating. Three participants were removed for not following instructions, leaving a total of 218. Of these, 94% were U.S. born, with a mean age of 35.1 years (SD = 12.4). The sample was 81% white, 7.7% African American, 5% Asian, and 1.4% declined to report their race.

Participants read the following vignette:

“It is a Wednesday morning and John has overslept. He takes a quick shower, throws on some clothes and rushes down to the train station to catch his train to work. He runs up the steps to the platform, and slips through the doors just before they shut. On the train ride, John notices a young woman he’s never seen before and starts up a conversation. Her
name is Sarah, and the conversation goes very well. One year later, John
and Sarah end up getting married.”

Participants chose between the following two statements: “John and Sarah’s
meeting was meant to be” and “John and Sarah’s meeting was just a coincidence.”

Results

Women were more likely than men to attribute John and Sarah’s meeting to fate
(51% vs. 37%), \( \chi^2(1) = 3.92, p < .05, d = .27. \)

Study 1b

Study 1b was a further test of gender differences in fate attributions. Rather than
compelling participants to pick between fate and chance as causal forces, as in the prior
study, we assessed fate and chance attributions separately via rating scales. Because fate
and chance are sometimes seen as coexisting (Burris & Roese, 2006; Norenzayan & Lee,
2010, Pepitone & Saffioti, 1997), it makes sense to test such beliefs in a less constrained
manner.

The current study also tested the generalizability of the gender difference in
attribution by examining life event attributions across multiple social contexts. It could be
argued that the romantic context examined in the prior study is stereotypically feminine
and that the observed gender difference is simply a reflection of this gendered topic. To
rule out this possibility, the current study also examined attributions in a stereotypically
masculine context (sports) and a gender-neutral context (death). In so doing, we sought
totest the generalizability of the observed gender difference in fate attributions. Though
we did not specifically select these contexts to test our interdependent fate hypothesis as
these data were gathered before we had fully articulated it, we note that both the romantic and sports contexts may respectively tap into relational and collective aspects of interdependence.

Method

Participants were 454 undergraduate students (282 women, 172 men) enrolled in an introductory psychology class at the University of Illinois at Urbana-Champaign. Mean age was 19.9 years (SD = 1.09). The sample was 70% white, 13% Asian, 9% Hispanic, 6% African American, and 2% as other or unspecified. English was reported as the first language of 90% of the sample.

Procedure

As part of a larger battery of in-class tests, each participant made attributions for focal events in three vignettes. We used the identical romantic vignette from Study 1a as well as a vignette about death and a vignette about sports (see Appendix A)².

For each vignette, participants rated the degree to which each event was “determined by fate” and “the result of random chance” using scales ranging from 1 (“not at all”) to 7 (“extremely”). Degrees of freedom vary slightly across analyses because some participants omitted responses to particular items.

Results

We first conducted an omnibus test with the dependent variable averaging attributions across the 3 vignettes. Fate and chance attributions were negatively correlated $r(454) = -.39, p < .001$.

In a 2 (gender) x 2 (attribution type: fate vs. chance) mixed ANOVA, the interaction was significant, $F(1, 452) = 7.32, p = .007, \eta^2 = .02$, and the key observation
was that, overall, women made stronger fate attributions ($M = 3.90, SD = 1.31$) than did men ($M = 3.48, SD = 1.34$), $t(452) = 3.31, p = .001, d = .32$. However, women and men did not differ in their chance attributions ($Ms = 4.70$ vs. $4.79, SDs = 1.05, .95$), $t(452) = .90, p = .37, d = .09$. Overall, chance attributions were rated higher than fate attributions ($M = 4.73, SD = 1.01$ vs. $M = 3.74, SD = 1.34$), $F(1, 452) = 123.5, p < .001, d = 1.08$. Thus, looking across the 3 vignettes, we saw a general pattern of women making stronger fate attributions than men.

We next conducted separate 2 (gender) x 2 (attribution type) ANOVAs for each vignette. Results are summarized in Figure 1.

**Romantic Context.** Chance attributions ($M = 4.19, SD = 1.29$) were stronger than fate attributions ($M = 3.62, SD = 1.43$), $F(1, 451) = 8.21, p = .004, d = .42$. This main effect was qualified by an interaction with gender, $F(1, 451) = 8.37, p = .004$. Fate attributions were greater for women ($M = 4.38, SD = 1.66$) than they were for men ($M = 3.87, SD = 1.77$), $F(1, 451) = 9.90, p = .002, d = .30$. By contrast, chance attributions did not significantly differ between women and men ($M = 4.38, SD = 1.61$ vs. $M = 4.61, SD = 1.67$, respectively), $F(1, 452) = 2.15, p = .14, d = 14$.

**Sports Context.** Two main effects emerged. First, chance attributions ($M = 4.12, SD = 1.81$) were stronger than fate attributions ($M = 3.25, SD = 1.63$), $F(1, 451) = 46.36, p < .001, d = .51$. Second, women ($M = 3.84, SD = 1.10$) made stronger attributionsthan men did ($M = 3.44, SD = 1.15$), $F(1, 451) = 13.31, p < .001, d = .36$. This was true for both fate attributions, $F(1, 451) = 4.95, p = .03, d = .22$ and chance attributions, $F(1, 451) = 6.43, p = .01, d = .24$. The interaction was not significant, $F(1, 451) = .14, p = .71$. 
Death Context. Two main effects emerged. First, chance attributions ($M = 3.97$, $SD = 1.71$) were stronger than fate attributions ($M = 3.42$, $SD = 1.74$), $F(1, 448) = 21.21$, $p < .001$, $d = .32$. Second, women ($M = 3.84$, $SD = 1.08$) made stronger attributions than men did ($M = 3.49$, $SD = 1.22$), $F(1, 448) = 8.85$, $p = .003$, $d = .30$. This was true for fate attributions, $F(1, 451) = 8.29$, $p = .004$, $d = .28$ but not chance attributions, $F(1, 449) = 1.18$, $p = .28$, $d = .10$. However, the interaction between gender and attribution type was not significant, $F(1, 451) = 1.39$, $p = .24$.

To test the robustness of these effects, we reran the above analyses including age and whether English was their first language (0 = no, 1 = yes) as a proxy for culture. All of the main and interaction effects reported above involving gender held; however, the main effects for attribution type were no longer significant across any of the scenarios.

Discussion

When it comes to making sense of events in life, two studies found evidence for a gender difference in attributions, using both forced-choice and rating scale formats. Women attributed life events to fate more so than did men. Study 1b, which was designed before we had fully articulated the interdependent fate hypothesis, was originally intended to test the generality of Study 1a. In this regard, it did give some indication of generality in that an omnibus test of all three vignettes suggested an overall gender difference in fate attribution. However, previewing the next studies as more targeted tests of the interdependent fate hypothesis, we also assessed attribution patterns within each scenario, and interestingly, discovered that the strongest gender difference in fate attribution occurred within the romantic vignette. Because the romantic vignette most clearly embodied the theoretical construct of interdependence, in terms of depicting one
of the most important intimate bonds (a relationship that led to marriage) being
established, it offers tentative support for the idea that fate is interwoven into the fabric of
women’s causal attributions to a larger extent than it is for men. Study 2 more directly
tests our interdependent fate hypothesis.

**Study 2**

The current study was designed to extend the previous findings in three ways. First, we
sought robustness across research methods by testing whether the gender
difference in causal attributions extends to autobiographical aspects of one’s own life.
Study 2 thus moves beyond the less personally compelling vignette research method to
the more personally relevant method of retrospective self-report.

Second, Study 2 was designed to provide more direct support for the
interdependent fate hypothesis. Namely, we examined whether life events with
interdependent (social) implications are attributed to fate to a larger degree than are life
events with more independent (or personal) implications. If the lay definition of fate is
conceived to be a social phenomenon that brings people together and tears them apart,
then life events with social implications should be attributed to fate to a larger degree
than life events with primarily personal implications.

Third, we expected this tendency to be more pronounced for women than for men.
Just like culture primarily impacts causal attributions about why social events happen
(Menon, Morris, Chiu, & Hong, 1999; Morris & Peng, 1994; Morris, Menon, & Ames,
2001), we expected the gender difference to be stronger for interdependent life events
than for independent life events.

**Method**
Participants were 130 students enrolled in an introductory psychology course at the University of California at Berkeley. Seventeen participants were removed for not indicating their gender, leaving a final sample of 113 (64 women, 49 men). The sample was 28% white, 2% African American, 11% Hispanic or Latino, 57% Asian, 2% Native American, and 2% declined to report race. The average age was $M = 20.33$, $SD = 1.72$. English was the first language for 72.57% of the sample.

The experiment used a 2 (gender) x 2 (attribution type: fate vs. chance) between-subjects design. Participants came to the laboratory where they were given a paper-and-pencil measure that indicated: “We are interested in your beliefs about the role of fate [chance] in your life. Fated [chance] events have a destined quality, suggesting they were meant to be and it would be difficult to imagine them being different. [Chance events are characterized by a luck quality, suggesting they occurred randomly and it would be easy to imagine them being different.] Consider the following characteristics of your life that have already come to pass or may come to pass in the future and indicate the extent to which you believe they are determined by fate [chance] using the following scale$^3$. Ratings were made on 9-point scales (1 = “not at all determined by [fate / chance]”; 9 = “extremely determined by [fate / chance]”).

Participants rated 28 life events expected to be relevant to college students, including items from the past (who one’s biological parents are), present (what you ate for breakfast today) and the future (the timing of one’s death). These life events appear in Appendix B.

Results
We began with an omnibus test of patterns across all 28 life events, averaging both fate attributions ($\alpha = .94$) and chance attributions ($\alpha = .85$). In a 2-way ANOVA, with gender and attribution as between-subject factors, the interaction was significant, $F(1, 109) = 3.60, p = .06$ (When we reran this analysis including age and English as first language as covariates, the effects remained significant, $ps = .004$ and .054, respectively).

Women’s fate attributions ($M = 4.29, SD = 1.42$) were greater than were men’s ($M = 3.63, SD = 1.21$), $t(109) = 2.17, p = .03, d = .50$. However, chance attributions did not significantly differ between women ($M = 4.50, SD = .86$) and men ($M = 4.66, SD = .80$), $t(109) = .51, p = .61, d = .19$.

Also, chance attributions ($M = 4.58, SD = .83$) were stronger than fate attributions ($M = 4.05, SD = 1.38$), $F(1, 109) = 8.21, p = .005, d = .47$.

*Life Event Analysis: Test of the Interdependent Fate Hypothesis.* Next we examined whether fate attributions emerged more strongly for life events that speak to interdependence as opposed to independence and, if so, whether this was particularly true for women compared to men. To test this, our first step was to identify life events characterized by interdependence and independence.

A sample of 128 Mechanical Turk workers were paid $0.50 to rate the 28 life events in terms of interdependence and independence on 7-point scales (endpoints: “not at all” and “extremely”). We defined interdependent life events as “events of a person's life characterized by *interdependence* and *relationships with close others*.” We defined independent life events as “events of a person's life characterized by *independence* and *personal achievements*.” We counterbalanced the order in which the judgments occurred.
(all events were rated on one dimension before being rated again on the other dimension).

Life events were presented in a randomized order.

To select events that fit the desired categories, we used two exclusion criteria: 1) events that were characterized neither by interdependence nor independence, as evidenced by their mean ratings falling below the midpoint of both scales; and 2) events whose mean ratings did not significantly differ, suggesting they were not distinguishable in terms of self-construal. Six items met the first criterion (sample item: “the biological cause of a person’s death”). Two items met the second criterion (sample item: “whether a person leads a happy and fulfilling life”). After removing these 8 items, our final sample included 20 life events, 9 of which were relatively interdependent and 11 of which were relatively independent. Paired samples t-tests revealed that interdependent life events ($\alpha = .74$) were rated more interdependent ($M = 4.97, SD = 1.00$) than independent ($M = 3.57, SD = 1.11$), $t(125) = 10.37, p < .001$; and independent life events ($\alpha = .86$) were judged to be more independent ($M = 4.75, SD = 1.03$) than interdependent ($M = 3.46, SD = 1.35$), $t(126) = 8.23, p < .001$.

Using the 20 items that qualified as relatively interdependent or independent, we then conducted a 2 (gender) a 2 (attribution: fate vs. chance) x 2 (life event type: interdependent vs. independent) mixed ANOVA. In addition to replicating the two effects reported above (main effect for attribution, $F(1, 109) = 5.33, p < .02, d = .44$; gender x attribution interaction, $F(1, 109) = 5.06, p = .03$), we observed several effects consistent with our hypotheses.

Consistent with the idea that interdependence stimulates attributional processes, stronger attributions were made overall for interdependent events ($M = 4.23, SD = .83$)
than for independent events ($M = 3.53, SD = 1.26$), $F(1, 109) = 74.97, p < .001, d = 1.64$.

This effect for event type was qualified by an interaction with attribution, $F(1, 109) = 11.57, p = .001$. Independent events were attributed more to chance ($M = 3.96, SD = 1.03$) than to fate ($M = 3.12, SD = 1.34$), $F(1, 111) = 14.04, p < .001, d = .71$; however, interdependent life events were attributed to fate ($M = 4.51, SD = 1.53$) as much as chance ($M = 4.56, SD = 1.07$), $F(1, 111) = .03, p = .86, d = .03$.

Finally, this interaction was further qualified by gender, $F(1, 109) = 3.37, p = .07$. As depicted in Figure 2, the gender × attribution interaction emerged for interdependent life events, $F(1, 109) = 7.49, p = .007$, but not for independent life events, $F(1, 109) = 1.38, p = .24$. For interdependent life events, women made stronger fate attributions than men did, $t(109) = 2.36, p = .02, d = .59$. By contrast, men and women did not significantly differ in chance attributions, $t(109) = -1.50, p = .14, d = .29$. For independent life events, the gender difference was not statistically significant for fate attributions, $t(109) = 1.64, p = .11, d = .42$ or for chance attributions, $t(109) = -.02, p = .99, d = .00$.

Discussion

This study extends the generality of gender differences in fate attributions to the autobiographical sphere. Consistent with the interdependent fate hypothesis, we found that aspects of individuals’ lives impacting social connections were attributed to fate more so than were aspects affecting personal achievements. However, a note of caution is warranted in interpreting this effect as we also observed an overall tendency for interdependent life events to stimulate attributional processes (cf. Hastie, 1984), both for fate and for chance.
Consistent with the notion that women are more attuned to social relationships than are men, gender differences in fate attributions were evident for how interdependent but not independent life events were interpreted. As expected, women made more fate attributions about interdependent life events than did men. This study thus identifies the social sphere of life as being one that is particularly prone to attributional processes. We also observed that women, who are socialized to see themselves in relation to others, made stronger attributions to fate for interdependent life events than did men.

**Study 3**

Having established a gender difference in fate attributions, we turned to an examination of the social cognitive underpinnings. To do so, we examined whether gender differences in fate attributions are rooted in generalized beliefs about inherent purpose to life events (“belief in fate”) (Banerjee & Bloom, 2014a). From an early developmental stage (Banerjee & Bloom, 2014b), socialization processes direct the attention of girls more so than boys toward social relationships (Maccoby, 1990), thus stimulating the search for meaning in social life events. If women report greater generalized belief in fate compared to men, then this may shed light on the gender difference in fate attributions.

We examined support for this teleological explanation alongside two known predictors of fate attributions: belief in God and causal complexity. Given research finding gender differences in belief in God (Norenzayan et al., 2012) and linking belief in God to fate attributions (Norenzayan & Lee, 2010), we also examined the potentially mediating role of belief in God. Though Norenzayan and Lee’s (2010) groundbreaking research reported a gender difference in fate attributions (p. 706), no explanation was
offered for it because it did not interact with their variables of interest (religiosity and culture). However, belief in God mediated the relation between religiosity and fate attributions, suggesting it may also account for a gender difference in causal inference. By this account, women’s greater religiosity accounts for their propensity to attribute more life events to fate than do men.

Finally, we also considered whether causal complexity explains the gender difference in fate attributions. The previous studies observed a de facto causally complex set of attributions for women (including both fate and chance in equal measures), particularly for life events affecting social connections. Causal complexity is defined as a tendency to consider a large number of interconnected causes for a given outcome, as opposed to a simpler causal pathway (Choi, Koo, & Choi, 2007; Nisbett, Peng, Choi, & Norenzayan, 2001). Norenzayan and Lee (2010) found that causal complexity accounted for the cultural difference in fate attributions. That is, compared to individuals of European descent, East Asian individuals exhibit greater causal complexity (Choi & Nisbett, 1998), and this tendency underlies the latter group’s tendency to make stronger fate attributions (Norenzayan & Lee, 2010). By this same logic, women might embrace belief in fate to a greater extent than men because they are more likely to see life events as interconnected, rather than social.

To test these hypotheses, we first confirmed that belief in fate, belief in God, and causal complexity represent distinct constructs via confirmatory factor analysis. We then tested whether these constructs uniquely predict gender differences in fate attributions.

*Method*
Participants were 201 Mechanical Turk workers (90 women, 111 men). The average age of our sample was $M = 31.86$, $SD = 11.23$. Ninety-one percent of the sample reported being born in the US; no other demographic variables were collected.

**Fate Attributions.** We included 11 life event vignettes from Norenzayan and Lee (2010). Participants read each vignette and then made a forced choice to indicate whether the events described in the scenario were fated versus a coincidence. Norenzayan and Lee’s measure of fate attributions, fate response proportion (FRP), was computed.

**Belief in Fate.** We measured teleological reasoning about inherent purpose to life events with a 6-item scale ($\alpha = .87$), including: “We all have a destiny to fulfill”, “Most things happen for a reason”, “Whatever happens in life, it was meant to be”, “Fate works in strange ways”, “There’s no such thing as a coincidence”, and “Things work out the way they were meant to.” Responses were on a 7-point scale (anchored by “disagree entirely” and “agree entirely”).

**Belief in God.** Participants indicated the degree to which they believe in God, are religious, spiritual, agnostic, and atheistic. The final two items were reverse-scored and a scale was formed ($\alpha = .94$). The response scale ranged from 1 (“disagree entirely”) to 6 (“agree entirely”).

**Causal Complexity.** Causal complexity was measured with the 6-item subscale ($\alpha = .74$) of the holistic reasoning scale developed by Choi et al. (2003): “Everything in the universe is somehow related to each other”; “Even a small change in any element in the universe can lead to substantial alterations in others”; “Any phenomenon has a numerous number of causes although some of the causes are not known”; “Any phenomenon has a numerous number of results although some of the results are not known”; “Nothing is
unrelated” and “Sometimes, the empty space in a painting is just as important as the objects.” Responses were on a 7-point scale (anchored by “disagree entirely” and “agree entirely”).

**Results**

Our first step was to examine the correlations between fate attributions and the proposed mediators. Fate attributions were highly correlated with belief in fate \((r = .61)\), moderately correlated with belief in God \((r = .46)\) and modestly correlated with causal complexity \((r = .22)\). Given that each construct was measured using a similar self-report format, we next tested whether belief in fate, belief in God, and causal complexity represent distinct constructs or reduce down to the same basic construct. To do so, we used confirmatory factor analysis.

The proposed 3-factor model had an acceptable fit \((\chi^2 = 120.28, df = 101, p = .09, \chi^2/df = 1.19, CFI = .99, TLI = .99, RMSEA = .03, AIC = 224)\). This analysis supports the assertion that belief in fate, belief in God, and causal complexity are distinguishable. Satisfied that our measures tap into distinct psychological constructs, we turned next to an examination of whether they explain the gender difference in fate attributions.

**Gender Differences.** As summarized in Table 1, we found gender differences in fate attributions \((t(199) = 2.65, p = .009, d = .36)\), belief in fate \((t(199) = 2.65, p = .009, d = .37)\), and causal complexity, \(t(199) = 2.58, p = .01, d = .37\). The gender difference in belief in God was relatively weaker, \(t(199) = 1.57, p = .12, d = .22\).

To assess the robustness of these effects, we ran a series of follow-up ANCOVAs with age and cultural background (born in the US = 1 or not = 0) as covariates. The main
effects of gender held for fate attributions ($p = .004$), belief in fate ($p = .003$), causal complexity ($p = .008$), and belief in God ($p = .10$).

**Mediation Analysis.** We examined whether each of the three candidate predictors explain the gender difference in fate attributions by entering them all along with gender into a regression predicting fate attributions. Although the gender difference in belief in God was not significant, we included it because we observed a trend consistent with past research.

We found that belief in fate ($\beta = .51, p < .001$) and belief in God ($\beta = .20, p = .002$) predicted fate attributions, but causal complexity did not ($\beta = .06, p = .29$). Furthermore, whereas gender predicted fate attributions when entered as the lone predictor ($\beta = .18, p = .009$), it failed to predict fate attributions when controlling for belief in fate, belief in God, and causal complexity ($\beta = .06, p = .29$). Consistent with this analysis, a bootstrapping procedure with 10,000 replications revealed an indirect effect of belief in fate on fate attributions, 95% CI = [.03, .17], but did not find evidence of an indirect effect for either belief in God, 95% CI = [-.01, .06], or causal complexity, 95% CI = [-.01, .03]. In a separate mediation analysis that controlled for participant age and cultural background, the indirect effect of belief in fate held, 95% CI = [.03, .19], but those of belief in God, 95% CI = [-.004, .07] and causal complexity, 95% CI = [-.01, .04], remained non-significant.

**Discussion**

This study sheds light on the role of beliefs about underlying purpose to life events in producing gender differences in causal attributions. We found that gender differences in supernatural beliefs in fate and God explained the gender difference in
causal attributions. By contrast, we did not find evidence that the gender difference in causal complexity, a cognitive processing style, mapped onto the gender difference in causal attributions. This implies that differences in how men and women interpret life events traces to their underlying beliefs in supernatural forces rather than the sheer number of causes presumed to be at play in determining life events.

**Study 4**

The prior study identified supernatural beliefs about fate and God as mediators of the gender difference in causal attribution. The current study attempts to further elucidate the origin of these gender differences in supernatural beliefs by examining their social cognitive underpinnings.

To begin, we attempted to replicate and extend research linking mentalizing ability, or the capacity to reason about the workings and contents of other people’s minds, with supernatural belief. Norenzayan and colleagues (2012) found this cognitive ability mediated the gender difference in belief in God, perhaps because mentalizing is a component of the process of personifying God into a motivated agent (Epley, 2014; Epley, Waytz, & Cacioppo, 2007). Recently, Banerjee and Bloom (2014a) found that the propensity to infer purpose in life events is enabled by mentalizing ability, even among the non-religious, suggesting belief in fate may also be predicted by the ability to get inside the mind of other beings.

We also examined self-construal as a mediator of gender differences in fate cognition. By heightening sensitivity to the social implications of life events, an interdependent self-construal may lead life events to appear more purpose-driven than they might otherwise be. We also expected an interdependent self-construal to promote
belief in God by creating the sense that the deity is a personified agent, and hence connected into the individual’s “social network.”

Finally, we examined whether social status predict supernatural beliefs. Alongside the fundamental need for social belonging (Baumeister & Leary, 1995), humans experience a strong pull towards hierarchical differentiation (Magee & Galinsky, 2008). Being at the top of a social hierarchy affords psychological benefits in the form of social approval (Anderson et al., 2012). If fate implies social connection, then individuals who enjoy prominence in a social hierarchy may report greater belief in fate than those who are lower in the social status hierarchy. Given that men’s sense of interdependence hinges on their position in hierarchies to a larger degree than it does for women (Baumeister & Sommers, 1997), we also examined whether this tendency is greater for men than it is for women. Along similar lines, high social status implies being at the top of a social hierarchy and thus “closer to” a God, who is typically thought to reside in heaven above. As such, social status may also correspond with belief in God.

Method

We recruited 1,218 adults from a U.S. national panel. Given the length of the survey, we used an instructional manipulation check to verify satisfactory attention (participants were asked to leave a question at the beginning of the survey blank). Unfortunately, a large proportion (59%) of the initial sample failed this check, leaving a final sample of 495 who completed all dependent measures (269 women, 226 men). Mean age was 27.6 ($SD = 16.4$). The sample was 75% white, 9% African American, 10% Hispanic or Latino, 3% Asian, 1% Native American, 0.2% “other”, and 1% declined to report race.
Participants answered demographic questions before proceeding to our dependent measures. Each measure was assessed on 7-point scales with endpoints of 1 (strongly disagree) and 7 (strongly agree). Belief in fate ($\alpha = .86$) and belief in God ($\alpha = .81$) were measured using the identical scales as in Study 3. We also assessed the following potential predictors of supernatural beliefs:

*Mentalizing Ability.* We used the adapted version of the 22-item EQ-Short index ($\alpha = .87$) (Wakabayashi et al., 2006) used by Norenzayan et al. (2012). The scale measures perspective taking, interest in others, and understanding of emotions. Example items include “I am good at predicting how someone will feel” and “Other people tell me I am good at understanding how they are feeling and what they are thinking.”

*Self-Construal.* We measured relational-self-construal using the 11-item Relational-Interdependent Self-Construal Scale ($\alpha = .82$) (Cross, Bacon, & Morris, 2000). Example items include “My close relationships are an important reflection of who I am”, and “Overall, my close relationships have very little to do with how I feel about myself” (reverse-scored).

*Social Status.* We used the 5-item scale ($\alpha = .94$) developed by Anderson et al. (2012), which included: “Others look up to me”, “Others admire me”, “I have a high level of respect in others’ eyes”, “I have high social standing”, and “I am held in high regard by others.”

*Demographic Variables.* We expanded the number of demographic variables in this study to include age, race, education level, marital status, number of children, birth country, employment status, and whether participants are the primary income earner in
their household. Unless reported directly, none of these variables qualified the main results reported.

Results

Gender Differences. Table 2 presents descriptive statistics. We replicated past gender effects for belief in fate \((F(1, 493) = 4.63, p = .03, d = .19)\), belief in God \((F(1, 493) = 9.19, p = .003, d = .27)\), interdependent self-construal \((F(1, 493) = 4.10, p = .04, d = .18)\), and mentalizing ability \((F(1, 493) = 24.03, p < .001, d = .44)\). As in Anderson et al. (2012), the gender difference in social status was not significant.

Predictors of Supernatural Beliefs. Table 3 presents the results of separate linear regression analyses predicting belief in fate and belief in God, with each of the three social connection variables included. As hypothesized, all three variables predicted both forms of supernatural beliefs. Each of these effects was robust to the inclusion of demographic controls.

We also found that social status interacted with gender to predict belief in fate, \(b = .15, p = .04\). As depicted in Figure 3, social status had a stronger influence on belief in fate for men, \(r(224) = .41, p < .001\), than it did for women, \(r(267) = .19, p = .002\).

Our final question was whether self-construal and mentalizing ability, the two predictors that evidenced a gender difference, could account for the observed gender differences in supernatural agency beliefs. To test for mediation, we conducted the bootstrap test (Zhao, Lynch, & Chen, 2010) with gender as the independent variable, both self-construal and mentalizing ability as mediators, and (in independent tests), either belief in fate or belief in God as the dependent variable (see Figure 4).
Turning first to belief in fate, when simultaneously entering self-construal and mentalizing ability, the gender difference in belief in fate was reduced (from $b = .10, p = .03$ to $b = .04, p = .37$). Both self-construal ($b = .31, p < .001$) and mentalizing ability ($b = .15, p = .002$) were independently related to belief in fate. We found an indirect effect for mentalizing ability, 95% CI = [0.01, 0.06], but not for self-construal, 95% CI = [-0.02, 0.06].

Turning next to belief in God, when both self-construal and mentalizing ability are included, the gender difference in belief in God was reduced (from $b = .14, p = .003$ to $b = .09, p = .05$). Both self-construal ($b = .14, p = .005$) and mentalizing ability ($b = .17, p = .001$) were independently related to belief in God. We found evidence of an indirect effect for mentalizing ability, 95% confidence interval = [0.01, 0.07]. However, we failed to find evidence of an indirect effect for self-construal, 95% confidence interval = [-0.0001, 0.03].

**Discussion**

This study examined the social cognitive underpinnings of gender differences in supernatural beliefs about fate and God. Consistent with past research, mentalizing ability emerged as a significant predictor of both belief in fate and belief in God. In addition, we observed a novel effect whereby interdependent self-construal predicted gender differences in belief in fate and belief in God. These effects emerged in combination with the gender difference in mentalizing ability. Overall, this study suggests that both the ability to get into the minds of others and the tendency to define the self in relation to others predicts both belief in fate and belief in God.

We also found that social status predicted these supernatural beliefs. Individuals who perceive themselves to be at the top of a social hierarchy reported more inherent
purpose to life events than those who perceive themselves to be lower in social status. This was particularly true for men, whose sense of self is more closely tied to their position in a social hierarchy that it is for women (Baumeister & Sommers, 1997). With respect to social status predicting belief in God, it is likely a reflection of the notion that being at the top of a social hierarchy renders oneself closer to God, who is often thought to reside in heaven above.

As a further differentiator of belief in fate and belief in God, an intriguing difference emerged in their respective relations with age. Whereas age was a significant predictor of belief in God ($r = .31$), it was only weakly (and non-significantly) correlated with belief in fate ($r = -.06$). Whereas greater belief in God (and presumably an afterlife) makes sense as death approaches, belief in fate may be more tied to an individual’s sense of fulfilling a life purpose in the here and now. We leave it to future research to explore further this intriguing possibility.

**Study 5**

The previous study found self-construal to be a novel predictor of gender differences in supernatural beliefs in fate and God. The final experiment was designed to test whether self-construal plays a causal role in the relationship between gender, supernatural beliefs, and fate attributions. If an interdependent self-construal plays a causal role in the previously observed gender differences, then priming interdependenceshould produce analogous effects (for a similar argument about testing the mechanism underlying cultural differences, see Oyserman & Lee, 2008).

To manipulate self-construal, we varied the cause of an important life event, using a standard priming methodology (Trafimow, Triandis, & Goto, 1991). We included
personal agency (which corresponds with an independent self-construal) as well as two forms of independent self-construal: relational and communal. The relational prime maps onto the measure of self-construal used in the previous study, which gauges the degree to which close relationships define the self. The communal prime, developed by Gardner, Gabriel, and Hochschild (2002), illustrates how shared membership in a community, rather than a family, influences the focal life event. By including both the relational and the communal primes, we were able to test the generalizability of interdependent self-construals on fate cognitions.

Method

Participants. Participants were 446 Mechanical Turk workers (227 male, 211 female, 8 declined to report) paid $1 for completing a survey about life events. The average age of the sample was $M = 33.45$, $SD = 10.75$. The sample was 72% white, 7% African American, 6% Hispanic or Latino, 13% Asian, .4% Native American, 1.1% “other”, and .2% declined to report race. Ninety-one percent of the sample reported being born in the US. The highest reported education of the sample was: 12% Masters degree or higher, 39% 4-year degree college, 10% 2-year degree, 25% some college and 14% high school or lower.

Data Exclusions. As gender was central to all of our analyses, we excluded 7 participants who declined to report their gender. We also excluded: 1) 8 participants who failed to respond correctly to an attention check asking them to leave a particular response blank, 2) 33 participants who failed the manipulation check (described below). Our final sample included 398 participants (213 male, 185 female). When analyses included the entire sample, results were consistent with the analyses reported below.
Experimental Design. We employed a 3 (self-construal prime: independent, relational, communal) x 2 (gender) between-subjects design.

Procedure. After consenting to participate, participants were instructed to read carefully a passage because they would be asked to recall details about it later. The passage describes an important life event (the appointment of a commander to an army). Consistent with past research (Gardner et al., 2002), we varied whether the appointment was based on individual merit (independent prime), family ties (relational prime), or shared membership in the community (communal prime). Past research has shown that this manipulation temporarily makes independent and interdependent aspects of the self cognitively accessible (Gardner et al., 1999). Whereas the independent prime describes a life event being influenced by an individual’s merit, both the relational and communal primes describe social connections affecting the life event and differ only in the type of social connection.

Manipulation Check. After reading the passage, participants were asked to identify who the commander (Tiglath) was in relation to the person who decided the appointment (Sostoras), with three choices: a talented general (independent condition), a family member of Sostoras (relational condition), or a respected member of the community (communal condition).

Dependent Measures. Participants completed the fate attributions (α = .89), belief in fate (α = .90), belief in God (α = .89), and causal complexity (α = .88) measures described previously. Though causal complexity failed to turn up as a mediating mechanism in Study 3, we included it here to test whether an interdependent self-
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construal leads to a more causally complex cognitive style. Finally, participants reported the demographic variables reported above.

**Results**

We conducted separate 2-way ANOVAs on the four dependent variables, with self-construal and gender as between-subject factors. Both the relational and communal primes emphasized how social connections influence life events. Because no differences were observed across the relational and communal primes for any of the dependent measures, we collapsed across them in the analyses reported below, referring to them collectively as the “interdependence” condition. See the Online Supplemental Materials for a reporting of results broken down by all 3 prime conditions, as well as an earlier study that yielded roughly the same results as those reported below.

**Fate Attribution.** As in the prior studies, women ($M = .39, SD = .36$) attributed life events more to fate than men did ($M = .27, SD = .31$), $F(1, 394) = 10.79, p = .001, d = .36$. A main effect of prime condition also emerged, $F(1, 394) = 4.91, p = .03, d = 21$. Consistent with the interdependent fate hypothesis, fate attributions were greater after priming interdependent ($M = .35, SD = .34$) compared to independent ($M = .28, SD = .33$) causes of life events. The self-construal x gender interaction was not statistically significant, $F(1, 394) = .61, p = .44$.

**Belief in Fate.** As in the previous studies, women ($M = 4.39, SD = 1.38$) reported greater belief in fate than men did ($M = 4.01, SD = 1.35$), $F(1, 394) = 3.43, p = .07, d = .28$. This main effect was qualified by an interaction with prime condition, $F(1, 394) = 4.82, p = .03$. Simple effects analyses revealed that after priming interdependence, women ($M = 4.55, SD = 1.31$) reported greater belief in fate than did men ($M = 3.96, SD = 1.35$).
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\( t(401) = -3.53, p < .001, d = .45 \); after priming independence, the difference between women (\( M = 4.09, SD = 1.48 \)) and men (\( M = 4.14, SD = 1.42 \)) was not significant, \( t(401) = .47, p = .64, d = .03 \). No other effects were significant.

Belief in God. Once again, belief in God was greater for women (\( M = 4.20, SD = 1.98 \)) than it was for men (\( M = 3.80, SD = 1.97 \)), \( F(1, 394) = 3.02, p = .08, d = .20 \). We also observed a main effect for prime condition, such that belief in God was greater after priming interdependence (\( M = 4.17, SD = 2.03 \)) than after priming independence (\( M = 3.61, SD = 1.84 \)), \( F(1, 394) = 8.19, p = .004, d = .29 \). The prime condition x gender interaction was not significant, \( F(1, 394) = .83, p = .36 \).

Causal Complexity. Women (\( M = 5.17, SD = .99 \)) report greater causal complexity beliefs than did men (\( M = 4.96, SD = 1.07 \)), \( F(1, 394) = 3.38, p = .07, d = .20 \). Neither the main effect for prime condition (\( F(1, 394) = .24, p = .63 \)) nor the interaction (\( F(1, 394) = .02, p = .90 \)) were significant.

Discussion

The current study established the causal role that self-construal has on supernatural beliefs and fate attributions. After priming interdependence (either through relational or communal ties) as a causal influence of an important life event, fate attributions about subsequent, unrelated life events were greater than when individuals were primed to consider the influence of personal agency in affecting the focal life event. This occurred independent of a gender difference in fate attributions. Whether temporarily activated via an interdependence prime or chronically accessible via gender, heightened attention to the influence of social connections led life events to be interpreted through the lens of fate.
We also examined the impact of self-construal priming on belief in fate, belief in God, and causal complexity. Across all three measures, main effects for gender emerged. For belief in fate, this main effect was qualified by prime condition, such that the interdependent prime produced the gender difference but the independent prime did not. For belief in God, we observed a main effect for prime that was consistent with the pattern observed for fate attributions. In other words, for men and women alike, priming interdependence elevated belief in God relative to an independent prime. The differing effect of the prime on these two forms of supernatural agency beliefs, both of which mediated the gender difference in fate attributions in Study 3, suggests a complex interweaving of fate and God in social theories about causality. Finally, the absence of any observed effects for the prime on causal complexity argues against the idea that self-construal affects fate cognition by promoting a more causally complex information processing style.

The previous study found social status to be a better predictor of men’s belief in fate than it was for women. Given that men are more communal in their interdependence than are women (Baumeister & Sommers, 1997; Gardner et al., 2002), we might have expected to see the relational and communal primes operating differently for women and men, with greater belief in fate for women under the relational prime and greater belief in fate for men under the communal prime. Instead, we found the primes had identical effects on our dependent measures and so we collapsed them into one interdependent condition. One possible explanation for the apparent disconnection is that the communal prime did not emphasize the influence of hierarchical social standing per se, which is what Study 4 found to trigger men’s belief in fate.
General Discussion

We have presented evidence of a robust gender difference in the propensity to attribute life events to fate. Interpretations of hypothetical vignettes as well as autobiographical aspects of one’s life revealed that women more so than men perceive fate as having been a causal influence in determining life events (Studies 1a and 1b). Consistent with the idea that fate is an assisting force that ushers in (or may well destroy) important relationships to fulfill an individual’s destiny, gender differences in fate attributions were particularly pronounced for interdependent life events (Study 2). We find that this gender difference in social perception is predicted by differences in beliefs about underlying purpose to life events (Study 3). This belief in fate, as well as belief in God, are due in part to difference in how women and men define the self in relation to others (Study 4-5). Women’s relatively interdependent self-construal corresponds with the heightened belief that life events have underlying purpose and, as a result, are a priori more likely to be influenced by fate. More so than women, men’s belief in fate hinges on their social status, a form of social connection that links up to men’s tendency to define the self in terms of their standing in the social hierarchy (Baumeister & Sommers, 1997).

Overall, this research supports the idea that gender differences in how the self is defined predict distinct attributions about life events.

We examined belief in fate alongside belief in God. Although these two forms of supernatural belief were correlated in each study, we found that they had independent effects on explaining the gender difference in causal attributions. This is perhaps not surprising in light of recent research determining that teleological explanations are evident even among the non-religious (Banerjee & Bloom, 2014a), suggesting fate and
God are often thought to be copilots directing life events. Even avowed atheist and bestselling author Richard Dawkins (2013, p. 288) has acknowledged that “perhaps life has a tendency to converge on a pathway, something like a magnetic pull that draws it back despite temporary deviations,” suggesting belief in fate is distinct from belief in God.

Past work has already drawn a connection between interdependent self-construal and belief in God, albeit at a rather general level. For example, the need to belong (i.e., to connect meaningfully with others) correlates with belief in God, and threats to belonging, for example by social exclusion, motivate increased belief in God in an apparently compensatory manner (Epley et al., 2008; Gebaur & Maio, 2012; Nilufer, Fischer, & Frey, 2010). Other scholars have suggested that belief in God derives from the same cognitive tendencies underlying romantic love (Dawkins, 2006; Dennett, 1987). That is, the tendency to form emotional attachments to romantic partners has been argued by some to have been “repurposed” into love for a deity. From these ideas, it is relatively straightforward to suggest that interdependent self-construal is related to belief in God, because both involve a focus on mindful agents with complex internal agendas and potentially ulterior motives. More intriguingly counter-intuitive, we suggest, is our finding that interdependent self-construal relates also to belief in fate, which unlike belief in God does not involve a willful, motivated agency.

This research contributes to a growing body of work examining the social cognition of supernatural belief (Willard & Norenzayan, 2013). In addition to drawing a novel connection between self-construal and supernatural belief, we also replicated Norenzayan et al.’s (2012) finding that mentalizing ability mediates the gender difference
in belief in God. We extended our understanding of mentalizing ability by showing that it also predicts belief in fate. In combination, we find that both entering into the mind of others and defining the self in relation to others promote supernatural belief.

The current research deepens our understanding of gender differences by building on cultural theories. We borrowed the approach of Cross and Madsen (1997) who extended Markus and Kitayama’s (1991) self-construal theory of culture into the gender realm (Markus & Conner, 2013). Paralleling the observation that individuals from interdependent cultures make more fate attributions than individuals from independent cultures, we found that individuals with relatively interdependent self-construals have stronger fate cognitions – both lay beliefs about fate’s existence and attributions to fate for specific life events – than those with independent self-construals. Whereas Norenzayan and Lee traced this cultural difference to differences in causal complexity, our research failed to find evidence that causal complexity explains the gender difference in causal attribution. To be sure, Study 2 observed a de facto more causally complex set of attributions (encompassing both fate and chance) from women relative to men and Studies 3 and 6 observed a gender difference in causal complexity. However, Study 3 failed to observe mediation evidence for causal complexity and Study 6 failed to find evidence that an interdependent self-construal increases causal complexity, suggesting causal complexity may play a relatively nuanced role in predicting gender differences in fate attributions. Future research that explicitly compares cultural and gender effects on social perception is needed.

Limitations and Future Directions
More research is needed to understand what the observed gender difference in social perception means on a practical level. At a minimum, it suggests women may be more inclined to interpret synchronistic events as signs from the universe rather than shrugging them off as mere coincidence (Richo, 2007). Sensing the presence of fate at work in one’s life may allow individuals to disengage adaptively from unattainable goals (Wrosch, Miller, Scheier, & Brun De Pontet, 2007; Wrosch, Scheier, Miller, Schulz, & Carver, 2003) and to let go of lost possible selves (King & Hicks, 2007). For example, by accepting that a failed romantic relationship was ill-fated (“it wasn’t in the cards”), individuals may find satisfactory explanations that allow them to detach emotionally from their former lover and move on. Future research is needed that explores the downstream consequences of fate cognitions. For example, it is an open question whether predictable misunderstandings arise in heterosexual couples due to differing appreciation for the role of fate in bringing about their union. In a separate vein, recent research has explored the impact of superstitious beliefs (which are somewhat related to fate beliefs in that both lack concrete, observable support) in persuasion (e.g., Hamerman & Johar, 2013; Kramer & Block, 2008; Ng, Chong, & Du (2010).), and the present research suggests that persuasive messages that embody fate appeals will be more effective among women than men.

Future research is also needed to better understand the relation between construal level theory (Trope & Liberman, 2003; 2010) and self-construal theory (Cross & Madsen, 1997; Markus & Kitayama, 1991). Whereas the former pertains to a transcendence of the self in the here and now to travel temporal or spatial distances, the latter involves defining the self narrowly as independent or more inclusively in relation to others. In this
sense, an interdependent self-construal may represent more psychological distance from the core self, and thus elicit processes consistent with an abstract construal. Indeed, both types of construals have been shown to impact fate cognitions. Burrus and Roese (2006) found that abstract construals of past events promote the sense that they were meant to be; here we find that interdependent self-construals also promote fate-based interpretations of life events. As both forms of construal level ultimately speak to how broadly a category is defined (Medin & Smith, 1984; Rosch, 1975), either in terms of psychological distance or the self, it suggests women’s relatively interdependent self-construal may facilitate an appreciation of the “big picture” leading life events to unfold as they do, resulting in a relatively complex social theory. Additional research is needed to understand the similarities and differences between construals based on psychological distance versus self-definition.

More work is also needed to understand the relation between belief in fate and subjective well-being and meaning in life. Whereas past research has emphasized the irrationality of beliefs about divine compensation for unnecessary risks (“tempting fate”) (Gilbert, Brown, Pinel, & Wilson, 2000; Risen & Gilovich, 2008), the current research examines the subjective experience of fate in one’s life, irrespective of its objective truth (which is, by definition, unknowable). To begin, future research may link belief in fate to the drive for self-actualization (Maslow, 1943; Rogers, 1961). Humanistic theories of personality suggest that individuals have a growth potential that must be realized to derive meaning in life. According to this perspective, self-actualizers are able to resolve the apparent dichotomy between determinism and free will. Similarly, more work is
Gender, Self-Construal & Fate

needed to connect belief in fate to positive emotions, such as feelings of awe, with its moral, spiritual, and aesthetic components (Keltner & Haidt, 2010).

At the same time that researchers explore the apparent benefits of belief in fate, they will need to resolve how these beliefs relate to women’s relatively low self-efficacy, depression and anxiety (Nolen-Hoeksema, 1987; Peterson & Seligman, 1984). Given that attributing events to external forces can reduce psychological threats and stress (Laurin, Kay, & Moscovitch, 2008; Shepherd & Kay, 2012; Sullivan, Landau, & Rothschild, 2010), it is important to establish the boundary conditions determining whether belief in fate is ultimately a help or a hindrance on the road to well-being.

Conclusion

The current research adds to the social cognitive literature on at least three levels. First, we documented a robust gender difference in fate cognitions, measured both in hypothetical vignettes as well as autobiographies. Second, we provided evidence that this difference emerges particularly strongly for social life events compared to independent life events. Third, we find that gender differences in self-construal underlie differences in supernatural belief about the existence of fate and God, which, in turn, predict gender differences in causal attributions. Overall, our studies shed light on why and when gender differences emerge in the interpretation of life events.

Dating back to ancient cultures, the female figure has been used to depict a transcendent reality. Indeed, it has been suggested that women may be “closer to enlightenment” (Tolle, 1999), because of their cyclical bodily experiences and natural rhythms, including a literal unity with another being during childbearing (Kanis, 2002). The current research suggests that women’s inclination to define themselves in terms of
social relationships facilitates the recognition of a wheel of life that connects people and events across time and space, often in mysterious ways, to realize our destinies.
References


http://dx.doi.org/10.1177/1088868313518487


Kray, L. J., George, L. G., Liljenquist, K. A., Galinsky, A. D., Tetlock, P. E., & Roese, N. J. (2010). From what might have been to what must have been: Counterfactual thinking creates meaning. *Journal of Personality and Social Psychology, 98*(1), 106-118. doi:http://dx.doi.org/10.1037/a0017905


doi:http://dx.doi.org/10.1371/journal.pone.0036880


We distinguish belief in fate from implicit destiny theories, which past research has described as corresponding with fixed beliefs about a romantic partner as a soul mate (Finkel, Burnette, & Scissors, 2007; Knee, 1998). We also distinguish fate from karma, which connotes a direct causal relationship between previous actions and subsequent outcomes (Young & Morris, 2004). By contrast, fate need not imply divine compensation.

We also manipulated whether the events were characterized by a near miss for purposes irrelevant to the current investigation. As this manipulation did not interact with gender for any of the dependent variables, we excluded it from our analysis and discussion. In addition to the measures reported, participants gave a general rating of the extent to which they believed that the timing of all people's deaths is determined by forces outside of their control. Men ($M = 3.80, SD = 1.86$) reported lower agreement (on a 7-pt scale) than did women ($M = 4.51, SD = 1.92$), $t(452) = -3.91, p < .001$. This dependent measure proved difficult to interpret within the fate vs God framework, and so we simply note it here.

We included both immutability and purpose in how we defined fated events because prior work has established they are both aspects of fate cognitions (Pepitone & Saffiotti, 1997). Conversely, a belief in chance implies that no antecedent power is perceived to be responsible and an entirely different outcome could have happened (Pepitone & Saffiotti, 1997).
We also considered the possibility that women’s greater belief in fate is motivated by a desire to compensate for their low status (Eagley & Wood, 1982; Ridgeway, 2001), in a manner akin to system justification (Jost & Banaji, 1994) and just world beliefs (Lerner, 1980). This implies social status mediates the gender difference in belief in fate. However, given that Anderson and colleagues (2012) did not observe a gender difference in self-reported social status, this prediction is a priori unlikely.

In an exploratory vein, we also measured individual differences in personal need for structure, regret and rumination. We failed to find main effects or interactions with gender for any of our dependent measures, so for simplicity’s sake we have omitted these variables from the text.
Means, Standard Deviations, and t-Test Results of the Individual Difference Scales in Study 3

<table>
<thead>
<tr>
<th>Scale</th>
<th>Overall (N = 201)</th>
<th>Men (n = 90)</th>
<th>Women (n = 111)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Fate Attributions (.69)</td>
<td>.40</td>
<td>.23</td>
<td>.36</td>
</tr>
<tr>
<td>Belief in Fate (.87)</td>
<td>4.35</td>
<td>1.36</td>
<td>4.12</td>
</tr>
<tr>
<td>Belief in God (.83)</td>
<td>3.51</td>
<td>1.61</td>
<td>3.35</td>
</tr>
<tr>
<td>Causal Complexity (.74)</td>
<td>5.27</td>
<td>.83</td>
<td>5.13</td>
</tr>
</tbody>
</table>

*Note.* Values in parentheses are Cronbach’s alphas.
Table 2
Means, Standard Deviations, and t-Test Results of the Individual Difference Scales in Study 4

<table>
<thead>
<tr>
<th>Scale</th>
<th>Overall (N = 495)</th>
<th>Men (n = 226)</th>
<th>Women (n = 269)</th>
<th>p</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Belief in Fate (.86)</td>
<td>4.89</td>
<td>1.20</td>
<td>4.77</td>
<td>1.23</td>
<td>5.00</td>
</tr>
<tr>
<td>Belief in God (.81)</td>
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<td>1.43</td>
<td>4.89</td>
<td>1.45</td>
<td>5.27</td>
</tr>
<tr>
<td>Self-Construal (.82)</td>
<td>4.83</td>
<td>0.97</td>
<td>4.73</td>
<td>0.99</td>
<td>4.91</td>
</tr>
<tr>
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<td>0.73</td>
<td>4.63</td>
<td>0.71</td>
<td>4.94</td>
</tr>
<tr>
<td>Social Status (.94)</td>
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<td>1.32</td>
<td>4.59</td>
<td>1.33</td>
<td>4.46</td>
</tr>
</tbody>
</table>

Note. Values in parentheses are Cronbach’s alphas.
### Table 3

Regression Models Predicting Belief in Fate and Belief in God in Study 4

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>.24 (.12)*</td>
<td>.14 (.11)</td>
<td>.14 (.11)</td>
<td>.30 (.13)*</td>
<td>.33 (.16)*</td>
<td>.22 (.13)*</td>
</tr>
<tr>
<td>Self-Construal</td>
<td>.36 (.06)**</td>
<td>.44 (.10)**</td>
<td>.23 (.09)*</td>
<td>.16 (.12)</td>
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</tr>
<tr>
<td>Mentalizing Ability</td>
<td>.17 (.09)*</td>
<td></td>
<td>.48 (.13)**</td>
<td>.11 (.17)</td>
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<td></td>
</tr>
<tr>
<td>Social Status</td>
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<td>.10 (.05)*</td>
<td>.20 (.07)**</td>
<td>.18 (.08)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-ConstrualXFemale</td>
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<td></td>
<td></td>
<td></td>
<td>.10 (.15)</td>
<td></td>
</tr>
<tr>
<td>Mentalizing AbilityXFemale</td>
<td></td>
<td>.17 (.18)</td>
<td></td>
<td></td>
<td>.17 (.21)</td>
<td></td>
</tr>
<tr>
<td>Social StatusXFemale</td>
<td>-.19 (.09)*</td>
<td></td>
<td></td>
<td></td>
<td>-.12 (.11)</td>
<td></td>
</tr>
<tr>
<td>Age&lt;sup&gt;10&lt;/sup&gt;</td>
<td>-.01 (.04)</td>
<td>-.01 (.04)</td>
<td>-.01 (.03)</td>
<td>.21 (.05)**</td>
<td>.27 (.04)**</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>-.42 (.14)**</td>
<td>-.36 (.13)**</td>
<td>-.39 (.13)**</td>
<td>-.30 (.19)</td>
<td>-.34 (.15)*</td>
<td></td>
</tr>
<tr>
<td>College Degree</td>
<td>-.19 (.11)</td>
<td>-.21 (.10)*</td>
<td>-.21 (.10)*</td>
<td>-.13 (.15)</td>
<td>-.30 (.12)*</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>.01 (.12)</td>
<td>-.10 (.11)</td>
<td>-.11 (.11)</td>
<td>.18 (.17)</td>
<td>.23 (.13)</td>
<td></td>
</tr>
<tr>
<td>Nchildren</td>
<td>.04 (.04)</td>
<td>.05 (.04)</td>
<td>.05 (.04)</td>
<td>.10 (.04)*</td>
<td>.10 (.05)*</td>
<td>.10 (.04)*</td>
</tr>
<tr>
<td>US Born</td>
<td>.01 (.20)</td>
<td>-.07 (.18)</td>
<td>-.04 (.18)</td>
<td>.03 (.27)</td>
<td>-.09 (.21)</td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>-.07 (.12)</td>
<td>.01 (.11)</td>
<td>.01 (.11)</td>
<td>.05 (.13)</td>
<td>.16 (.16)</td>
<td>.13 (.13)</td>
</tr>
<tr>
<td>Primary Earner</td>
<td>.24 (.13)</td>
<td>.22 (.11)†</td>
<td>.20 (.21)</td>
<td>.17 (.17)</td>
<td>-.02 (.14)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Numbers represent coefficient estimates (standard errors in parentheses).  
Age was multiplied by 10 to better illustrate effects.  
Self-Construal, Mentalizing Ability, and Social Status are mean-centered.
Figure Captions

*Figure 1.* Study 2: Gender differences in fate and chance attributions by life event context. Error bars represent the standard error of the mean.

*Figure 2.* Study 3: Gender differences in fate and chance attributions by life event type. Error bars represent the standard error of the mean.

*Figure 3.* Study 4: Self-construal and mentalizing ability as mediators of the effect of gender on belief in fate and belief in God.

*Figure 4.* Study 4: Predicted values of belief in fate by personal sense of status and gender.

*Figure 5.* Study 5: Gender differences in fate attributions, belief in fate, and belief in God by self-construal. Interdependence condition collapses across relational and communal primes. Error bars represent the standard error of the mean.
Gender, Self-Construal & Fate

![Graphs showing fate and chance attributions for different social contexts (Romance, Death, Sports) for men and women.](Image)
Independent Life Events

Interdependent Life Events

Type of Attribution

Men

Women
Gender, Self-Construal & Fate

Gender

\[ \beta = .09^* \]
\[ \beta = .09^* / \beta = .04 \]
\[ \beta = .22^{**} \]
\[ \beta = .10^* / \beta = .04 \]
\[ \beta = .10^* \]
\[ \beta = .15^{**} \]

Belief in Fate

Mentalizing Ability

\[ \beta = .14^{**} \]
\[ \beta = .14^{**} / \beta = .09^+ \]
\[ \beta = .10^* \]
\[ \beta = .14^{**} \]
\[ \beta = .17^{**} \]
Note: Predicted values determined via coefficient estimates obtained by regressing belief in fate on social status for men and women.
Gender, Self-Construal & Fate

**Fate Attributions**

- **Self-Construal Prime**
  - Independent
  - Interdependent

**Belief in Fate**

- **Self-Construal Prime**
  - Independent
  - Interdependent

**Belief in God**

- **Self-Construal Prime**
  - Independent
  - Interdependent
Appendix A

Study 1b stimulus materials

Romance vignette:
It is a Wednesday morning and John has overslept. He takes a quick shower, throws on some clothes and rushes down to the train station to catch his train to work. He runs up the steps to the platform, and slips through the doors just before they shut. On the train ride, John notices a young woman he’s never seen before and starts up a conversation. Her name is Sarah, and the conversation goes very well. One year later, John and Sarah end up getting married. Had John missed the train, they would have never met.

Death vignette:
“Matt was a bartender at a popular downtown bar. One Saturday, he came to work for his usual shift. The evening was busy, as was typical for Saturday nights, their most popular night. As he usually did, after his shift, he stayed after work and enjoyed a drink with his coworkers before heading home. As he left work on his motorcycle, he put on the helmet that he always wore and drove off. A few minutes later, he got into an accident by hitting a parked car and, as a result, lost his life.”

Sports vignette:
“At an early season Illinois basketball game, both teams have records of four wins and three losses. The game is fiercely contested with neither team leading by more than a few points. During the last minute, Illinois makes a couple of key baskets and defensive stops and manages to pull out the victory by a two-point margin. The final score is 97-95. Illinois wins!”
Appendix B

Life Events from Study 2

**Relatively Independent Life Events**
The amount of money you’ll have in your bank account at the time of your death
Your grade point average upon graduation from high school
The prestige of your job 25 years post-graduation
Your first job upon graduation from college
Your acceptance to UC Berkeley
What you ate for breakfast this morning
The prestige of your job 10 years post-graduation
Your grade point average upon graduation from college
The grade you earn on your next exam
The last time you were late for class
The dreams you have tonight

**Relatively Interdependent Life Events**
The biological parents you were born to
Who your siblings are
Whether you inherit a large sum of money one day
Whether your biological parents are still married
Whether you have your heart broken in your lifetime
Who you marry
Your first sexual partner
The number of children that you have at age 50
Whether you experience a divorce one day

**Both Independent and Interdependent Life Events**
Whether you lead a happy and fulfilling life
Whether you become famous

**Neither Independent nor Interdependent Life Events**
The timing of your death
Whether you experience a debilitating illness in your lifetime
Whether you win the lottery one day
Whether you are the victim of a violent crime
The biological cause of your death
Whether your favorite athletic team has a winning season next year