

**“What Was Meant to Be” Versus “What Might Have Been”:  
Effects of Culture and Control on Counterfactual Thinking**

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**Author Note**

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Experimental materials and raw data are available at ([https://osf.io/ejv8n/?view\\_only=68cc5ad514a64714a48d3e41255b775f](https://osf.io/ejv8n/?view_only=68cc5ad514a64714a48d3e41255b775f)). Please address correspondence to Angela Maitner, Department of International Studies, American University of Sharjah, P.O. Box 26666, Sharjah, United Arab Emirates; [amaitner@aus.edu](mailto:amaitner@aus.edu); Phone: +971 6 515 2437, Fax: +971 6 515 2516.

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**Abstract**

Counterfactual thinking is a ubiquitous feature of daily life with links to causal reasoning. Therefore, we argue that cultures that vary in perceptions of what controls important life outcomes may also vary in counterfactual thought. Investigating White American and United Arab Emirates-based Arab participants' counterfactual potency and spontaneous counterfactual thinking, we found that Arab participants endorsed counterfactual thoughts less than White Americans, and were unaffected by the routine nature of action when negative outcomes were severe. Differences in counterfactual endorsement in response to severe negative outcomes were linked to greater beliefs in divine control and fate in Arab participants, and not to religiosity, reinforcing an important role of perceptions of control in counterfactual thought. However, although reporting less counterfactual endorsement overall, Arabs showed a similar pattern of counterfactual thought to White Americans when negative outcomes were mild, or when reporting spontaneous thought. Arabs likewise showed a similar pattern of regret as White Americans regardless of event severity, reporting more regret when outcomes resulted from unusual action. These patterns suggest a dissociation between affect and cognition, and between what kind of outcomes are subject to counterfactual scrutiny in Arab participants.

*Keywords:* counterfactual thinking, culture, primary control, divine control, fate

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“A strong believer is better and more preferred to God than a weak believer, even though each of them has their worth. Be keen to attain what benefits you; seek God’s help and do not give up; if something befalls you do not say, ‘If only I had done this or that’ but rather, say, ‘It is the decision of God, whatever He wills He does.’ Indeed, ‘if’ opens the way for Satanic influence” (Muslim, 1998, p. 1161).

Counterfactual thinking, imagining how past events might have been different, is ubiquitous (Roese, 1997; Summerville & Roese, 2008). However as the hadith (a narrative of the words, actions, or habits of the Prophet Muhammad) used to open this paper suggests, counterfactual thinking may differ across groups. This paper investigates counterfactual thinking and regret in United Arab Emirates (UAE)-based Arab and White American university students, exploring whether differences in counterfactual thinking relate to culturally-grounded beliefs about causality.

**Counterfactual Thinking**

Counterfactual thinking involves undoing an event that has actually occurred by imagining how antecedent conditions or consequences could have been different (Kahneman & Miller, 1986; Roese, 1997). Counterfactuals are a common feature of daily life for American samples (Summerville & Roese, 2008). People can consider alternatives to past outcomes that would have been better (upward counterfactuals) or worse (downward counterfactuals) than factual events. Because these thoughts differ in both their antecedents and effects, and because upward counterfactuals are more common in response to negative events, we focus primarily on upward counterfactuals in the current research.

Upward counterfactuals are linked to a self-improvement motivation (White & Lehman, 2005) and have broad motivational and performance benefits (Epstude & Roese,

2008) in the samples investigated. Such counterfactuals influence a variety of processes, including causal reasoning (Wells & Gavanski, 1989), ascriptions of blame (Goldinger et al., 2003), and behavioral intentions (Smallman & Roese, 2009). Upward counterfactuals typically produce negative affect (Davis et al., 1995; Markman et al., 1993), uniquely eliciting the emotion of regret (Gilovich & Medvec, 1995; Zeelenberg et al., 1998). Thus, cultural differences in upward counterfactual thinking could have implications for a range of psychological phenomena.

Existing research shows that upward counterfactual thoughts are most likely to occur when a causal antecedent event is easy to mentally undo. Thus, counterfactuals are more likely when an event is unusual or surprising versus typical or expected (Kahneman & Miller, 1986) or when an alternative is numerically or temporally closer to a better outcome (Medvec et al., 1995). Importantly, counterfactuals are linked bi-directionally to perceptions of personal control. People tend to engage in more counterfactual thinking after controllable than uncontrollable negative events (Roese & Olson, 1995) and to focus on controllable elements of a situation when considering ways to have avoided a negative outcome (Giroto et al., 1991; McCloy & Byrne, 2000). This focus on control is especially likely when current circumstances were initiated by the individual, and may be less likely to be the case when circumstances were initiated by someone else (see Roese et al., 2017). In turn, counterfactual thoughts can increase perceptions of efficacy and control (Nasco & Marsh, 1999, Wong et al., 2012).

Most research on counterfactual thinking has examined participants in Western countries<sup>1</sup>, and overall, there is a dearth of psychological research on Arab participants (see

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<sup>1</sup> The research on counterfactual thinking, like much of social psychology, has historically largely used college-student samples. However, there are important lifespan changes in counterfactual thinking and associated emotions in older adults (e.g., Wrosch & Heckhausen, 2002). Our discussion of past work and the implications of the current work thus should be understood in the context of young and middle adulthood; future work should consider cross-cultural variation in developmental trajectories.

Arnett, 2008; San Martin et al., 2018; Thalmayer et al., 2020). In this paper, we extend the existing literature by comparing young White Americans to young (majority Muslim) Arabs in the UAE. We expected these samples to differ in perceptions of control while maintaining similarities in age, education, and socioeconomic status.

### **Culture and Control**

Cross-cultural research suggests that cultures vary in the extent to which people perceive control over life outcomes. Skinner (1996) defines personal control as “self as agent, the self’s actions or behaviors as the means, and an effected change in the social or physical environment as the outcome” (p. 558). Personal or primary control beliefs are expectations that an individual can directly affect or change their outcomes, and therefore reflect *influence motives*, or desires to change one’s environment to suit the self (Morling, 2000; Morling et al., 2002; Rothbaum et al., 1982). In that way, personal control beliefs are associated with a disjoint model of agency, where people perceive their own actions as freely chosen, and reflective of individual preferences or motives (see Savani et al. 2011).

Secondary control is a more amorphous construct, and researchers have argued whether it should be termed a form of control at all as the locus of control lies outside the individual (Morling and Evered, 2006; Skinner, 2007). Rothbaum and colleagues (1982) introduced four manifestations of secondary control: Predictive control is associated with perceptions that one’s ability is severely limited in a particular context; illusory control is akin to beliefs in luck shaping one’s outcomes; vicarious control reflects a belief that powerful agents determine outcomes; finally interpretive control occurs when the individual tries to construct meaning and accept uncontrollable events. Morling and Evered (2006) further suggested that secondary control is dimensional, including elements of ‘fit versus control’ reflecting differences in the individual’s desire to establish a feeling of control, versus a desire to fit themselves to the situation or circumstances in which they find

themselves. In the cross-cultural literature, comparing Western countries to East Asia, fit-focused secondary control reflects *adjustment motives*, or desires to change the self to suit the context, often in the service of harmony and interdependence (Morling, 2000; Morling et al., 2002).

For many cultures and individuals, religious and fatalistic beliefs offer important causal structure to understanding the world, reflecting fit-focused (vicarious or interpretive) secondary control. To the extent that individuals perceive that God or fate determine their outcomes, they will also perceive those outcomes as predetermined, meaningful, and causally inevitable (Berrenberg, 1987; Krause, 2005). As a result, individuals accept those outcomes, and adjust themselves to their circumstances, rather than trying to control or change them. Investigating origins of endorsement of personal control (termed structural fatalism) versus fate beliefs (termed cosmological fatalism), Ruiu (2013) reported that cultural factors (including religion) and historical institutional experiences affected national endorsement of fate beliefs.

Culture also affects beliefs in equifinality, in which outcomes are seen as fixed, such that if an outcome that is “meant to be” it would have occurred by a different means even if the antecedent conditions were changed. Such outcomes cannot be affected or “controlled” by an individual. Because such beliefs are likely to undermine the functionality of upward counterfactual thinking, Norenzayan and Lee (2010) argued that beliefs in equifinality may reduce counterfactual potency. Consistent with this view, Alquist and colleagues suggest that counterfactual reasoning requires the thinker to consider that one event could have had multiple possible outcomes, or that changes in antecedent conditions could elicit changes in the outcome (Alquist et al., 2015).

### ***Control in North American Contexts***

North Americans tend to perceive situations in terms of their affordances for direct personal control. This idea is perhaps best exemplified by the American Dream, which incorporates the idea that the country is exceptional with the belief that individuals can pursue individual success and fulfillment, the latter component suggesting that individuals should take action to influence their environment to suit the self (Hauhart, 2015). In fact, Morling et al. (2002) showed that U.S. culture affords influence situations, and that both American and Japanese participants reported higher feelings of efficacy in response to influence situations generated by Americans, suggesting that Americans experience influence situations which particularly stimulate feelings of personal control. Americans are also more likely to make choices that force the environment to suit them, rather than changing the self to fit the environment (Morling, 2000). Relatedly, in the US, endorsing a disjoint model of agency is associated with support for policies promoting individual rights, but not for policies that promote equality or social benefits (Savani et al., 2011), showing that believing that individuals' actions are freely chosen is associated with an expectations that individuals are then responsible for their positions in society, over which they have personal control.

For North Americans, influenced by Aristotelian systems of logic, endorsing personal control beliefs may be incompatible with endorsing secondary control beliefs. Empirical research shows that European Canadians make fewer attributions to fate for surprising life events than do East Asian Canadians, due to East Asians' greater propensity to endorse causal complexity. European Canadians were likewise less likely to show equifinality beliefs (Norenzayan & Lee, 2010), suggesting that they expect that changing antecedent conditions can facilitate changes in outcomes. Relatedly, Alquist et al. (2015) reported that, across four studies with American college students, beliefs in free will led participants to focus on how they could have changed their own behavior within a particular set of circumstances, and thus predicted counterfactual thinking. However, it is worth noting that Canadian Christian

students make more attributions to fate than do non-religious participants, due to Christian participants' belief in God (Norenzayen & Lee, 2010).

Overall, though, research suggests that young North Americans endorse primary control and show lower beliefs in fate than comparison groups. It may be these culturally-grounded belief systems that support patterns of counterfactual thinking that are well established in the research literature.

### *Control in Arab Contexts*

Academic and religious scholarship suggest that Arabs and Muslims perceive a significant role of fate and divine control in determining life outcomes. Pre-Islamic Arabs attributed successes and misfortunes to time, a force closely linked to fate and destiny (Watt, 1973). During this period, invocations of fate are visible in cultural products such as Arabic poetry (Gasimova, 2014). Cohen-Mor (2001) argues that the influence remains visible in literature today, arguing that belief in fate has retained vitality and acts as a powerful cultural force. In fact, many Arabs believe that important life events are naseeb (نَصِيب or "destiny") or maktub (مَكْتُوب or "it is written") and such beliefs are closely tied with equifinality, suggesting that outcomes will occur no matter what choice an individual makes (see El-Shamy, 1995). The everyday appeal to fate in Arab culture is perhaps best exemplified by the consistent use of the phrase insha'Allah (إِنْ شَاءَ اللَّهُ; "if God wills") when discussing future events (see Clift & Helani, 2010). This phrase, acknowledging that one's outcomes are not fully determined by primary control, is spoken by Christians, Muslims, and non-religious Arabs, often for non-religious purposes.

However, belief in fate does not mean that Arabs perceive no control or responsibility over their life course. In reflecting on pre-Islamic Arabic poetry Gasimova, (2014) argues that at times, individuals would challenge fate or look for ways to overcome fate to determine their own destiny. Demonstrating that empirically, Rashwan and Jenkins (2017) showed that

both Christian and Muslim Egyptians endorsed beliefs in primary control (termed empirical fatalism: “I decide my future”) alongside beliefs in divine control (termed theological fatalism: “God has decided my future and it is a matter outside of my control”). The authors found no differences between Muslim and Christian participants, and they found that the two beliefs were uncorrelated, suggesting that endorsing primary control beliefs does not prohibit beliefs in secondary control in Arab samples (Rashwan & Jenkins, 2017). Similarly, looking at data from the 2002 Gallup Poll of the Islamic World, Acevedo (2008) reported that Saudi and Lebanese respondents showed beliefs in primary control (measured similarly to Rashwan & Jenkins empirical fatalism, but reverse coded; thus lower scores are interpreted here as indicating primary control) and beliefs in divine control (theological fatalism). The overall pattern was similar in Iranian participants, whereas Turkish participants endorsed primary control less, and Indonesian participants endorsed both primary control and divine control more, suggesting that the pattern was not identical across Muslim-majority contexts. Although Lebanese Christians and Muslims endorsed primary control to a similar extent, Christians endorsed beliefs in divine control somewhat less than Muslims. Finally, Ruii (2013) found that Egypt, Morocco, and Mali were outliers when looking at the relationship between primary control and fate beliefs, suggesting weaker associations between the two beliefs in these three Muslim (two North African Arab) countries.<sup>2</sup>

Islam, a religion which originated and developed within an Arab cultural context, also evokes divine will and fate as meaningful causes of important life events (Rubin & Yasien-Esmael, 2004; Watt, 1973). In fact, belief in divine decree and predestination (قضاء و قدر, qada

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<sup>2</sup> This work highlights an existing problem in research on fate beliefs, as much research assumes that primary and secondary control beliefs represent two ends of a continuum (ignoring the potential for dialectical endorsement of both beliefs), and thus do not measure beliefs as independent factors allowing researchers to explore independent effects on outcomes. Measurements include items such as: “Some people believe that individuals can decide their own destiny, while others think that it is impossible to escape a predetermined fate. Please tell me which comes closest to your view:” 1 = *Everything in life is determined by fate*; 10 = *people shape fate themselves*. In Acevedo’s (2008) work, Saudis score moderately on this single item measure, which may reflect the fact that participants endorse both possibilities, resulting in moderate scores when beliefs are measured as a single item.

and qadar) is one of six articles of faith, which are basic beliefs required of faithful Muslims (Saeed, 2006). Thus, Islam prohibits questioning God's will over important events, but also provides a meaningful explanation for aversive outcomes, thereby reducing the need to question the causal chain of events or attempt to control or change it.

As within Arab culture, beliefs in divine destiny are quite compatible with beliefs in individual choice and responsibility within Islam (Wan Zakaria, 2015). Indeed, the hadith with which we opened this paper evokes both intentional individual action and submission to God's will. Likewise, many verses in the Qur'an emphasize individual control, choice, and responsibility over one's own actions (see Kabasakal & Dastmalchian, 2001). Moreover, in the last judgment, God is believed to judge individuals based on the moral content of their acts. Thus, although final or substantial outcomes are known to God, humans have responsibility for the chosen path that ultimately leads to their destiny (Watt, 1973).

Importantly, although Arab Muslims are discouraged from questioning difficult outcomes, they are not equally discouraged from feeling upset about them. For example, the Arab Muslim experience of grief involves strong emotional bereavement while verbally placing faith in God and God's will, a pattern of reactions that differs from Muslims of other cultural backgrounds (Rubin & Yasien-Esmael, 2004; Wilkan, 1988; see also Al-Meshhedany & Al-Sammerai, 2010). Although this work investigates bereavement, it suggests that Arab Muslims may notice and be emotionally sensitive to situational features known to increase counterfactual thinking. If this is indeed the case, then they may show emotional reactions similar to North Americans, reporting regret in the face of negative outcomes, while still refusing to endorse counterfactual thought about events determined by God. This would suggest an important dissociation between emotions that reflect a desire that an outcome *was* different with explicit thoughts considering how it *could have been* different in Arab participants. It may also imply that even if counterfactual thoughts can be salient for Arabs,

they nevertheless may choose to disregard them in line with scripture and a recognition that although people should try to influence their environment, they do not control ultimate outcomes.

Thus, cultural and religious scholarship suggests that both Arab culture and Islam are tied to beliefs in fate. Similarly, Norenzayan and Lee (2010) reported that both collectivistic culture and religion were independently and additively associated with beliefs in fate. Therefore, we expected that a majority Muslim Arab sample would be likely to score high in fate beliefs, representing a strong comparison group for samples that have been previously investigated in research on counterfactual thinking.

### **Current Research**

Past research suggests that negative outcomes that were controllable, important, and closer to better outcomes will produce more frequent and impactful counterfactuals (Gilovich and Medvec, 1995; Kahneman & Miller, 1986; Medvec et al., 1995; Roese & Olson, 1995). However, the vast majority of this research was conducted with North American samples. We predicted that differences in culturally-grounded beliefs that emphasize fate and divine control over predetermined outcomes would produce different patterns of counterfactual thought between Americans and Arabs, while eliciting similar patterns of regret.

Across five studies, we investigated upward counterfactual thinking and regret reported in response to both severe and mild negative outcomes, systematically replicating and extending findings to explore mediators and moderators of cultural differences. Across studies, Arab and American participants read scenarios in which a protagonist experienced an aversive outcome. **Borrowing a well-established paradigm (Kahneman & Miller, 1986), we manipulated whether the protagonist's outcome resulted after routine or unusual action.** Participants read scenarios and reported thoughts in a close-ended format in Study 1. In Study 2, we replicated and extended that work, also asking participants to spontaneously generate

thoughts before completing close-ended measures that explored counterfactuals about both the target and the situation. To investigate whether cultural differences remain when outcomes are less severe and more akin to the path individuals choose to reach their divine destiny, in Studies 3 and 4, we measured close-ended and spontaneous reactions to mild negative outcomes. In these studies, we also explored behavioral intentions, as well as how participants themselves, versus the target, would think, feel, and behave (McCrea, 2007). Finally, we conducted a correlational study (Study 5) to investigate the extent to which religiosity versus control beliefs were associated with counterfactual thoughts for Arab participants.

We hypothesized:

H1: Arab participants would show greater propensity to believe that divine control and fate influence life events, both in response to specific events (H1a), and in general (H1b) compared to American participants.

H2: Arab participants would engage in less counterfactual thinking than American participants.

Counterfactual thoughts have two parts: an antecedent (“If I had set an alarm...”) and a consequent (“...then I would not have overslept for my exam.”) These components respectively relate to how likely it is that circumstances might have been different, and to the impact of that change on an outcome. We predicted both a main effect of culture and a culture  $\times$  event condition (whether the outcome resulted from routine or unusual action) interaction on the extent to which participants endorsed counterfactuals about antecedents in response to severe outcomes (H2a), such that the effect of condition would be stronger for the American than the Arab sample (Studies 1 and 2). This finding would reflect well-established patterns in American samples, who are more likely to endorse ‘counterfactual antecedents’ when an outcome resulted from an exception to routine and is thus controllable. Because we

expected Arabs to have higher beliefs in fate, we did not expect their endorsement of antecedents to differ in their response to routine versus unusual events. We then explored whether this effect would replicate in response to mild events, more akin to the path individuals choose to reach their divine destiny, or whether Arabs and Americans would report similar differences for counterfactual antecedents between routine and unusual events which were less severe (Studies 3 and 4).

Because counterfactuals about consequents – whether the outcome could have been different *given* a change in antecedents – are less reflective of primary control, we expected only a main effect of culture on ‘counterfactual consequences’ (H2b). Such results would be indicative of more beliefs in equifinality in Arab participants, which we also measured.

Finally, the overall strength of a counterfactual can be computed as the multiplied product of counterfactual antecedents and consequents, a calculation known as counterfactual potency<sup>3</sup> (Petrocelli et al., 2011). Given our predictions about these components, we expected potency would demonstrate both a main effect of culture, and a culture × event condition interaction when outcomes were severe (H1c; Studies 1 and 2). We then explored the pattern of potency when outcomes were mild (Studies 3 and 4).

H3: Differences in beliefs about divine control and fate would mediate the effect of culture × event condition effect on counterfactual thought. That is, we predicted that Arabs would endorse counterfactuals less than Americans reflecting their stronger beliefs that outcomes are determined by divine will and fate.

H4: Arabs would be emotionally reactive to event condition, showing heightened regret when aversive outcomes resulted from unusual action, similar to Americans. This hypothesis reflects research suggesting a dissociation between thought processes and affect in

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<sup>3</sup> Formally, counterfactual potency is a conjoint conditional probability, where  $P(B) = P(A) * P(B|A)$ .

Arab Muslims allowing more negative emotional reactions than counterfactual thought after negative experiences.

We report all materials and complete data analyses for all five studies in Supplemental Materials (SMF) and Supplemental Data (SDF) Files. In addition, study programs and materials and data and analysis files are available at [https://osf.io/ejv8n/?view\\_only=68cc5ad514a64714a48d3e41255b775f](https://osf.io/ejv8n/?view_only=68cc5ad514a64714a48d3e41255b775f) (Maitner & Summerville, 2021). Below, we report analyses that directly test hypotheses. For Studies 1 and 2, following the recommendations of Lakens and Evers (2014), we set a minimum of 50 participants from each culture per event condition, and exceeded that number in both locations. Given the results of Studies 1 and 2, for Studies 3 and 4, we pre-registered an analysis plan (see [Blinded As Predicted PDF attached for peer review; will insert link in accepted version]) to test competing hypotheses exploring the impact of culture and event condition on reactions to mild outcomes. Although we had started data collection for Study 3, we registered the goal of collecting data from a minimum of 60 participants per condition, to exceed the minimum within-culture sample investigated in Studies 1 and 2, before accessing or evaluating any data. For Study 5, we pre-registered a goal of collecting data from 80 participants for our correlational study (see [Blinded As Predicted PDF attached for peer review; will insert link in accepted version]). All data were collected prior to analysis in all studies.

Norenzayan and Lee (2010) found that Asian Canadians reported higher fate attributions than did European Canadians. Likewise Ross et al. (1983) reported that the Mexican cultural identity is associated with holding a fatalistic worldview. Finally, Gaines et al. (1997) showed that Asian, Black, and Latino Americans are more collectivistic than European Americans. Thus, to ensure the most powerful comparison between cultural groups, while holding age, education, and socioeconomic status constant, we compared data from Arab students in the UAE and White, non-Hispanic American students in the US.

Our Arab sample from the UAE is nationally diverse, reflecting the demographic makeup of the country where only 11% of the resident population are Emirati nationals (United Arab Emirates National Bureau of Statistics, 2011). Thus, Arab students in our sample speak a variety of Arabic dialects, all of which differ from written Arabic, which takes a standard form. In 2015, 56% of Arab youth from Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE reported speaking English more than Arabic on a daily basis (ASDA'A Burson-Marsteller, 2015). Moreover, admission to the data collection institution requires fluency in written English, as English is the language of instruction, but there are no requirements regarding fluency in written Arabic. Because English is widely spoken, because fluency in modern standard Arabic varies within our samples, and because the language of instruction at the UAE data collection institution is English, we collected all data in the US and the UAE in English (for more information, see SMF).

### **Study 1**

In Study 1, participants reported general control beliefs as well as their counterfactual thoughts and regret about scenarios in which the protagonist was seriously injured. We measured attributions to personal control, fate, and luck, as well as equifinality beliefs as internal replications of our main variables, and to help us more completely depict thought processes of an underrepresented participant group.

### **Method**

#### ***Participants***

Participants included 135 White, non-Hispanic Americans<sup>4</sup> from a mid-sized state university in the US (65 male, 70 female,  $M$  age = 19.31,  $SD$  = 1.72; 68.9% identified as

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<sup>4</sup>Thirty-three non-white participants were excluded from the U.S. sample. However overall conclusions do not change substantially if those 33 participants are included in analyses. Note that for brevity, we will refer to the White, non-Hispanic American sample as "White Americans" in all studies.

Christian) and 174 Arab<sup>5</sup> participants from an English language university in the UAE (60 men, 114 women,  $M$  age = 20.04,  $SD$  = 1.58; 90.2% identified as Muslim). IRB approval was granted by both institutions for Studies 1-4, and from our UAE-based university for Study 5. For further consideration of cultural context, see SMF.

Participants read hypothetical scenarios in which a negative outcome resulted from either a routine event or unusual event. We included two scenarios (car accident vs. construction accident) adapted from previous research (Kahneman & Miller, 1986) to investigate the generalizability of results.

### ***Procedure***

Participants at both locations completed identical experimental surveys. Participants in the US completed the study in a laboratory on computers using Qualtrics online research platform (Qualtrics, 2009); up to 5 students participated in sessions in which each participant was seated in an individual room with a single computer station. In the UAE, up to 8 participants completed the study at the same time in a large, open laboratory environment on computers running MediaLab software (Jarvis, 2014); careful spacing and desktop dividers provided privacy between participants. All instructions and materials were presented on the computer.

Participants were told that they would read about different events. They were asked to imagine that the event really happened and to try to take the perspective of the protagonist.

### ***Scenario and Event Manipulations***

Participants read two scenarios presented in a counterbalanced order (see SMF). In one scenario, Adam got into a car accident and was seriously injured while taking his typical (routine-event condition) or an unusual (unusual-event condition) route to work. In the other

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<sup>5</sup> The UAE sample was drawn from an international university where slightly less than 25% of students are Emirati nationals, but a majority of students are from Arab nations. Participants included students who self-identified as holding Arab ethnicity. For brevity, in text we refer to the UAE-based Arabs as “Arabs”.

scenario, Sara was seriously injured by falling construction debris while walking to her routine (routine-event condition) or unusual (unusual-event condition) grocery store.<sup>6</sup>

### ***Dependent Variables***

All ratings were made on 6-point scales (see SMF). Participants were first instructed to consider the counterfactuals “If only Adam (Sara) had taken another route (gone to a different store), then he (she) would not have been injured.” They reported the likelihood that the protagonist could have changed the *antecedent* conditions, and the likelihood that changing the antecedent conditions would have changed the *consequence*. We analyzed these responses individually and computed *counterfactual potency*, the overall strength of a counterfactual thought, by multiplying responses on the individual measures (see Petrocelli et al., 2011).

Participants then responded to the following seven items in random order (see full item wording in SMF). They reported *causal attributions*, including perceptions that the outcome was caused by *fate* (“determined by fate” and “meant to be”; for White Americans these two items were correlated  $r = .57$  for the car accident, and  $r = .76$  for the construction accident; for Arabs,  $r = .53$  for the car accident, and  $r = .52$  for the construction accident), *personal control* (“personal actions”) and *luck* (“random chance or bad luck”). Participants also reported *equifinality beliefs* (whether the outcome would have occurred even if the antecedent had differed); *regret* (whether the protagonist would feel regret); and *blame* (whether the other driver/the construction company should have to pay for the accident).

After reading one scenario and reporting all related dependent variables, participants repeated the process with the second scenario which varied in event condition. Unfortunately, analyses yielded complex order effects. Order effects are a common issue for studies of

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<sup>6</sup> Informal pilot testing with undergraduate assistants at both universities identified both Adam and Sara as common names for both Arabs and White Americans.

counterfactual thinking due to counterfactual mindset (e.g. Galinsky & Moskowitz, 2000; Kray & Galinsky, 2003). Thus, we report analyses only for the first scenario, creating a 2 (culture: White American vs. Arab)  $\times$  2 (event condition: routine vs. unusual)  $\times$  2 (scenario: car accident vs. construction accident) between-subjects design. However, note that participants responded to two scenarios before reporting dispositional control beliefs.

### ***Dispositional Control Beliefs***

Participants completed a 30-item individual difference measure of fatalism, reflecting 5 related concepts associated with beliefs in different forms of primary and secondary control (Esparza et al., 2014).<sup>7</sup> The measure includes five 6-item subscales indicating the extent to which participants agree that outcomes are due to internal control (e.g. “My life is determined by my own actions;” for scale reliability, see Table 2), divine control (e.g. “Everything that happens is part of God’s plan”), fate (e.g. “If bad things happen, it is because they were meant to happen”), luck (e.g. “When I get what I want, it’s usually because I’m lucky”), or that people are helpless to control outcomes in their lives (e.g. “I feel that nothing I can do will change things”). The final four constructs indicate beliefs in different forms of secondary control, and measuring all five subscales allows us to assess the three central constructs while contrasting scores against other measures of secondary control.

### ***Demographics***

Participants in the UAE reported demographic data before being debriefed and thanked for participation. Participants in the US reported their religious affiliation at the end

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<sup>7</sup> Esparza (2005) factor analyzed 29 fatalism scales, which yielded 5 meaningful constructs, including internality (akin to primary control), fatalism (similar to interpretive control), divine control (a specific manifestation of vicarious control), helplessness (predictive control), and luck (illusory control). Esparza et al. (2014) later developed a multidimensional fatalism measure in both English and Spanish, to decenter linguistic content from construct meaning, measuring these five constructs, and providing convergent and discriminant validity for the five constructs. Because this scale was validated in two languages showing no clear structural differences when administered in English or Spanish to bilingual participants, and because it included specific manifestations of the forms of secondary control that are central to our hypotheses, we chose to use this measure as reflective of ‘dispositional control beliefs,’ with internal control, divine control, and fate beliefs (labeled fatalism on the scale) reflecting our central constructs.

of the survey and then completed other unrelated studies before reporting remaining demographic data and being debriefed and thanked.

## **Results**

Except as noted, we analyzed all dependent measures using a culture  $\times$  event condition  $\times$  scenario between-subjects ANOVAs. Table 1 shows descriptive statistics by culture and event condition for each scenario as well as main effects and interactions of culture and event condition. All other significance tests, analysis of exploratory variables, and a correlation table, are reported in the SDF. Below we discuss the results for focal analyses, regardless of significance, as well as other significant results.

**Table 1**

*Means and Standard Deviations of Main Dependent Variables by Scenario, Culture, and Event Condition, With Tests of Main Hypotheses, Study 1.*

	Car Accident				Construction Accident				Main Hypothesis Tests		
	White Americans		Arabs in the UAE		White Americans		Arabs in the UAE		Culture	Event Condition	Culture × Event Condition
	Routine <i>M</i> ( <i>SD</i> )	Unusual <i>M</i> ( <i>SD</i> )									
<i>Hypothesis 1a:</i>											
Fate Attributions	3.10 (1.48)	2.91 (1.33)	4.77 (1.27)	4.64 (1.39)	3.05 (1.25)	2.61 (1.34)	4.53 (1.38)	4.80 (1.74)	<b><i>F</i> (1, 299) = 115.89,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .279</math></b>	<i>F</i> (1, 299) = 0.55, <i>p</i> = .460, $\eta_p^2 = .002$	<i>F</i> (1, 299) = 1.36, <i>p</i> = .245, $\eta_p^2 = .005$
Personal Control Attributions	2.31 (1.23)	2.43 (1.59)	2.46 (1.48)	2.82 (1.59)	2.30 (1.23)	2.67 (1.27)	2.72 (1.72)	2.50 (1.77)	<i>F</i> (1, 297) = 1.30, <i>p</i> = .256, $\eta_p^2 = .004$	<i>F</i> (1, 297) = 0.78, <i>p</i> = .377, $\eta_p^2 = .003$	<i>F</i> (1, 297) = 0.26, <i>p</i> = .609, $\eta_p^2 = .001$
Luck Attributions	4.49 (1.04)	4.83 (1.57)	3.15 (1.72)	3.09 (1.66)	5.02 (0.88)	4.27 (1.51)	3.14 (1.67)	3.29 (1.87)	<b><i>F</i> (1, 294) = 68.45,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .189</math></b>	<i>F</i> (1, 294) = 0.19, <i>p</i> = .662, $\eta_p^2 = .001$	<i>F</i> (1, 294) = 0.50, <i>p</i> = .481, $\eta_p^2 = .002$
<i>Hypothesis 2a:</i>											
Counterfactual Antecedents	3.60 (1.59)	5.70 (0.56)	3.35 (1.39)	3.66 (1.55)	2.30 (1.34)	4.67 (1.51)	2.55 (1.49)	3.32 (1.63)	<b><i>F</i> (1, 296) = 24.71,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .078</math></b>	<b><i>F</i> (1, 296) = 66.32,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .183</math></b>	<b><i>F</i> (1, 296) = 24.71,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .077</math></b>
<i>Hypothesis 2b:</i>											
Counterfactual Consequences	4.49 (1.27)	4.57 (1.12)	3.73 (1.60)	3.16 (1.43)	4.91 (1.20)	4.82 (1.40)	3.84 (1.74)	3.14 (1.75)	<b><i>F</i> (1, 297) = 50.24,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .145</math></b>	<i>F</i> (1, 297) = 3.39, <i>p</i> = .067, $\eta_p^2 = .011$	<i>F</i> (1, 297) = 3.27, <i>p</i> = .072, $\eta_p^2 = .011$
Equifinality	2.17 (0.82)	2.35 (1.03)	3.90 (1.15)	4.19 (1.26)	2.14 (0.95)	2.33 (0.99)	3.77 (1.60)	4.24 (1.46)	<b><i>F</i> (1, 295) = 157.44,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .348</math></b>	<b><i>F</i> (1, 295) = 3.98,</b> <b><i>p</i> = .047, <math>\eta_p^2 = .013</math></b>	<i>F</i> (1, 295) = 0.46, <i>p</i> = .499, $\eta_p^2 = .002$
<i>Hypothesis 2c:</i>											
Counterfactual Potency	16.46 (8.98)	26.09 (7.04)	12.35 (8.00)	12.34 (8.39)	11.61 (7.84)	22.52 (10.25)	10.00 (8.18)	11.20 (9.63)	<b><i>F</i> (1, 296) = 58.10,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .164</math></b>	<b><i>F</i> (1, 296) = 28.91,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .089</math></b>	<b><i>F</i> (1, 296) = 22.94,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .072</math></b>
<i>Hypothesis 4:</i>											
Regret	3.29 (1.30)	5.00 (0.95)	3.48 (1.54)	4.11 (1.30)	3.63 (1.54)	4.30 (1.29)	3.75 (1.62)	4.31 (1.26)	<i>F</i> (1, 298) = 0.79, <i>p</i> = .374, $\eta_p^2 = .003$	<b><i>F</i> (1, 298) = 30.25,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .092</math></b>	<i>F</i> (1, 298) = 3.32, <i>p</i> = .069, $\eta_p^2 = .011$

*Note:* Hypothesis tests in bold are statistically significant at  $p < .05$ .

***Hypothesis 1. Control Beliefs***

**H1a Situation-specific Control Beliefs.** We hypothesized that Arab participants would show greater propensity to believe that fate influences outcomes in response to specific events than would White American participants. Analysis of the extent to which participants attributed the accident to fate revealed only a main effect of culture (see Table 1). Supporting H1a, Arabs were more likely to attribute the accident to fate than were White Americans. Analysis of attributions to personal control revealed no significant effects. Analysis of attributions to luck revealed a main effect of culture. Overall, White Americans were more likely to attribute the accident to luck than were Arabs. Taken together, results suggest that Arabs expect fate to play an important role in determining specific outcomes, but they are not fatalistically powerless.

**H1b Dispositional Control Beliefs.** We also hypothesized that Arab participants would show greater propensity to believe that divine control and fate influence life events in general than would White American participants. To investigate differences in dispositional control beliefs across cultures, we conducted a mixed-model ANOVA predicting the five subscales of the Esparza et al. (2014) measure from culture (see Table 2). Analyses (corrected for a violation of sphericity) revealed significant main effects of culture,  $F(1, 306) = 61.90, p < .001, \eta_p^2 = .168$ , and subscale,  $F(2.70, 827.23) = 357.67, p < .001, \eta_p^2 = .539$ , qualified by a culture  $\times$  subscale interaction,  $F(2.70, 827.23) = 63.99, p < .001, \eta_p^2 = .173$ .

**Table 2***Hypothesis 1b. Dispositional Control Beliefs by Culture, Study 1.*

	White Americans			Arabs in the UAE			<i>F</i> (1, 306)	<i>p</i>	$\eta_p^2$
	<i>M</i>	<i>SD</i>	$\alpha$	<i>M</i>	<i>SD</i>	$\alpha$			
Internal Control	4.83 <sub>a</sub>	0.59	.76	4.60 <sub>a</sub>	0.67	.72	<b>10.06</b>	<b>.002</b>	<b>.032</b>
Divine Control	3.25 <sub>b</sub>	1.53	.97	4.83 <sub>a</sub>	1.17	.91	<b>106.02</b>	<b>&lt;.001</b>	<b>.257</b>
Fate	3.28 <sub>b</sub>	0.84	.78	4.24 <sub>b</sub>	0.97	.78	<b>83.05</b>	<b>&lt;.001</b>	<b>.213</b>
Luck	3.02 <sub>b</sub>	0.70	.73	2.89 <sub>c</sub>	0.72	.59	2.55	.111	.008
Helplessness	2.29 <sub>c</sub>	0.80	.82	2.46 <sub>d</sub>	0.84	.77	3.37	.067	.011

*Note:* *F* tests indicate differences within row between cultures. Bold numbers indicated that

the test is significant at  $p < .05$ . Different subscripts indicate means are significantly different within column.

In line with H1b, Arab participants scored significantly higher than White Americans on endorsement of divine control and fate. Exploring other control measures showed that Arab participants also scored marginally higher than White Americans on helplessness. White American participants scored significantly higher than Arabs on endorsement of internal control. Arab and White American participants did not differ in their endorsement of luck.

As indicated in Table 2, simple effects tests indicated that White American participants most strongly endorsed internal control, followed by divine control, fate, and luck, which do not differ from one another, and finally helplessness. Arabs most strongly endorsed divine control and internal control, followed by fate, luck, and finally helplessness. White American participants thus showed a pattern highly consistent with feelings of primary control or influence motives, whereas Arabs indicated a belief that one's outcomes are determined by God as directed by one's own actions (see also Rashwan & Jenkins, 2017; Wan Zakaria, 2015).

Across situational and dispositional measures, this study provides consistent support for Hypothesis 1.

***Hypothesis 2. Counterfactual Thinking***

**H2a Antecedents.** We hypothesized that Arab participants would be less likely to believe that the protagonist could have changed his or her antecedent conditions than would White Americans, and that White Americans, but not Arabs, would be impacted by event condition. Consistent with this prediction, analysis of counterfactual antecedents revealed a main effect of culture and a significant culture  $\times$  event condition interaction. Simple effects tests indicated that White American participants saw greater likelihood for changes to the antecedent behavior in the unusual-event than the routine-event condition,  $F(1, 296) = 75.61$ ,  $p < .001$ ,  $\eta_p^2 = .203$ . Arabs showed a similar, though substantially weaker pattern of results,  $F(1, 296) = 5.84$ ,  $p = .016$ ,  $\eta_p^2 = .019$ .

**H2b Consequences.** We hypothesized that Arab participants would be less likely to believe that the protagonist could have changed his or her outcomes than would White Americans. Analysis of counterfactual consequences revealed only a significant main effect of culture (see Table 1). Arabs believed that changing the antecedent conditions was less likely to prevent aversive consequences than did White Americans, regardless of condition.

To further test this hypothesis, we investigated participants' equifinality beliefs. Analyses revealed significant main effects of culture and event condition. Consistent with H1b, Arabs were more likely to believe that the protagonist would have experienced an accident even if they had changed their behavior. In addition, both Arab and White American participants were more likely to expect the accident to be inevitable if it resulted from unusual action.

**H2c Counterfactual Potency.** Analysis revealed a main effect of culture qualified by the predicted culture  $\times$  event condition interaction (see Table 1). Simple effects tests indicated that White American participants showed greater counterfactual potency in the unusual-event than the routine-event condition,  $F(1, 296) = 45.43$ ,  $p < .001$ ,  $\eta_p^2 = .133$ ,

whereas Arab participants' counterfactual potency, which was lower than White Americans' overall (both  $p < .036$ ), was unaffected by event condition,  $F(1, 296) = 0.20$ ,  $p = .655$ ,  $\eta_p^2 = .001$ .

Arab participants engaged in less counterfactual thinking than White Americans overall and counterfactual antecedents and potency were less affected by whether outcomes resulted from routine or exceptional action, consistent with Hypothesis 2. The cultural pattern was similar in response to both a car accident and construction accident scenario (see SDF).

### ***Hypothesis 3. Moderated Mediation***

We predicted that individual differences in beliefs about divine control and fate would mediate the effect of culture on counterfactual thought. To test this hypothesis, we used the package "mediation" in R (Tingley et al., 2014) to test for an indirect effect of group on counterfactual potency for each of the fate beliefs independently. Because we expected differences in counterfactual potency to emerge primarily in the unusual-event condition, we examined a model in which cultural group (dummy coded as 0 = American and 1 = Arab) predicted standardized counterfactual potency via fate subscale ratings (all standardized), with event condition (0 = routine, 1 = unusual) moderating these paths.

Consistent with our predictions, divine control beliefs were a significant mediator in the unusual-event condition but not the routine-event condition; these indirect effects differed significantly (see Table 3 for test of moderated mediation, conditional indirect effects and coefficients). Thus, Arab participants reported stronger beliefs in divine control, which in turn predicted lower ratings of potency for counterfactual stories.

**Table 3***Hypothesis 3. Coefficients for Analysis of Indirect Effects for each Belief Measure, Study 1*

	Routine-Event Condition				Unusual-Event Condition				Test for Moderated Mediation (95% C.I.)
	a path	b path	c' path	Conditional indirect effect (95% CI)	a path	b path	c' path	Conditional indirect effect (95% CI)	
Divine Control	1.03	0.13	-0.41	0.14 {-0.02, 0.31}	1.00	-0.20	-1.04	<b>-0.20</b> { <b>-0.38, -0.04</b> }	<b>0.34</b> { <b>0.13, 0.60</b> }
Fate	0.93	< .01	-0.27	-0.001 {-0.14, 0.14}	0.92	-0.14	-1.11	-0.13 {-0.30, 0.03}	0.13 {-0.08, 0.35}
Internal Control	-0.42	-0.03	-0.28	0.01 {-0.05, 0.09}	-0.22	0.02	-1.23	-0.005 {-0.05, 0.04}	0.02 {-0.05, 0.10}

*Note:* Confidence intervals shown in **bold** exclude 0. Dummy coding: 0 = USA and routine; 1

= UAE and unusual.

Contrary to expectations, fate beliefs were not a significant mediator of group differences in either condition. Because internal control beliefs significantly differed between samples, we also investigated them as a potential mediator. However, internal control beliefs were not a significant mediator of the cultural differences in either condition.

Thus, we find partial support for Hypothesis 3.

#### ***Hypothesis 4. Regret***

Finally, we hypothesized that Arabs would be emotionally reactive to event condition, showing heightened regret when aversive outcomes resulted from unusual action, similar to White Americans. Analysis of reported regret yielded only a significant main effect of event condition (see Table 1). Supporting Hypothesis 4, Arab participants, like White Americans, were emotionally sensitive to details associated with antecedent events.

#### **Discussion**

Study 1 provided support for our primary hypotheses. Arab participants reported that divine control and fate played a more important role in life outcomes than did White Americans, and were less likely to endorse counterfactual thoughts as a result. White

Americans showed a pattern of results consistent with previous literature, seeing antecedent conditions as more mutable to the extent that an event resulted from an exception to routine. Arab participants, in contrast, found counterfactuals less potent overall and their endorsement of counterfactuals was unaffected by event condition. Their beliefs in divine control were associated with reduced counterfactual potency relative to White Americans when outcomes resulted from exceptional action. Arabs did report similar levels of regret to White Americans when considering negative outcomes, suggesting a dissociation between affective and cognitive responses to negative events.

Comparing mean scores in cross-cultural data can be problematic as mean differences could reflect reference group or deprivation effects, or differential use of scales. However, it is unlikely that reference group effects can explain differences in situation-specific control beliefs, counterfactual thoughts, or feelings of regret. Additionally, because we see different patterns of cultural differences across different measures, it is unlikely that differential use of scales explains the differences we find here. Most importantly, we are able to show within-culture patterns that vary meaningfully. Specifically, when looking at dispositional control beliefs, we see that Arabs in the UAE endorse divine control and internal control, followed by fate beliefs, luck, and helplessness, reflecting that Arabs perceive a role of both divine will and personal control over outcomes. White Americans, in contrast, endorse internal control more than divine control, fate, and luck, and endorse beliefs in helplessness least, showing that White Americans more strongly endorse beliefs in primary, than any form of secondary control. Likewise, White Americans showed higher counterfactual potency in the unusual-event condition, as compared to the routine-event condition, whereas Arabs in the UAE were unaffected by event condition, showing that in addition to mean differences, the process of counterfactual endorsement varies meaningfully across cultures.

## Study 2

Although Study 1 found differences in counterfactual thinking between White American and Arab participants, it investigated only counterfactuals about the focal actor's behavior. If the results in Study 1 were due to lower primary control beliefs for Arabs (rather than higher fate beliefs), this might mean that their counterfactual thoughts would be focused on changes to the situation rather than changes made by the focal actor. Thus in Study 2, we tested Hypotheses 2 (that White Americans but not Arabs would engage in counterfactual thinking, especially about unexpected events) as related to both the actor and the situation, as well as by using spontaneously generated counterfactuals (Roese, 1994).

## **Method**

### ***Participants***

One-hundred sixty-seven white, non-Hispanic students (38 men, 129 women;  $M_{age} = 18.49$ ,  $SD = 0.78$ ; 73.7% identified as Christian) completed the study in the US. One-hundred fourteen Arab students (39 men, 75 women;  $M_{age} = 20.25$ ,  $SD = 1.43$ ; 86.8% identified as Muslim)<sup>8</sup> completed the study in the UAE.

### ***Procedure***

Participants at both locations completed identical experimental surveys using the Qualtrics online research platform (Qualtrics, 2009) under similar laboratory conditions and following the same instructions as Study 1.

### ***Event Manipulation***

In this study, participants read only the car accident scenario, and were randomly assigned to either the routine (control) or unusual (counterfactual) route condition.

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<sup>8</sup> Out of consideration for equity and inclusion regarding educational experiences, all students enrolled in introductory psychology classes were invited to participate in this study, however for research purposes, only those who identified as non-Hispanic White Americans (in the US sample) or as Arab (in the UAE sample) were included in the experimental sample. This resulted in 41 participants being excluded from the US sample and 54 participants being excluded from the UAE sample. They are not included in the total number listed in the participants section. Because all participants were excluded a priori, we did not investigate how conclusions changed with all participants included in analyses. We similarly excluded non-White Americans and non-Arabs in the UAE in Studies 3 and 4 as per our pre-registration.

### ***Dependent Variables***

**Thought Listing.** Participants were first asked to briefly describe what Adam would most likely be thinking after the accident. Participants' responses were coded for whether they spontaneously referenced either divine control (i.e. "it was God's will") or fate ("what is meant to happen will happen"). Responses were also coded for upward counterfactuals ("Adam might think "if only I had stuck to my usual route none of this would have happened").<sup>9</sup> Two trained coders rated each response while blind to sample, condition, and hypothesis. Interrater reliability was good (references to God, 98% agreement,  $\kappa = .89$ ; references to fate, 90% agreement,  $\kappa = .31$ ; counterfactuals, 83% agreement,  $\kappa = .68$ ). Discrepancies were resolved by the second author while blind to sample and condition.

**Rating Scales.** As in Study 1, all ratings were made on 6-point scales. Participants considered both the same self-control counterfactual as in Study 1 and a situational counterfactual, "If only the traffic had been different, then Adam would not have been injured." For each counterfactual, they rated both the if-likelihood and then-likelihood. The order of the two counterfactuals was randomized across participants.

As in Study 1, participants reported *causal attributions to fate* (2 items,  $r = .76$  for White Americans,  $r = .54$  for Arabs), *personal control*, or *luck*, as well as perceptions of *equifinality* and *regret*. In this study, they also reported *surprise*, or how surprising Adam's accident seemed (3 items,  $\alpha = .75$  for White Americans,  $\alpha = .63$  for Arabs). These nine items appeared in a random order.

### ***Dispositional Control Beliefs***

Participants completed the same measure of primary and secondary control as in Study 1 (Esparza et al., 2014).

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<sup>9</sup> Only 6 counterfactuals were not focused on Adam; the results are equivalent if only upward counterfactuals focused on Adam are analyzed.

***Demographics***

Participants in the UAE then reported demographic information. Participants in the US provided their religion at the end of the study and completed demographic information after completing a series of unrelated studies.

**Results**

Table 4 shows descriptive statistics and significance tests for the rating items by culture and event conditions.

**Table 4***Means and Standard Deviations of Main Dependent Variables by Culture and Event Condition, With Significance Tests, Study 2.*

	White Americans		Arabs in the UAE		Main Effect of Culture	Main Effect of Event condition	Interaction of Culture × Event condition
	Routine <i>M</i> ( <i>SD</i> )	Unusual <i>M</i> ( <i>SD</i> )	Routine <i>M</i> ( <i>SD</i> )	Unusual <i>M</i> ( <i>SD</i> )			
<i>Hypothesis 1a</i>							
Fate Attributions	2.93 (1.36)	3.12 (1.51)	4.72 (1.26)	4.29 (1.22)	<b><i>F</i> (1, 277) = 79.46,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .223</math></b>	<i>F</i> (1, 277) = 0.46, <i>p</i> = .498, $\eta_p^2 = .002$	<i>F</i> (1, 277) = 3.47, <i>p</i> = .064, $\eta_p^2 = .012$
Personal Control Attributions	2.17 (1.02)	2.13 (1.16)	2.78 (1.42)	2.42 (1.40)	<b><i>F</i> (1, 276) = 8.93,</b> <b><i>p</i> = .003, <math>\eta_p^2 = .031</math></b>	<i>F</i> (1, 276) = 1.82, <i>p</i> = .178, $\eta_p^2 = .007$	<i>F</i> (1, 276) = 1.13, <i>p</i> = .290, $\eta_p^2 = .004$
Luck Attributions	4.49 (1.09)	4.59 (1.35)	3.64 (1.45)	3.89 (1.62)	<b><i>F</i> (1, 276) = 22.13,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .074</math></b>	<i>F</i> (1, 276) = 1.13, <i>p</i> = .289, $\eta_p^2 = .004$	<i>F</i> (1, 276) = 0.22, <i>p</i> = .643, $\eta_p^2 = .001$
<i>Hypothesis 2a</i>							
Self-Control Antecedents	4.19 (1.41)	5.19 (1.04)	3.80 (1.60)	3.75 (1.47)	<b><i>F</i> (1, 275) = 30.46,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .100</math></b>	<b><i>F</i> (1, 275) = 8.17,</b> <b><i>p</i> = .005, <math>\eta_p^2 = .029</math></b>	<b><i>F</i> (1, 275) = 10.02</b> <b><i>p</i> = .002, <math>\eta_p^2 = .035</math></b>
Situational Antecedents	3.40 (1.34)	3.85 (1.47)	3.32 (1.44)	3.15 (1.19)	<b><i>F</i> (1, 276) = 5.45,</b> <b><i>p</i> = .020, <math>\eta_p^2 = .019</math></b>	<i>F</i> (1, 276) = 0.66, <i>p</i> = .417, $\eta_p^2 = .002$	<i>F</i> (1, 276) = 3.49, <i>p</i> = .063, $\eta_p^2 = .012$
<i>Hypothesis 2b</i>							
Self-Control Consequences	4.56 (1.12)	4.31 (1.16)	3.63 (1.56)	3.75 (1.38)	<b><i>F</i> (1, 277) = 22.89,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .076</math></b>	<i>F</i> (1, 277) = 0.16, <i>p</i> = .694, $\eta_p^2 = .001$	<i>F</i> (1, 277) = 1.32, <i>p</i> = .251, $\eta_p^2 = .005$
Situational Consequences	4.35 (1.19)	4.53 (1.10)	3.73 (1.53)	3.76 (1.33)	<b><i>F</i> (1, 275) = 20.23,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .069</math></b>	<i>F</i> (1, 275) = 0.48, <i>p</i> = .489, $\eta_p^2 = .002$	<i>F</i> (1, 275) = 0.25, <i>p</i> = .619, $\eta_p^2 = .001$
Equifinality	2.48 (0.91)	2.45 (1.05)	4.00 (1.36)	3.58 (1.28)	<b><i>F</i> (1, 276) = 92.24,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .250</math></b>	<i>F</i> (1, 276) = 2.62, <i>p</i> = .107, $\eta_p^2 = .009$	<i>F</i> (1, 276) = 2.01, <i>p</i> = .158, $\eta_p^2 = .007$
<i>Hypothesis 2c</i>							
Self-Control Potency	19.40 (8.81)	22.42 (8.05)	14.37 (9.65)	14.45 (7.80)	<b><i>F</i> (1, 275) = 38.19,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .122</math></b>	<i>F</i> (1, 275) = 2.17, <i>p</i> = .142, $\eta_p^2 = .008$	<i>F</i> (1, 275) = 1.95, <i>p</i> = .164, $\eta_p^2 = .007$
Situational Potency	15.25 (8.26)	17.62 (8.60)	12.71 (8.49)	12.31 (7.36)	<b><i>F</i> (1, 274) = 15.11,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .052</math></b>	<i>F</i> (1, 274) = 0.95, <i>p</i> = .331, $\eta_p^2 = .003$	<i>F</i> (1, 274) = 1.87, <i>p</i> = .172, $\eta_p^2 = .007$
<i>Hypothesis 4</i>							
Regret	4.53 (1.20)	5.07 (0.93)	4.54 (1.24)	4.69 (1.32)	<i>F</i> (1, 277) = 1.71, <i>p</i> = .192, $\eta_p^2 = .006$	<b><i>F</i> (1, 277) = 5.98,</b> <b><i>p</i> = .015, <math>\eta_p^2 = .021</math></b>	<i>F</i> (1, 277) = 1.93, <i>p</i> = .166, $\eta_p^2 = .007$

Note: Hypothesis tests in bold are statistically significant at  $p < .05$ .

***Hypothesis 1. Control Beliefs***

**H1a Situation-specific Control Beliefs.** Replicating Study 1, analysis of causal attributions for Adam's accident to both fate and luck revealed main effects of culture (see Table 4). Differing from Study 1, analysis of attributions to personal control also revealed a main effect of culture. Overall, Arabs were more likely to attribute the outcome to Adam's personal actions than were White Americans.

We also coded participants' spontaneous thoughts for whether they referenced divine control or fate. Table 5 shows the frequency of each thought type in each sample by condition. We examined whether the frequency of each thought type differed by culture in a 2 (culture: White American vs. Arab)  $\times$  2 (target thought: present vs. absent) chi-square analysis, and further examined whether these relative frequencies differed by condition using the Breslow-Day test of conditional independence (equivalent to the test of an interaction effect in an ANOVA context).

**Table 5**

*Percentages of Participants by Culture and Event Condition Who Spontaneously Generated Thoughts Associated with Divine Control, Fate, and Upward Counterfactuals, Study 2*

	White Americans		Arabs in the UAE	
	Routine	Unusual	Routine	Unusual
Divine Control	0%	2.3%	1.7%	3.6%
Fate	0%	0%	10.2%	7.3%
Upward Counterfactuals	53.1%	61.6%	55.9%	54.5%

Statements noting divine control were quite rare, and equally common among Arabs and White Americans,  $\chi^2(1) = 0.80, p = .372$ , odds ratio = 2.36; the relative frequency did not differ by condition, Breslow-Day  $\chi^2(1) = 0.75, p = .388$ . However, statements noting fate were significantly more common among Arabs than White Americans (who made no such statements),  $\chi^2(1) = 15.19, p < .001$ . The Breslow-Day statistic could not be computed, but

difference in frequency of thought type across samples was significant in both the routine-event ( $\chi^2(1) = 8.61, p = .003$ ) and unusual-event conditions ( $\chi^2(1) = 6.44, p = .011$ ).<sup>10</sup>

**H1b Dispositional Control Beliefs.** To investigate differences in dispositional control beliefs across cultures, we conducted a mixed-model ANOVA predicting the five subscales of the Esparza et al. (2014) measure from culture and event condition. Analyses (corrected for non-sphericity) revealed significant main effects of culture,  $F(1, 276) = 41.65, p < .001, \eta_p^2 = .131$  and subscale,  $F(2.62, 722.25) = 384.29, p < .001, \eta_p^2 = .582$ , qualified by a culture  $\times$  subscale interaction,  $F(2.62, 722.25) = 34.52, p < .001, \eta_p^2 = .111$ . No effects of event condition were significant (all  $F < 1.40, p > .238$ ). Overall, the cultural differences and simple effects were similar to Study 1 and consistent with H1b (see Table 6).

**Table 6**

*Hypothesis 1b. Dispositional Control Beliefs by Culture, Study 2.*

	White Americans			Arabs in the UAE			$F(1, 276)$	$p$	$\eta_p^2$
	$M$	$SD$	$\alpha$	$M$	$SD$	$\alpha$			
Internal Control	4.79 <sub>a</sub>	0.53	.66	4.57 <sub>a</sub>	0.62	.66	<b>9.49</b>	<b>.002</b>	<b>.033</b>
Divine Control	3.52 <sub>b</sub>	1.50	.97	4.74 <sub>a</sub>	1.20	.92	<b>52.10</b>	<b>&lt; .001</b>	<b>.159</b>
Fate	3.45 <sub>b</sub>	0.88	.80	4.22 <sub>b</sub>	0.92	.76	<b>49.46</b>	<b>&lt; .001</b>	<b>.152</b>
Luck	2.89 <sub>c</sub>	0.67	.73	2.77 <sub>c</sub>	0.91	.85	1.54	.216	.006
Helplessness	2.03 <sub>d</sub>	0.58	.67	2.35 <sub>d</sub>	0.80	.77	<b>14.51</b>	<b>&lt; .001</b>	<b>.050</b>

*Note:*  $F$  tests indicate differences within row between cultures. Bold numbers indicated that

the test is significant at  $p < .05$ . Different subscripts indicate means that are significantly different within column.

**Hypothesis 2. Counterfactual Thinking.**

**H2a Antecedents.** Replicating Study 1, analysis revealed the predicted main effect of culture, and culture  $\times$  event condition interaction (see Table 4). Analysis also yielded a main

<sup>10</sup> No participants mentioned God more than once in a response, and only one participant made two references to fate. Eleven percent of participants generated two upward counterfactuals. Analyzing these responses using a count of responses in a Poisson regression rather than as a binary outcome in a chi-squared test produces equivalent results.

effect of event condition. Simple effects tests indicated that White American participants reported a greater likelihood of taking a different route in the unusual-event condition than in the routine-event condition,  $F(1, 275) = 22.20, p < .001, \eta_p^2 = .075$ , whereas Arab participants reported equal likelihood across conditions,  $F(1, 275) = 0.04, p = .841, \eta_p^2 < .001$ .

We also explored whether Arab participants would be less likely to believe that the situation could have been different compared to White Americans. Analysis yielded a significant effect of culture and a marginal culture  $\times$  event condition interaction. Simple effects tests indicated that whereas Arab participants' belief that traffic could have been different was unaffected by condition,  $F(1, 276) = 0.47, p = .494, \eta_p^2 = .002$ , White American participants' belief that the likelihood that traffic could have been different was higher in the unusual-event condition than in the routine-event condition,  $F(1, 276) = 4.42, p = .037, \eta_p^2 = .016$ . Thus, the cultural pattern of Arabs being less likely than White Americans to believe that antecedent conditions could have been different extends beyond personally controllable actions to situational factors as well.

**H2b Consequences.** Replicating Study 1, analysis revealed only the predicted main effect of culture (see Table 4). Arab participants were substantially less likely to believe that changing the antecedent conditions would have prevented the accident.

We also explored whether Arab participants would be less likely to believe that changes in the situation would have led to a different outcome, which again revealed only a main effect of culture. Overall, Arabs believed that alterations to traffic were less likely to prevent Adam's injury than did White Americans (see Table 4). This pattern is consistent with the idea that Arabs have higher belief in equifinality than White Americans, as neither changes to personal or situational antecedents are expected to change outcomes. Testing that hypothesis directly, and replicating Study 1, we also found a significant main effect of culture

on equifinality beliefs, with Arab participants believing more strongly that changing antecedent conditions would fail to change outcomes.

**H2c Counterfactual Potency.** Analysis of counterfactual potency for thoughts about changing personal antecedents revealed only a main effect of culture, with White Americans reporting more potent counterfactuals overall. Although we found the predicted interaction on personal antecedents, and although descriptively the pattern in Table 4 reflects H2c (and that seen in Study 1), the interaction between culture and event condition was not significant.

Similarly, analysis of counterfactual potency associated with changes to situational antecedents revealed only a main effect of culture, with White Americans showing more counterfactual potency overall.

**Spontaneous Counterfactuals.** Finally, we explored whether cultural differences in counterfactual thinking extend to spontaneously generated thoughts (see Table 5). Analysis revealed that counterfactuals were equally common among Arabs and White Americans,  $\chi^2(1) = 0.14, p = .712$ , odds ratio = 0.92; the relative frequency did not differ by event condition, Breslow-Day  $\chi^2(1) = 0.69, p = .408$ . This suggests that Arab participants have counterfactual thoughts come to mind, but do not endorse those thoughts as strongly as White Americans.

### ***Hypothesis 3. Moderated Mediation***

As in Study 1, we examined whether standardized dispositional control beliefs mediated the effect of culture on standardized ratings of potency for Adam's actions, with event condition as a moderator of these indirect effects. See Table 7 for test of moderated mediation, conditional indirect effects, and coefficients.

**Table 7***Hypothesis 3. Coefficients for Analysis of Indirect Effects for each Belief Measure, Study 2*

	Routine-Event Condition				Unusual-Event Condition				Test for Moderated Mediation (95% C.I.)
	a path	b path	c' path	Conditional indirect effect (95% CI)	a path	b path	c' path	Conditional indirect effect (95% CI)	
Divine Control	0.86	-0.11	-0.44	-0.10 {-0.26, 0.05}	0.74	-0.18	-0.73	<b>-0.13</b> { <b>-0.27, -0.01</b> }	-0.04 {-0.16, 0.24}
Fate	0.88	-0.13	-0.43	-0.12 {-0.28, 0.20}	0.70	-0.24	-0.53	<b>-0.17</b> { <b>-0.32, -0.04</b> }	0.05 {-0.16, 0.25}
Internal Control	-0.43	0.13	-0.49	-0.06 {-0.16, 0.01}	-0.29	0.11	-0.83	-0.03 {-0.11, 0.02}	0.34 {-0.10, 0.82}
Helpless	0.51	0.01	-0.55	0.004 {-0.08, 0.09}	0.40	-0.14	-0.81	-0.06 {-0.15, 0.01}	0.06 {-0.05, 0.19}

Note: Confidence intervals shown in **bold** exclude 0. Dummy coding: 0 = USA and routine; 1

= UAE and unusual.

In line with H3, and replicating Study 1, beliefs in divine control significantly mediated the effect of culture in the unusual-event condition but not the routine-event condition although these did not significantly differ. Additionally, as predicted, beliefs in fate significantly mediated the effect of culture in the unusual-event condition but not the routine-event condition; again, these did not differ significantly.

Because internal control and helplessness differed between groups in this study, we also examined whether they mediated the effect of culture on potency. Neither of these subscales mediated the effect of culture on potency in either condition.

#### ***Hypothesis 4. Regret.***

Replicating Study 1, analysis of regret yielded only a significant main effect of event condition (see Table 4).

#### **Discussion**

As in Study 1, we found support for Hypothesis 1. Overall, Arabs were more likely to perceive a role of fate and divine control in response to specific events (H1a), and in general

(H1b). In this study, Arabs were also more likely to spontaneously reference fate when reflecting on a negative event. Results were also consistent with H2a, Arabs were less likely to endorse counterfactual antecedents than White Americans, and such antecedents were unaffected by event condition for Arab participants. This pattern emerged for both counterfactuals focused on the actor and on the situation, suggesting that this difference occurs for counterfactual thinking broadly and is not due solely to American emphasis on primary control. Further replicating Study 1 and consistent with H2b, we found only a main effect of culture on counterfactual consequences. Arabs were less likely to believe that changing antecedent conditions associated with either the actor or the situation would change outcomes, reflecting higher beliefs in equifinality. Consistent with hypothesis 3, differences in beliefs in divine control and fate mediated the effect of cultural group on potency ratings in the unusual-event condition, suggesting that cultural differences in beliefs about control are related to differences in counterfactual endorsement. Finally, consistent with hypothesis 4, both Arabs and White Americans reported more regret when negative outcomes followed unusual events.

The culture  $\times$  event condition interaction was not significant for spontaneously-generated counterfactual thoughts. Although White Americans endorsed counterfactual thoughts more than Arabs, this study indicates Arabs do spontaneously consider counterfactuals. Many spontaneous counterfactual responses focused on the idea that Adam might regret having taken that route. It may be that counterfactual thoughts were equally common because both groups recognized Adam's likely emotional response and its origins. The discrepancy between spontaneous counterfactuals and potency ratings may thus arise due to a conscious suppression of available counterfactuals, or by emphasizing only the affective aspects of counterfactual simulations. As one Arab participant stated, "[Adam might think]

‘If only I didn’t take the highway today.’ Or he could just accept his fate and say what is meant to be will happen...”

### Study 3

In Study 3, we investigated whether Arabs would be more likely to endorse counterfactual thoughts in response to events that were less severe, and therefore more akin to the paths they choose on their way to their ultimate destiny. To explore the functionality of counterfactuals, we also investigated future behavioral intentions to examine whether counterfactuals serve a similar function across cultures. For Studies 3 and 4, we preregistered our analysis plan to investigate competing hypotheses about whether event severity would moderate counterfactual endorsement and feelings of regret (see *Blinded As Predicted PDF* attached for peer review; will insert link in accepted version).

### Method

#### *Participants*

One-hundred forty-two white, non-Hispanic students (44 men, 97 women, 1 other/unreported;  $M_{age} = 18.99$ ,  $SD = 1.23$ ; 72.5% identified as Christian) completed the study in the US. One-hundred seventy-four Arab students (63 men, 111 women;  $M_{age} = 20.31$ ,  $SD = 1.42$ ; 87.9% identified as Muslim) completed the study in the UAE.

#### *Event Manipulation*

The procedure mirrored Study 2, except that participants read a version of the car accident scenario, where outcomes were mild (Adam’s car requires minor repairs, and he is a few minutes late for work; see SMF).<sup>11</sup> Participants were randomly assigned to either the routine (control) or unusual (counterfactual) route condition.

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<sup>11</sup>We pretested whether Arabs would view the mild scenario as less severe than that used in Studies 1 and 2. One-hundred ninety-three Arab participants read one of four conditions (severe vs. mild)  $\times$  (control vs. counterfactual), and reported whether the event had a significant impact on Adam’s life or changed the direction of Adam’s life. These two variables were correlated  $r = .59$ ,  $p < .001$ . For both measures, analyses revealed a main effect of severity (significant impact:  $F(1, 188) = 15.69$ ,  $p = .000$ ,  $\eta_p^2 = .077$ ; changed direction:  $F(1, 189)$

### ***Dependent Variables***

Participants reported the same counterfactual items and dependent variables as Study 1, including causal attributions to *fate* ( $r = .62$  for White Americans,  $r = .63$  for Arabs), *personal control*, or *luck*, as well as perceptions of *equifinality* and *regret*. In this study, they also reported desires to change the behavior (“Adam will probably avoid taking this road to work in the future”), desires to take the normal route in the future, and the impact of the event on individuals’ lives (“This event likely changed the direction of Adam’s life.” and “This event likely had a significant impact on Adam’s life.”  $r = .66$  for White Americans,  $r = .63$  for Arabs).

Participants reported dispositional control beliefs, demographic information, and were thanked and debriefed, as in Studies 1 and 2.

### **Results**

Table 8 shows descriptive statistics and significance tests for the rating items by culture and event conditions.

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= 5.27,  $p = .023$ ,  $\eta_p^2 = .027$ ). Participants perceived the severe outcome as significantly more severe. No other effects were significant (all  $p > .795$ ; see SDF).

**Table 8**

*Means and Standard Deviations of Main Dependent Variables by Culture and Event condition, With Significance Tests, Study 3.*

	White Americans		Arabs in the UAE		Main Effect of Culture	Main Effect of Event Condition	Interaction of Culture × Event Condition
	Routine <i>M</i> ( <i>SD</i> )	Unusual <i>M</i> ( <i>SD</i> )	Routine <i>M</i> ( <i>SD</i> )	Unusual <i>M</i> ( <i>SD</i> )			
<i>Hypothesis 1a</i>							
Fate Attributions	2.94 (1.30)	3.19 (1.26)	4.57 (1.36)	4.72 (1.17)	<b><i>F</i> (1, 312) = 121.27,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .280</math></b>	<i>F</i> (1, 312) = 1.86, <i>p</i> = .173, $\eta_p^2 = .006$	<i>F</i> (1, 312) = 0.10, <i>p</i> = .753, $\eta_p^2 = .000$
Personal Control Attributions	2.33 (1.20)	2.71 (1.26)	2.30 (1.23)	2.37 (1.36)	<i>F</i> (1, 312) = 1.78, <i>p</i> = .183, $\eta_p^2 = .006$	<i>F</i> (1, 312) = 2.46, <i>p</i> = .118, $\eta_p^2 = .008$	<i>F</i> (1, 312) = 1.18, <i>p</i> = .278, $\eta_p^2 = .004$
Luck Attributions	4.53 (1.33)	4.29 (1.22)	3.64 (1.62)	3.59 (1.52)	<b><i>F</i> (1, 312) = 23.41,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .070</math></b>	<i>F</i> (1, 312) = 0.82, <i>p</i> = .366, $\eta_p^2 = .003$	<i>F</i> (1, 312) = 0.33, <i>p</i> = .565, $\eta_p^2 = .001$
<i>Hypothesis 2a</i>							
Counterfactual Antecedents	3.68 (1.46)	4.83 (1.33)	2.95 (1.19)	4.04 (1.37)	<b><i>F</i> (1, 312) = 25.02,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .074</math></b>	<b><i>F</i> (1, 312) = 54.89,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .150</math></b>	<i>F</i> (1, 312) = 0.03, <i>p</i> = .853, $\eta_p^2 = .000$
<i>Hypothesis 2b</i>							
Counterfactual Consequences Equifinality	4.99 (1.07)	4.57 (1.14)	3.54 (1.48)	3.67 (1.37)	<b><i>F</i> (1, 312) = 64.89,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .172</math></b>	<i>F</i> (1, 312) = 0.94, <i>p</i> = .333, $\eta_p^2 = .003$	<i>F</i> (1, 312) = 3.48, <i>p</i> = .063, $\eta_p^2 = .011$
	2.14 (1.04)	2.66 (0.98)	3.75 (1.26)	3.96 (1.13)	<b><i>F</i> (1, 312) = 132.99,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .299</math></b>	<b><i>F</i> (1, 312) = 8.23,</b> <b><i>p</i> = .004, <math>\eta_p^2 = .026</math></b>	<i>F</i> (1, 312) = 1.54, <i>p</i> = .216, $\eta_p^2 = .005$
<i>Hypothesis 2c</i>							
Counterfactual Potency	18.57 (8.67)	22.30 (8.53)	10.58 (6.27)	14.58 (7.29)	<b><i>F</i> (1, 312) = 81.92,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .208</math></b>	<b><i>F</i> (1, 312) = 19.81</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .060</math></b>	<i>F</i> (1, 312) = 0.23, <i>p</i> = .879, $\eta_p^2 = .000$
<i>Hypothesis 4</i>							
Regret	3.37 (1.48)	4.41 (1.03)	3.19 (1.24)	4.04 (1.18)	<b><i>F</i> (1, 312) = 3.91,</b> <b><i>p</i> = .049, <math>\eta_p^2 = .012</math></b>	<b><i>F</i> (1, 312) = 45.64,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .128</math></b>	<i>F</i> (1, 312) = 0.44, <i>p</i> = .509, $\eta_p^2 = .001$
<i>Exploratory Data</i>							
Change Behavior	3.01 (1.31)	4.71 (0.95)	2.81 (1.12)	3.89 (1.15)	<b><i>F</i> (1, 312) = 15.95,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .049</math></b>	<b><i>F</i> (1, 312) = 116.25,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .271</math></b>	<b><i>F</i> (1, 312) = 5.80,</b> <b><i>p</i> = .017, <math>\eta_p^2 = .018</math></b>

*Note:* Hypothesis tests in bold are statistically significant at  $p < .05$ .

### *Hypothesis 1. Control Beliefs*

**H1a Situation-specific Control Beliefs.** As in Studies 1 and 2, analysis of causal attributions for Adam's accident to both fate and luck revealed main effects of culture (see Table 8). Replicating Study 1, analyses revealed no significant differences by culture or event condition on perceptions of personal control.

**H1b Dispositional Control Beliefs.** Analyses (corrected for non-sphericity) revealed significant main effects of culture,  $F(1, 312) = 71.22, p < .001, \eta_p^2 = .186$  and subscale,  $F(2.67, 832.68) = 384.19, p < .001, \eta_p^2 = .552$ , qualified by a culture  $\times$  subscale interaction,  $F(2.67, 832.68) = 36.58, p < .001, \eta_p^2 = .105$ . No effects of event condition were significant (all  $F < 0.76, p > .385$ ). Overall, the cultural differences and simple effects are consistent with H1b and are similar to Studies 1 and 2, though in this study, Arabs and White Americans did not significantly differ in beliefs in internal control (see Table 9).

**Table 9**

*Hypothesis 1b. Dispositional Control Beliefs by Culture, Study 3.*

	White Americans			Arabs in the UAE			$F(1, 306)$	$p$	$\eta_p^2$
	$M$	$SD$	$\alpha$	$M$	$SD$	$\alpha$			
Internal Control	4.75 <sub>a</sub>	0.54	.67	4.66 <sub>a</sub>	0.58	.69	2.40	.122	.008
Divine Control	3.39 <sub>b</sub>	1.61	.98	4.73 <sub>a</sub>	1.23	.94	<b>70.01</b>	<.001	.182
Fate	3.47 <sub>b</sub>	0.84	.77	4.20 <sub>b</sub>	0.86	.78	<b>57.06</b>	<.001	.154
Luck	3.09 <sub>c</sub>	0.69	.77	3.11 <sub>c</sub>	0.79	.81	0.09	.761	.000
Helplessness	2.09 <sub>d</sub>	0.67	.77	2.37 <sub>d</sub>	0.70	.71	<b>12.38</b>	<.001	.038

*Note:*  $F$  tests indicate differences within row between cultures. Bold numbers indicated that

the test is significant at  $p < .05$ . Different subscripts indicate means that are significantly different within column.

### *Hypothesis 2. Counterfactual Thinking*

**H2a Antecedents.** Differing from Studies 1 and 2, analysis revealed only main effects of culture and event condition (see Table 8). In response to a mild negative outcome, Arabs

endorsed counterfactuals less than White Americans overall, but like White Americans, Arabs reported more counterfactuals when the outcome resulted from an exception to routine.

**H2b Consequences.** Analysis revealed only a main effect of culture (see Table 8). Replicating Studies 1 and 2, Arab participants were substantially less likely to believe that changing the antecedent conditions would have prevented the accident.

In addition, and replicating Studies 1 and 2, we also found a significant main effect of culture on equifinality beliefs. Arab participants believed more strongly that changing antecedent conditions would fail to change outcomes. As in Study 1, we also found a main effect of event condition, with participants believing that even if Adam had taken another route, he would have been more likely to get into an accident in the unusual-event condition.

**H2c Counterfactual Potency.** Analysis of counterfactual potency for thoughts about changing personal antecedents revealed main effects of culture, with White Americans reporting more potent counterfactuals overall, and event condition, with more potent counterfactuals in the unusual-event condition.

In short, the results of Study 3 indicate that cultural differences in counterfactual thought predicted by Hypothesis 2 extend to mild outcomes. However, unlike Studies 1 and 2, when the outcome was mild, Arab participants endorsed counterfactuals more in the unusual-event condition similarly to White Americans, suggesting that they perceived less of a role for fate or divine control when outcomes are not life altering.

### ***Hypothesis 3. Moderated Mediation***

Because event condition did not moderate the effect of culture on endorsement of counterfactual thought, we did not investigate mediated moderation in this study.

***Hypothesis 4. Regret***

Replicating Studies 1 and 2, analysis of regret yielded a significant main effect of event condition, however it also yielded a small main effect of culture, with White Americans reporting more regret than Arabs (see Table 8).

***Behavioral Intentions***

Analyses of the extent to which participants reported that Adam would avoid the route he took revealed main effects of culture, and event condition, as well as a culture  $\times$  event condition interaction (see Table 8). Arab and White American participants both reported stronger desires to change their behavior in the counterfactual than control conditions ( $F(1, 312) = 79.04, p < .001, \eta_p^2 = .202$  for White Americans,  $F(1, 312) = 38.98, p < .001, \eta_p^2 = .111$  for Arabs). However, although Arab and White American participants reported equal desires to change their behavior in the control condition,  $F(1, 312) = 1.25, p = .265, \eta_p^2 = .004$ , White Americans reported a stronger desire to change their behavior in the future in the unusual-event condition than Arabs,  $F(1, 312) = 20.66, p < .001, \eta_p^2 = .062$ .

**Discussion**

This study extended beyond Studies 1 and 2 by investigating patterns of counterfactual thought for relatively mild negative outcomes. We again found unqualified support for Hypotheses 1 and 4: Arabs report more beliefs in divine control and fate than did White Americans, and both Arabs and White Americans reported more regret when negative outcomes result from exceptional action. We also again found support for Hypothesis 2b: White Americans were more likely to believe that changing antecedent conditions would result in different outcomes than did Arabs, who also endorsed equifinality beliefs more than White Americans.

A different pattern emerged for counterfactual antecedents. As in Studies 1 and 2, we found that Arabs endorsed counterfactual antecedents less overall than White Americans.

However, in response to mild negative outcomes, they showed a similar process to White Americans, endorsing counterfactuals more when negative outcomes resulted from exceptions to routine. That is, when outcomes are mild and therefore are more akin to chosen paths than ultimate destiny, Arabs endorsed counterfactual antecedents more when outcomes resulted from exceptional actions. This study also added the finding that for both Arabs and White Americans, exposure to exceptional action amplifies desires for behavioral change, reflecting an understanding that the individual holds some responsibility for their outcomes.

#### **Study 4**

In Study 4, we replicated and extended Study 3, exploring spontaneous counterfactuals as we had for Study 2, but with the mild outcome from Study 3. Unlike Study 2, we asked participants to imagine that they were in a similar situation as Adam, and share the thoughts and feelings that *they* might have. Previous research shows that first versus third person counterfactual thoughts can meaningfully differ (McCrea, 2007), thus this shift helps evaluate whether imagining of one's own, versus a stranger's experience, affects counterfactual thought.

#### **Method**

##### ***Participants***

One-hundred eighty-three white, non-Hispanic students (87 men, 96 women;  $M_{age} = 19.14$ ,  $SD = 1.02$ ; 72.1% identified as Christian) completed the study in the US. One-hundred sixty-four Arab students (51 men, 113 women;  $M_{age} = 19.78$ ,  $SD = 1.23$ ; 90.9% identified as Muslim) completed the study in the UAE.

##### ***Event Manipulation***

The procedure mirrored Study 3, with participants assigned to the same event conditions.

### ***Dependent Variables***

**Thought Listing.** Participants were first asked to briefly describe what kinds of thoughts they would have if they had been in Adam's situation. As in Study 2, participants' responses were coded by two trained coders who were blind to sample, condition, and hypothesis, for whether they spontaneously referenced either divine control or fate. Responses were also coded for attributions to personal control, as well as both upward and downward counterfactuals. Because outcomes were mild in this study, we explored whether they would elicit gratitude that the situation was not worse; these downward counterfactuals have been linked to perceptions of divine control in past work (Buffone et al., 2016) and thus might be a more common form of counterfactual thought in Arab participants who have high levels of these beliefs. Interrater reliability was good (references to God, 100% agreement,  $\kappa = 1.00$ ; references to fate, 99% agreement,  $\kappa = .90$ ; references to personal control, 87.9% agreement,  $\kappa = .74$ , upward counterfactuals, 88% agreement,  $\kappa = .73$ ; downward counterfactuals, 92% agreement,  $\kappa = .76$ ). Discrepancies were resolved by the first author while blind to sample and condition.

**Rating Scales.** Participants reported the same counterfactual items as Study 3, as well as *causal attributions to fate* ( $r = .59$  for White Americans,  $r = .52$  for Arabs), *personal control*, or *luck*, and perceptions of *equifinality*, and event impact. Their ratings of *regret*, and behavioral intentions were changed so that participants reported their own imagined feelings and behavior (see SMF).

Participants reported dispositional control beliefs and demographic information, and were thanked and debriefed, as in the previous studies.

### **Results**

Table 10 shows descriptive statistics and significance tests for the rating items by culture and event conditions.

**Table 10**

*Means and Standard Deviations of Main Dependent Variables by Culture and Event Condition, With Significance Tests, Study 4.*

	White Americans		Arabs in the UAE		Main Effect of Culture	Main Effect of Event Condition	Interaction of Culture × Event Condition
	Routine <i>M</i> ( <i>SD</i> )	Unusual <i>M</i> ( <i>SD</i> )	Routine <i>M</i> ( <i>SD</i> )	Unusual <i>M</i> ( <i>SD</i> )			
<i>Hypothesis 1a</i>							
Fate Attributions	2.85 (1.27)	3.04 (1.35)	4.64 (1.03)	4.56 (1.08)	<b><i>F</i> (1, 343) = 165.43,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .325</math></b>	<i>F</i> (1, 343) = 0.19, <i>p</i> = .661, $\eta_p^2 = .001$	<i>F</i> (1, 343) = 1.14, <i>p</i> = .287, $\eta_p^2 = .003$
Personal Control Attributions	2.16 (1.04)	2.43 (1.13)	2.12 (1.07)	2.55 (1.23)	<i>F</i> (1, 343) = 0.12, <i>p</i> = .731, $\eta_p^2 = .000$	<b><i>F</i> (1, 343) = 8.47,</b> <b><i>p</i> = .004, <math>\eta_p^2 = .024</math></b>	<i>F</i> (1, 343) = 0.46, <i>p</i> = .496, $\eta_p^2 = .001$
Luck Attributions	4.62 (1.08)	4.51 (1.30)	3.58 (1.51)	3.58 (1.51)	<b><i>F</i> (1, 343) = 45.80,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .118</math></b>	<i>F</i> (1, 343) = 0.17, <i>p</i> = .680, $\eta_p^2 = .000$	<i>F</i> (1, 343) = 0.13, <i>p</i> = .723, $\eta_p^2 = .000$
<i>Hypothesis 2a</i>							
Counterfactual Antecedents	4.04 (1.41)	5.00 (1.26)	3.01 (1.32)	4.09 (1.35)	<b><i>F</i> (1, 343) = 45.49,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .117</math></b>	<b><i>F</i> (1, 343) = 49.80,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .127</math></b>	<i>F</i> (1, 343) = 0.17, <i>p</i> = .682, $\eta_p^2 = .000$
<i>Hypothesis 2b</i>							
Counterfactual Consequences	4.90 (1.24)	4.67 (1.02)	3.78 (1.47)	3.84 (1.32)	<b><i>F</i> (1, 342) = 51.47,</b> <b><i>p</i> = .000, <math>\eta_p^2 = .131</math></b>	<i>F</i> (1, 342) = 0.42, <i>p</i> = .520, $\eta_p^2 = .001$	<i>F</i> (1, 342) = 1.09, <i>p</i> = .298, $\eta_p^2 = .003$
Equifinality	2.12 (0.96)	2.29 (0.89)	3.52 (1.15)	3.63 (1.14)	<b><i>F</i> (1, 343) = 151.24,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .306</math></b>	<i>F</i> (1, 343) = 1.54, <i>p</i> = .216, $\eta_p^2 = .004$	<i>F</i> (1, 343) = 0.11, <i>p</i> = .740, $\eta_p^2 = .000$
<i>Hypothesis 2c</i>							
Counterfactual Potency	19.98 (9.14)	23.67 (8.35)	11.86 (7.34)	16.24 (7.88)	<b><i>F</i> (1, 342) = 76.82,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .183</math></b>	<b><i>F</i> (1, 342) = 20.70</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .057</math></b>	<i>F</i> (1, 342) = 0.15, <i>p</i> = .699, $\eta_p^2 = .000$
<i>Hypothesis 4</i>							
Regret	2.98 (1.44)	4.01 (1.44)	2.89 (1.41)	3.74 (1.54)	<i>F</i> (1, 343) = 1.31, <i>p</i> = .253, $\eta_p^2 = .004$	<b><i>F</i> (1, 343) = 35.75,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .094</math></b>	<i>F</i> (1, 343) = 0.36, <i>p</i> = .550, $\eta_p^2 = .001$
<i>Exploratory Data</i>							
Change Behavior	2.59 (1.26)	3.91 (1.32)	2.30 (1.26)	3.46 (1.31)	<b><i>F</i> (1, 343) = 7.06,</b> <b><i>p</i> = .008, <math>\eta_p^2 = .020</math></b>	<b><i>F</i> (1, 343) = 80.96,</b> <b><i>p</i> &lt; .001, <math>\eta_p^2 = .191</math></b>	<i>F</i> (1, 343) = 0.34, <i>p</i> = .563, $\eta_p^2 = .001$

*Note:* Hypothesis tests in bold are statistically significant at  $p < .05$ .

***Hypothesis 1. Control Beliefs***

**H1a Situation-specific Control Beliefs.** Replicating all studies, and supporting H1a analysis of causal attributions for Adam’s accident to both fate and luck revealed main effects of culture. Analysis of personal control attributions yielded a main effect of event condition, with participants reporting that the accident was more caused by Adam’s personal actions in the unusual-event condition (see Table 10).

We also examined spontaneously-generated thoughts. As in Study 2, we examined whether the frequency of each thought type differed by culture in a 2 (culture: White American vs. Arab) × 2 (target thought: present vs. absent) chi-square analysis, and further examined whether these relative frequencies differed by condition using the Breslow-Day test of conditional independence. We also examined whether the frequency of thought type differed by event condition using a 2 (event type: routine vs. unusual) × 2 (target thought: present vs. absent) chi-square analysis.

**Table 11**

*Percentages of Participants by Culture and Event Condition Who Spontaneously Generated Thoughts Associated with Divine Control, Fate, Personal Control, and Upward and Downward Counterfactuals, Study 4.*

	White Americans		Arabs in the UAE	
	Routine	Unusual	Routine	Unusual
Divine Control	1.1%	0%	10.7%	5.0%
Fate	0%	1.1%	4.8%	13.8%
Personal Control	27.7%	61.8%	15.5%	46.3%
Upward Counterfactuals	23.4%	64.0%	13.1%	43.8%
Downward Counterfactuals	16.0%	23.6%	32.1%	20.0%

Spontaneous references to divine control were more common among Arabs than White Americans,  $\chi^2(1) = 12.26, p < .001$ , odds ratio = 16.35; the relative frequency did not differ by condition, Breslow-Day  $\chi^2(1) = 0.41, p = .523$  (see Table 11). Similarly, spontaneous references to fate were more common among Arabs than White Americans,

$\chi^2(1) = 14.77, p < .001$ , odds ratio = 19.23; and more common in the unusual-event than routine-event conditions,  $\chi^2(1) = 4.59, p = .032$ , odds ratio = 3.45. The relative frequency did not differ by condition, Breslow-Day  $\chi^2(1) = 0.34, p = .561$ . Finally, spontaneous references to personal control were more common among White Americans than Arabs,  $\chi^2(1) = 6.77, p = .009$ , odds ratio = 0.51; and more common in the unusual-event than routine-event conditions,  $\chi^2(1) = 38.56, p < .001$ , odds ratio = 4.40. The relative frequency did not differ by condition, Breslow-Day  $\chi^2(1) = 0.03, p = .853$ .

**H1b Dispositional Control Beliefs.** Analyses (corrected for non-sphericity) revealed significant main effects of culture,  $F(1, 343) = 98.00, p < .001, \eta_p^2 = .222$ , and subscale,  $F(2.81, 964.99) = 340.76, p < .001, \eta_p^2 = .498$ , qualified by a culture  $\times$  subscale interaction,  $F(2.81, 964.99) = 38.66, p < .001, \eta_p^2 = .101$ . No effects of event condition were significant (all  $F < 1.54, p > .206$ ). Overall, the cultural differences and simple effects were similar to the previous three studies, with White Americans and Arabs endorsing internal control similarly, as in Study 3 (see Table 12).

**Table 12**

*Hypothesis 1b. Dispositional Control Beliefs by Culture, Study 4.*

	White Americans			Arabs in the UAE			$F(1, 306)$	$p$	$\eta_p^2$
	$M$	$SD$	$\alpha$	$M$	$SD$	$\alpha$			
Internal Control	4.69 <sub>a</sub>	0.59	.75	4.69 <sub>a</sub>	0.68	.78	0.00	.975	.000
Divine Control	3.38 <sub>b</sub>	1.55	.97	4.74 <sub>a</sub>	1.06	.91	<b>89.56</b>	<.001	.207
Fate	3.35 <sub>b</sub>	0.85	.77	4.13 <sub>b</sub>	0.83	.72	<b>73.83</b>	<.001	.177
Luck	3.19 <sub>b</sub>	0.76	.80	3.15 <sub>c</sub>	0.83	.82	0.16	.693	.000
Helplessness	2.21 <sub>c</sub>	0.69	.76	2.60 <sub>d</sub>	0.90	.82	<b>21.72</b>	<.001	.060

*Note:*  $F$  tests indicate differences within row between cultures. Bold numbers indicated that

the test is significant at  $p < .05$ . Different subscripts indicate means that are significantly different within column.

### ***Hypothesis 2. Counterfactual Thinking***

**H2a Antecedents.** Replicating Study 3, analysis revealed only main effects of culture and event condition (see Table 10). Arabs endorsed counterfactuals less than White Americans overall, but like White Americans, reported more counterfactuals when the mild negative outcome resulted from an exception to routine.

**H2b Consequences.** Analysis revealed only the predicted main effect of culture (see Table 10). Replicating all three studies, Arab participants were substantially less likely to believe that changing the antecedent conditions would have prevented the accident.

We also found a significant main effect of culture on equifinality beliefs, with Arab participants believing more strongly that changing antecedent conditions would fail to change outcomes.

**H2c Counterfactual Potency.** Again replicating Study 3, analysis of counterfactual potency for thoughts about changing personal antecedents revealed a main effect of culture, with White Americans reporting more potent counterfactuals overall (see Table 10). Analyses also revealed a main effect of event condition, with participants endorsing counterfactuals more strongly in the unusual-event condition.

**Spontaneous Counterfactuals.** We also explored spontaneously generated thoughts (see Table 11) about what the participants would think if they were in Adam's situation. Upward counterfactuals were more common among White Americans than Arabs,  $\chi^2(1) = 8.35, p = .004$ , odds ratio = 0.46; the relative frequency did not differ by condition, Breslow-Day  $\chi^2(1) = 0.07, p = .792$ . However counterfactuals differed by condition,  $\chi^2(1) = 48.00, p < .001$ , odds ratio = 5.50. Similar to close-ended counterfactuals, White Americans engaged in upward counterfactuals more than Arabs overall, and both groups engaged in counterfactuals more in the unusual-event condition.

Examination of downward counterfactuals yielded a different result. Downward counterfactuals were equally common among White American and Arab participants,  $\chi^2(1) = 2.20, p = .138$ , odds ratio = 1.46; however, the relative frequency differed by condition, Breslow-Day  $\chi^2(1) = 4.82, p = .028$ . Arabs listed downward counterfactuals more frequently than White Americans in the control condition,  $\chi^2(1) = 6.69, p = .010$ , but not in the unusual-event condition,  $\chi^2(1) = 0.32, p = .573$ . Notably, Arab participants were less likely to make upward counterfactuals in the routine-event condition, seemingly shifting their reactions from regret that the outcome could have been avoided, to gratitude that it was not worse.

#### ***Hypothesis 4. Regret***

Although we changed our measure to ask participants how they would feel in Adam's situation, as in Studies 1, 2, and 3, analysis of regret yielded a significant main effect of event condition. Across all studies, participants anticipated more regret when negative outcomes resulted from exceptional action.

#### ***Behavioral Intentions***

Analyses of the extent to which participants reported that *they* would avoid the route that led to an accident revealed main effects of culture, with Arabs less likely to report that they would avoid the route that led to the accident, and event condition, with participants more likely to report that they would avoid the exceptional route.

#### **Discussion**

Replicating Studies 1, 2, and 3, and supporting Hypothesis 1, we found in Study 4 that Arabs reported more beliefs in divine control and fate than did White Americans. In this study, Arabs also spontaneously referenced both divine control and fate more than White Americans when considering what they would think about had they experienced the accident themselves. Also replicating Studies 1, 2, and 3, and supporting Hypothesis 2b, White Americans were more likely to believe that changing antecedent conditions would result in

different outcomes than did Arabs, who also endorsed equifinality beliefs more than White Americans. In addition, supporting Hypothesis 4, both Arabs and White Americans reported more regret when negative outcomes resulted from exceptional action.

Replicating Study 3, we found that, in response to mild negative outcomes, Arab participants, who endorsed counterfactual antecedents less than White Americans overall, endorsed upward counterfactuals more when negative outcomes resulted from exceptional action. Thus differing from Studies 1 and 2, and identifying a moderator of Hypotheses 2a and 2c, culture did not interact with event condition. This suggests that when outcomes are mild, and perhaps less attributable to fate or divine control, Arab participants showed a pattern of upward counterfactual thought that seemed similar in process to that of White Americans. Extending from Study 3, we also found this pattern in spontaneously generated counterfactuals when participants were asked to consider what they themselves would think about had they been in Adam's situation. Importantly, this study also shows that Arab participants may avoid upward counterfactuals by reflecting on how the situation could have been worse. In fact, nearly one third of Arab participants in the control condition spontaneously generated downward counterfactuals. This shift in thinking may have important functional implications; consistent with avoiding endorsing upward counterfactuals, Arab participants were less likely to endorse relevant behavioral intentions (to avoid the route where the accident occurred).

### **Meta-analysis**

In order to estimate the overall evidence for our hypotheses across Studies 1-4, we performed a within-paper random-effects meta-analysis (see Goh et al., 2016) using the R package metafor (Viechtbauer, 2010) based on sample scripts provided by Center for Open Science at <https://osf.io/nmdtq/> (Soderberg, 2017). We examined the standardized mean difference of the effect of culture (US – UAE) and, separately, of event condition (unusual –

routine); we also measured whether event condition moderated the effects of culture.

Additionally, because Studies 1 and 2 used severe outcomes, and Studies 3 and 4 used mild outcomes, we examined outcome severity and the event condition  $\times$  severity interaction as moderators of the effect of culture. See Table 13.

Across the four studies, we found support for H1a: White Americans were consistently less likely to make attributions to fate than Arabs. In addition, White Americans were more likely to make attributions to luck than Arabs, but samples did not differ in their tendency to make attributions to personal control (see Figure 1). Severity moderated the effects of culture such that White Americans attributed less personal control than Arabs for severe, but not mild, outcomes.

Additionally, we performed a meta-analysis testing H1b in which we examined the standardized mean difference of the effect of culture (US – UAE) for the 5 Fatalism Belief subscales. Supporting H1b, compared to Arabs, White Americans reported lower beliefs in divine control and fate. Additionally, White Americans reported lower helplessness and higher beliefs in internal control (see Table 14).

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**Table 13**

*Meta-analysis of Standardized Mean Difference  $d$  (with 95% Confidence Intervals) for Studies 1-4.*

	Culture (USA – UAE)	Event Condition (Unusual – Routine)	Culture × Condition	Culture × Severity	Culture × Condition × Severity
<b>Hypothesis 1a:</b>					
Fate Attributions	<b>-1.237 (-1.370, -1.103)</b>	0.013 (-0.103, 0.130)	-0.152 (-0.406, 0.101)	0.153 (-0.103, 0.409)	-0.047 (-0.547, 0.453)
Personal Control Attributions	-0.093 (-0.238, 0.053)	0.125 (-0.006, 0.257)	-0.123 (-0.421, 0.175)	<b>-0.295 (-0.520, -0.069)</b>	-0.154 (-0.625, 0.317)
Luck Attributions	<b>0.721 (0.572, 0.870)</b>	0.035 (-0.147, 0.077)	0.212 (-0.062, 0.486)	0.166 (-0.145, 0.476)	0.191 (-0.434, 0.816)
<b>Hypothesis 2a:</b>					
Counterfactual Antecedents	<b>0.566 (0.315, 0.817)</b>	<b>0.655 (0.359, 0.952)</b>	<b>-0.564 (-0.959, -0.169)</b>	-0.120 (-0.667, 0.428)	<b>-0.885 (-1.496, -0.273)</b>
<b>Hypothesis 2b:</b>					
Counterfactual Consequences	<b>0.724 (0.605, 0.844)</b>	-0.090 (-0.206, 0.027)	0.024 (-0.226, 0.274)	-0.181 (-0.397, 0.034)	-0.353 (-0.777, 0.070)
Equifinality	<b>-1.308 (-1.432, -1.185)</b>	<b>0.148 (0.010, 0.286)</b>	-0.122 (-0.369, 0.125)	-0.006 (-0.254, 0.242)	-0.082 (-0.577, 0.414)
<b>Hypothesis 2c:</b>					
Counterfactual Potency	<b>0.809 (0.598, 1.020)</b>	<b>0.402 (0.199, 0.604)</b>	<b>-0.404 (-0.779, -0.030)</b>	-0.269 (-0.683, 0.146)	<b>-0.696 (-1.192, -0.200)</b>
<b>Hypothesis 4:</b>					
Regret	<b>0.150 (0.038, 0.263)</b>	<b>0.589 (0.424, 0.753)</b>	<b>-0.265 (-0.490, -0.041)</b>	-0.049 (-0.292, 0.195)	-0.232 (-0.683, 0.219)

*Note:* Confidence intervals that exclude zero are shown in **bold**.

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**Table 14**

*Meta-analysis of Standardized Mean Difference  $d$  (USA - UAE, with 95% Confidence Intervals) for Fatalism Subscales in Studies 1-4.*

Divine Control	<b>-1.004 (-1.122, -0.885)</b>
Fate	<b>-0.921 (-1.039, -0.804)</b>
Internal Control	<b>0.221 (0.041, 0.401)</b>
Luck	0.086 (-0.026, 0.198)
Helplessness	<b>-0.393 (-0.521, -0.266)</b>

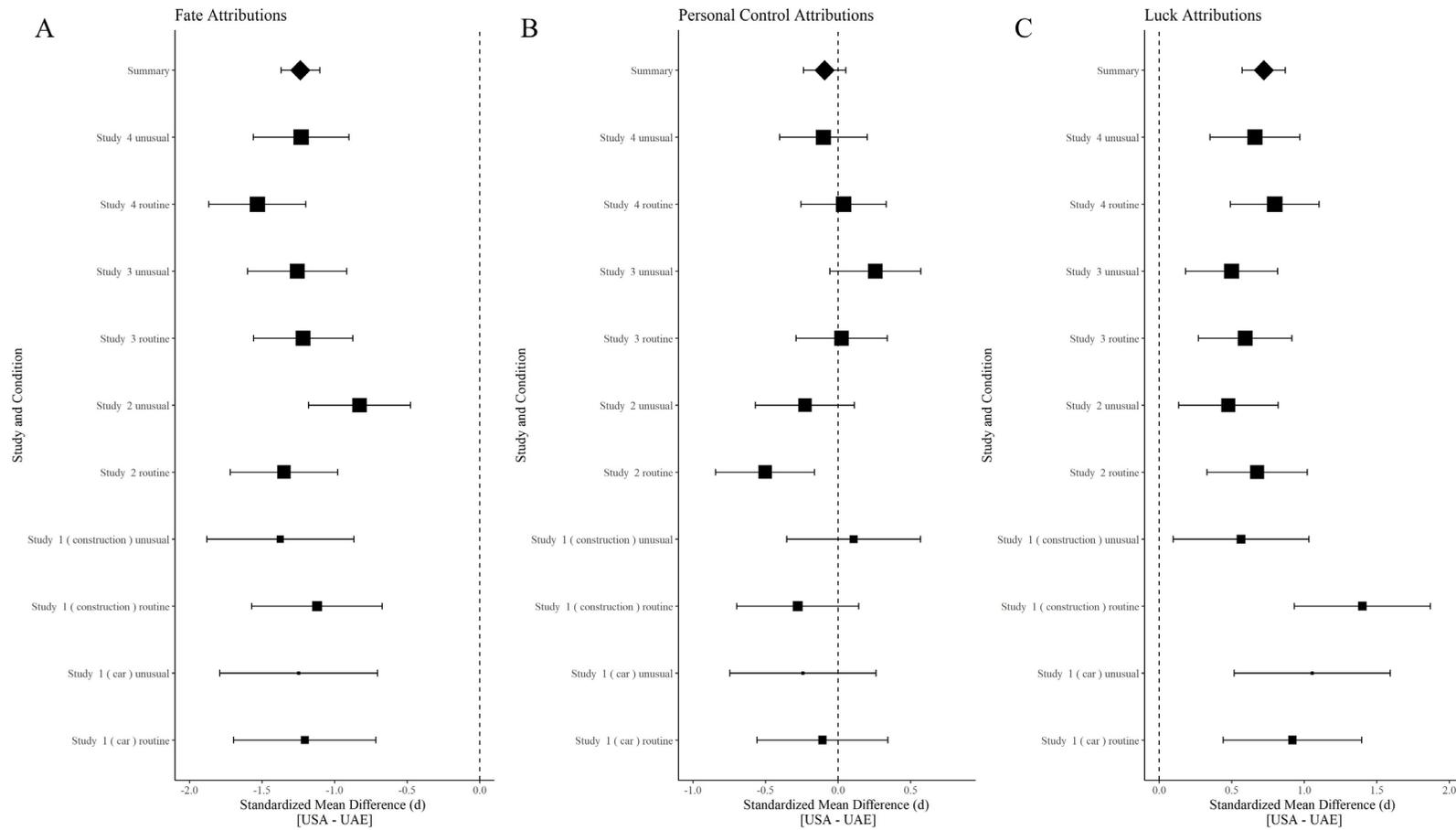
*Note:* Confidence intervals that exclude zero are shown in **bold**.

Likewise, we found support for H2: overall, White Americans saw counterfactual antecedents and consequences as more likely, and had higher overall counterfactual potency and lower equifinality ratings than Arabs (see Figure 2). For antecedents and overall potency, this effect was stronger in the counterfactual than the control condition. Counterfactual focus on the self (actor) versus situation did not moderate the effect of culture (95% C.I.: [-1.00, 0.32] antecedents; [-0.51, -.079] consequences; [-0.92, 0.11] potency), the effect of condition (95% C.I.: [-1.37, 0.037] antecedent; [-0.05, 0.51] consequences; [-0.86, -.18]), nor the culture by condition interaction (95% C.I.: [-0.92, 1.20] antecedent; [-0.87, 0.36] consequences; [-0.86, 1.00] potency), indicating that this is an effect of counterfactual thinking generally, rather than self-focused counterfactuals specifically. However, outcome severity moderated the culture  $\times$  event condition interaction for antecedents and for potency, such that the interaction emerged for severe but not for mild outcomes. This suggests that Arabs endorsed counterfactuals more in the unusual-event than routine-event condition when outcomes were mild, but not when outcomes were severe.

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**Figure 1**

*Forest Plot of Cross-Cultural Differences in (A) Fate Attributions, (B) Personal Control Attributions, and (C) Luck Attributions (Hypothesis 1).*

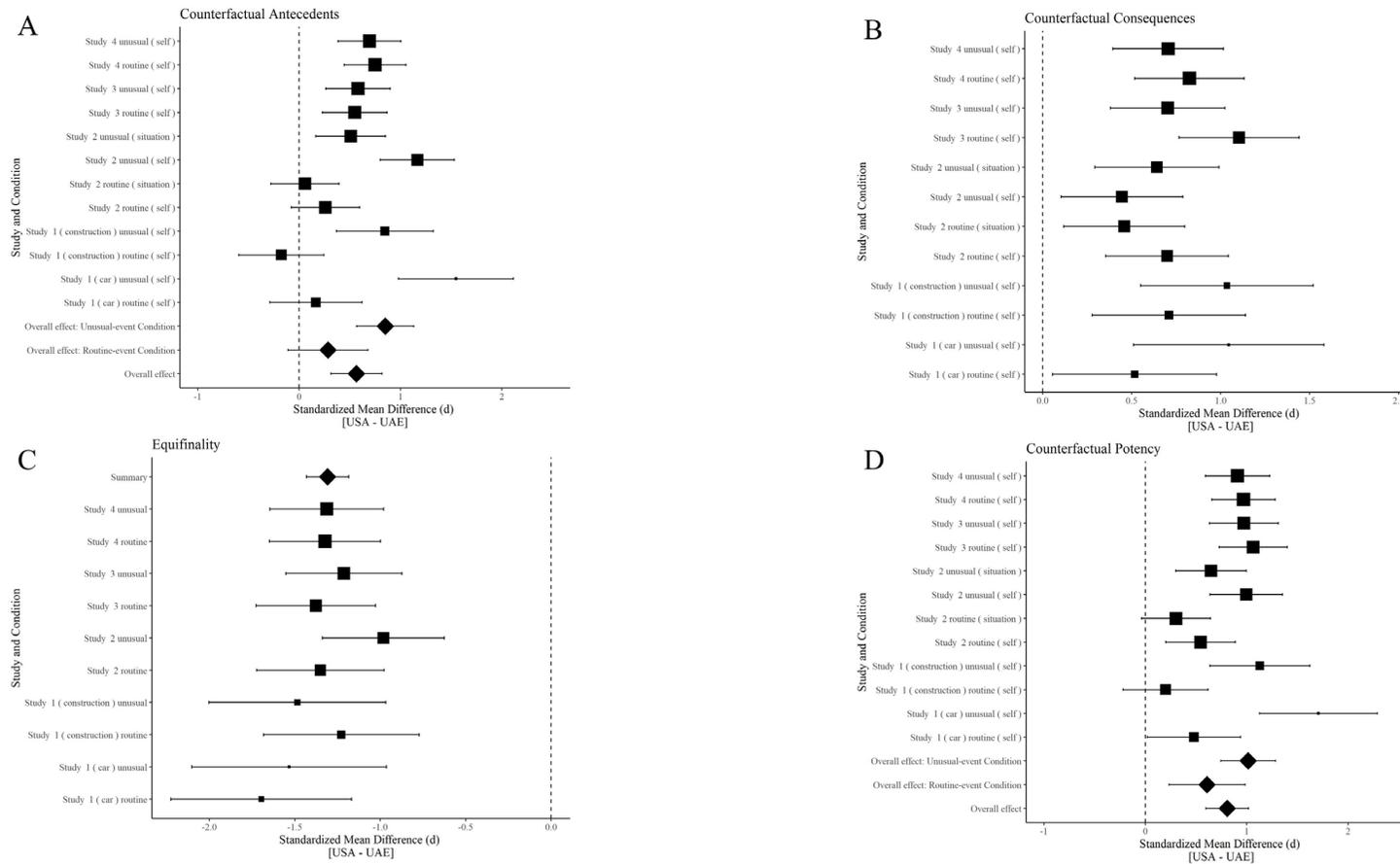


*Note:* The x-axis shows the effect size  $d$  for the difference between samples, computed as [USA – UAE]. Data points are scaled by standard errors, such that larger points represent more reliable estimates.

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**Figure 2:**

*Forest Plot of Cross-Cultural Differences in (A) Counterfactual Antecedents, (B) Counterfactual Consequences, (C) Equifinality, and (D) Counterfactual Potency (Hypothesis 2).*



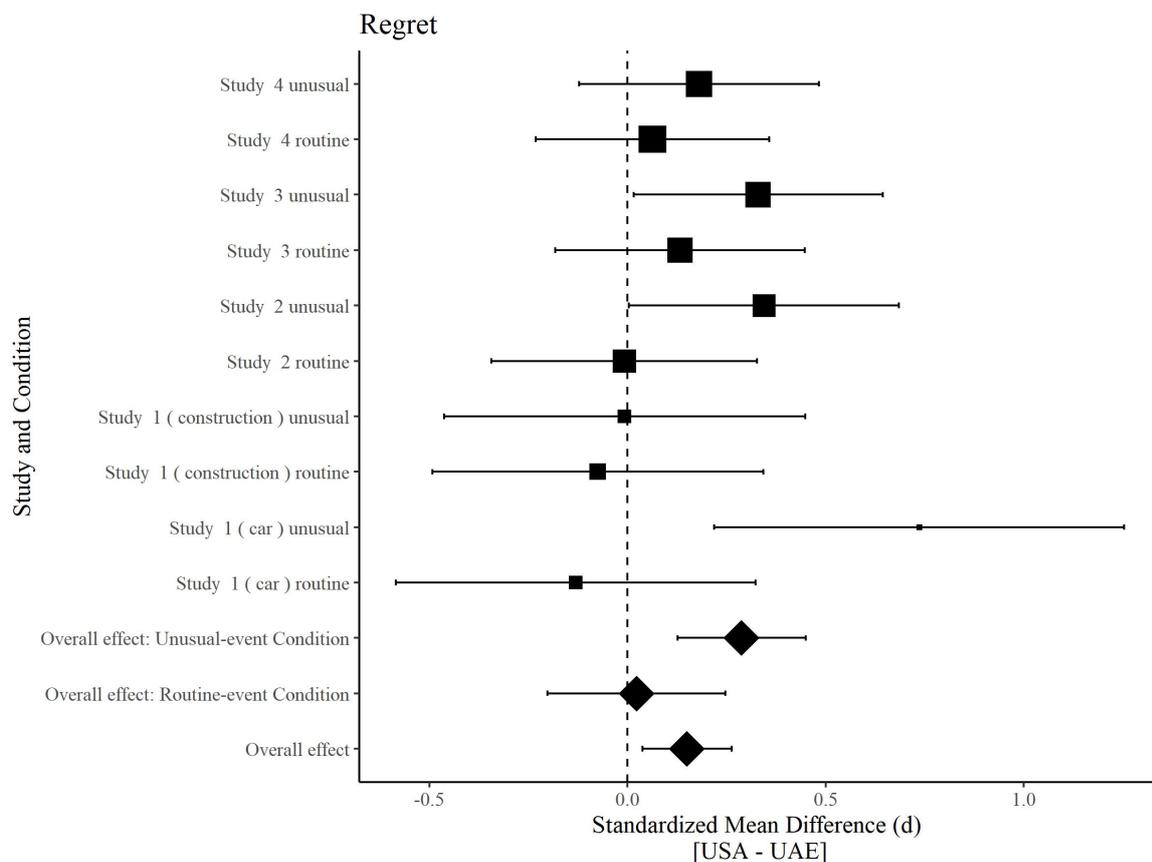
*Note:* The x-axis shows the effect size  $d$  for the difference between samples, computed as [USA – UAE]. Data points are scaled by standard errors, such that larger points represent more reliable estimates. Summary effects are shown for routine-event and unusual condition separately when there was significant moderation by condition.

## CULTURE AND COUNTERFACTUAL THINKING

Finally, the meta-analysis revealed that both White Americans and Arabs reported more regret in the unusual-event condition than in the routine-event condition, although White Americans reported stronger regret than Arabs in the counterfactual but not control condition (see Figure 3).

**Figure 3**

*Forest Plot of Cross-Cultural Differences in Regret (Hypothesis 4).*



*Note:* The x-axis shows the effect size  $d$  for the difference between samples, computed as [USA – UAE]. Data points are scaled by standard errors, such that larger points represent more reliable estimates. Summary effects are shown for routine-event and unusual condition separately when there was significant moderation by condition.

### Study 5

The first four studies provide compelling support for our hypotheses that White Americans and Arabs in the UAE show differences in control beliefs and endorse

counterfactual thoughts differently while showing more similar patterns of regret. To more fully explore whether it is control beliefs, rather than differences in religiosity that explain cross-cultural differences in counterfactual thought, we conducted a final correlational study, isolating our central variables with only Arab participants in the UAE. We explored associations between religiosity, Arab identity, and control beliefs, and counterfactuals and regret. To further ensure that Arab participants were interpreting the single item measure of regret as expected, we used three items from the Regret Elements Scale (Buchanan et al., 2016) along with the single item we used in Studies 1 through 4.

## **Method**

### ***Participants***

Two-hundred fourteen students in the UAE completed this study (66 men, 148 women;  $M_{age} = 19.59$ ,  $SD = 1.46$ ; 84.1% identified as Muslim; 150 participants indicated that they considered themselves Arab. When given a range of race/ethnicities to choose from 138 selected Arab, 5 Black African, 9 East Asian, including South East Asian and Pacific Islander, 3 Hispanic, 40 South Asian, 2 White European, 9 mixed or multi-racial, and 8 other).

The one-hundred fifty participants who reported considering themselves to be Arab (48 men, 102 women;  $M_{age} = 19.56$ ,  $SD = 1.51$ ; 94% identified as Muslim) were used to test primary research questions maintaining a comparable sample to Studies 1-4. We report exploratory analyses with other participants in the SDF.

### ***Counterfactual Scenario***

All participants read the unusual event, car accident scenario from Studies 1 and 2 that resulted in a serious accident, as this is the condition in which fate beliefs and divine control mediated cultural differences.

### ***Measured Variables***

Participants reported the same counterfactual items as Study 1, then reported the same item measuring regret from the previous studies along with three additional items (see SMF). These 4-items created a reliable scale ( $\alpha = .87$  for all participants,  $\alpha = .88$  for Arab participants), indicating that the single item we used in the previous studies reflects an understanding of regret that is similar to that explored previously with American participants (see Buchanan et al., 2016).

Participants next reported dispositional control beliefs. In this study we measured only the divine control (all participants  $\alpha = .96$ ; for Arabs  $\alpha = .87$ ), fate (all participants  $\alpha = .76$ ; for Arabs  $\alpha = .77$ ), and internal control (all participants  $\alpha = .72$ ; for Arabs  $\alpha = .70$ ) subscales.

Next, participants completed six items measuring religiosity (see SMF; these items were taken from the Fetzer Institute's (1999) 38 item Brief Multidimensional Measure of Religiousness/Spirituality). Because the six items used different scales, we standardized responses across the full sample before creating an index of religiosity (all participants  $\alpha = .90$ ; for Arabs  $\alpha = .89$ ). Participants also indicated whether they considered themselves to be Arab, then completed a ten-item group-level investment scale modified from Leach et al. (2008) to measure Arab identification (see SMF; only Arabs completed this scale,  $\alpha = .91$ ).

Participants reported demographic information, then were thanked and debriefed.

## **Results**

### ***Is Religiosity Associated with Counterfactual Thinking?***

Table 15 shows descriptive statistics and correlations among variables. As can be seen, and replicating Studies 1 and 2, Divine Control and Fate beliefs were negatively associated with counterfactual potency. Although Religiosity and Arab identification also negatively predicted potency, neither bivariate association was significant. This finding validates our focus on control beliefs, rather than on other elements of culture, religion, or

religiosity as centrally linked to differences in counterfactual thought. However, religiosity was positively associated with divine control, fate, and internal control. Thus, in line with the religious scholarship we cited in the introduction, for our majority Muslim sample, religiosity does not undermine beliefs in internal control and instead is positively associated with them. Arab identification was likewise correlated with divine control and fate beliefs.

**Table 15**

*Descriptive Statistics and Associations Among Variables for Arab participants, Study 5.*

		Religiosity	Arab Identity	Internal Control	Divine Control	Fate Beliefs
Religiosity (z score)	$M = 0.09$ $SD = 1.05$					
Arab Identification	$M = 4.63$ $SD = 0.87$	$r = .47$ $p < .001$				
Internal Control	$M = 4.45$ $SD = 0.68$	$r = .25$ $p = .002$	$r = .12$ $p = .134$			
Divine Control	$M = 4.79$ $SD = 1.32$	$r = .67$ $p < .001$	$r = .32$ $p < .001$	$r = .10$ $p = .224$		
Fate Beliefs	$M = 4.31$ $SD = 0.89$	$r = .52$ $p < .001$	$r = .30$ $p < .001$	$r = .02$ $p = .794$	$r = .69$ $p < .001$	
Counterfactual Antecedents	$M = 3.84$ $SD = 1.48$	$r = -.09$ $p = .271$	$r = -.03$ $p = .676$	$r = .05$ $p = .515$	$r = -.10$ $p = .248$	$r = -.14$ $p = .099$
Counterfactual Consequences	$M = 3.79$ $SD = 1.44$	$r = -.11$ $p = .174$	$r = -.10$ $p = .233$	$r = -.06$ $p = .496$	$r = -.21$ $p = .009$	$r = -.25$ $p = .002$
Counterfactual Potency	$M = 14.75$ $SD = 8.19$	$r = -.14$ $p = .078$	$r = -.12$ $p = .159$	$r = .003$ $p = .971$	$r = -.20$ $p = .015$	$r = -.26$ $p = .001$
Regret	$M = 3.42$ $SD = 1.52$	$r = -.04$ $p = .626$	$r = -.02$ $p = .773$	$r = .063$ $p = .446$	$r = -.001$ $p = .995$	$r = -.04$ $p = .614$

We also analyzed whether regressing counterfactuals and regret on religiosity and identification simultaneously would reveal a unique effect of religiosity or ethnic identification on our primary variables. None of the four models was significant (all  $p > .171$ ), nor were any individual slopes (all  $|\beta| < .12$ ; see SDF). Regressing counterfactual potency on religiosity, ethnic identification, divine control, and fate beliefs simultaneously did yield a significant model ( $F(4, 145) = 2.73, p = .032, R^2 = .070$ ), primarily driven by fate

beliefs ( $\beta = -.23$ ,  $t(145) = -2.08$ ,  $p = .040$ ). Divine control ( $\beta = -.04$ ), religiosity ( $\beta = .03$ ), and Arab identification ( $\beta = -.05$ ) did not uniquely predict potency (all  $p > .625$ ).

Thus, religiosity alone is not associated with counterfactual thinking, and instead, beliefs in fate seem to more directly predict counterfactual reasoning.

## Discussion

Study 5 provides further evidence that endorsing divine control and fate beliefs is associated with reduced counterfactual potency in response to severe outcomes. In addition, it shows that these effects are not fully accounted for by underlying differences in religiosity or identification with one's ethno-cultural group, but instead are most strongly tied to beliefs about causality and the role of fate in determining one's outcomes.

This study also shows that fate beliefs seem to most uniquely affect counterfactual consequences in our Arab participants. Believing that fate determines important life outcomes is associated with beliefs that the outcome cannot be changed (reflecting beliefs in equifinality), and thus counterfactual potency remains low, even when outcomes result from exceptional action. More than identifying a population of individuals likely to show the results we have obtained, we think this result is of primary importance. That is, whether steeped in religious or cultural tradition, we argue that beliefs in fate, a specific form of secondary control, has important consequences for counterfactual reasoning.

## General Discussion

Building on previous research that shows that control plays a central role in the experience of counterfactual thinking (Giroto et al., 1991; McCloy & Byrne, 2000; Roese & Olson, 1995), in four studies, we show that cultural differences in beliefs about control are associated with corresponding differences in counterfactual thought. In Study 5, we show that such cultural differences are unlikely to be due to religiosity, and are more likely to be associated with culturally grounded beliefs about causality. In Studies 1-4, we found that

Arab participants in the UAE more strongly endorsed beliefs in divine control and fate than did White American participants, both as an individual difference, and in reaction to specific vignettes. Arabs were less likely to believe that the protagonist could change his or her action, and less likely to believe that doing so would have prevented the aversive outcome. Consistent with past research with this population, White Americans reported that an antecedent about both the target (Studies 1 and 2) and about the situation (Study 2) was more mutable when the severe negative outcome resulted from unusual action, whereas Arab participants' ratings were less affected by chosen action. In these studies, endorsing divine control (Studies 1 and 2) and fate (Study 2) mediated cultural differences in counterfactual potency, with Arabs showing less counterfactual thinking in the unusual-event condition. This suggests that Arabs' beliefs in divine control and fate were associated with less upward counterfactual thought in response to important life outcomes. However, when the negative outcome was mild, we found only main effects of culture and event condition. Although Arabs endorsed counterfactual thoughts less than White Americans overall, they endorsed counterfactuals more when a mildly negative outcome resulted from exceptional action, suggesting a weaker role of fate or stronger role of personal responsibility over less life-altering events. Relatedly, Arabs reported that they would be more likely to change their behavior in the unusual-event condition in those two studies. Across all four studies, Arabs anticipated more regret (in themselves and others) in response to aversive outcomes resulting from unusual action. This finding shows, even in response to severe outcomes, that Arab participants did notice differences between conditions, but that those differences affected self-reported emotions and cognitions differently.

Together, these findings offer important insights into cultural patterns of beliefs about control, cognition, and emotion in counterfactual thought, as well as broader beliefs about fate and divine control as causal forces. Below, we detail the implications of these major

findings for beliefs about control, counterfactual antecedents, spontaneous counterfactual generation, and regret.

### **Fate and Divine Control**

Beliefs about whether an event was controllable are fundamental to counterfactual thinking (McCloy & Byrne, 2000). The current research builds on previous work investigating free will as a necessary facet of counterfactual thinking (Alquist et al., 2015) to suggest that culturally-grounded beliefs about causal control may increase or decrease the likelihood of counterfactual thinking when outcomes can be attributed to fate or divine will.

Engaging in downward comparisons or reflecting on pivotal events increases fate perceptions or beliefs that certain outcomes were meant to be (see Buffone et al., 2016 and Kray, et al., 2010). The current work suggests a contrasting parallel to the positive association of downward counterfactuals and such beliefs, demonstrating that beliefs in fate may encourage people to avoid upward counterfactual thinking following significant negative events. Indeed, some Arab participants in Study 2 spontaneously noted that although Adam might initially think about how the accident could have been avoided, he should instead thank God for having prevented a more serious accident. We were able to capture and quantify this pattern directly in Study 4, where participants in the control condition were more likely to make downward than upward counterfactuals. Building on past work demonstrating the links of counterfactuals to religious and fatalistic beliefs, the current work suggests that fate beliefs may thus actively shift counterfactuals away from an upward focus toward a downward focus that reaffirms these beliefs and provides an alternative functionality of thought processes.

Moreover, our mediational analyses and correlational results from Study 5 provide support for the idea that cultures that vary in control beliefs – and in particular in beliefs in fate and divine control – are likely to vary also in counterfactual endorsement to the extent that outcomes are attributable to fate or divine will. Although it is not possible to establish the

causal structure from mediational analyses alone (see Fiedler et al., 2011), our results suggest that there may be different cultural schemas that influence how people think about fate, and how, when, or whether people engage in counterfactual thought. Thus, whether causally determined or resulting from shared cultural scripts which themselves may reflect religious or historical influences, other cultures with strong beliefs in deterministic fate may show similar patterns of counterfactual thought as our Arab participants. Previous investigations of counterfactuals in non-Western cultures have focused on East Asians, who have relatively low beliefs in primary control (see Morling, 2000). Such research has found that, like Arabs reflecting on mild negative outcomes, East Asians do engage in counterfactual thinking (see Chen et al., 2006; Gilovich, et al., 2003; Morris & Peng, 1994), but tend to focus less on changes an individual could have made to a situation than to situational mutations, reflecting a focus on secondary control (Morris & Peng, 1994). Comparing East Asian and Arab samples to each other, as well as investigating cultures beyond these groups (such as Mexicans, who also show heightened endorsement of fate beliefs; Ross et al., 1983), may help further disentangle the relative effects of specific secondary control beliefs (e.g., luck/random chance versus divine control) in counterfactual thinking.

### **Counterfactual Antecedents**

In Studies 1 and 2, we found a culture by event condition interaction on counterfactuals about antecedents. Consistent with decades of work on counterfactual thinking (Kahneman & Miller, 1986), White Americans were more likely to think that the protagonist could have acted differently when the events described deviated from the actor's usual routine. In contrast, Arabs were less likely to endorse this counterfactual antecedent and were less sensitive to the normality of the event when outcomes were severe. However, Arabs were equally or more likely to say that the accident was under the protagonist's causal control, indicating that this was not simply due to lower primary control beliefs among Arabs

than White Americans. In Studies 3 and 4, when we investigated mild outcomes over which Arabs may perceive less divine influence, they showed a pattern similar to Americans, endorsing counterfactuals more when the outcome resulted from exceptional action. Thus, this research indicates that understandings of causality and of counterfactual possibility have a more complex relationship for Arabs than the fairly simplistic direct associations that tie these understandings for White Americans and other Westerners. In particular, the severity of an outcome appears to evoke different beliefs about causal control and counterfactual possibility for Arabs. Indeed our meta-analysis shows that severity moderated the culture  $\times$  event condition interaction so that it only emerged in response to more severe negative events.

Importantly, this work suggests that if both influence and adjustment motives are accessible to individuals, they may be able to flexibly apply either as appropriate in the situation or context. When culture or religion dictate that individuals should accept outcomes as they are and adjust to the situation, they do so. When that expectation is not present, individuals may question outcomes and the role they played in eliciting them. Such a finding is consistent with previous research showing that Arabs endorse both primary and secondary control (see Rashwan & Jenkins, 2017), as well as with other work showing that Arabs in the UAE may hold seemingly conflicting beliefs or values, and access or apply them differently across social contexts (see Maitner, 2021; Maitner et al., 2017). In contrast, White Americans may show a more simplistic emphasis on primary control regardless of context, and thus emphasize counterfactual possibilities for an actor.

### **Spontaneous Counterfactuals**

The finding in Study 2 that the two groups were equally likely to spontaneously generate counterfactual thoughts further indicates that although there may be differences in the choice to endorse counterfactuals, such thinking may be equally accessible across

cultures. That is, Arabs may be just as likely to have counterfactuals come to mind when negative outcomes occur, but apply or endorse those thoughts flexibly according to circumstance. Emphasizing adjustment and submission to God's will, Arabs may choose to disregard or invalidate counterfactuals more than White Americans when outcomes are severe or life altering, and therefore attributable to divine control. Previous work has indicated that considering downward counterfactuals offers a means to reaffirm religious belief (Buffone et al., 2016); it may be that abstention from or active rejection of upward counterfactuals offers similar benefits for believers who emphasize the power of divine control in determining life outcomes.

Elaborating that, in Study 4, we found that although Arabs spontaneously listed fewer upward counterfactuals than White Americans overall, they were sensitive to event condition, expressing upward counterfactuals more when the outcome resulted from an exception to routine. In the routine-event condition, only 13% of Arab participants spontaneously generated upward counterfactuals while 32% generated downward ones. Like White Americans, Arabs also reported a lower likelihood of changing future behavior in this condition, providing some initial support to the idea that avoiding upward counterfactuals (and instead, promoting downward ones) may inhibit influence and promote adjustment motives. Thus, although the functionality of upward and downward counterfactuals may be similar across cultures, counterfactual thoughts may be accessed or applied differently across cultures and circumstances to best match cultural mandates associated with influence and adjustment.

### **Regret**

Regardless of outcome severity, Americans and Arabs reported more regret in response to negative outcomes resulting from exceptional action. Investigations of regret in western populations have repeatedly underscored its ties to counterfactual thoughts (Morrison

& Roese, 2011; Summerville & Roese, 2008), particularly those involving discrepancies between actual behavior and one's ideal standards (Zhang et al., 2020). We therefore consider the dissociation between endorsed thought and emotion reflected by our Arab participants an important avenue for future research. Reflecting broader cultural patterns that allow for such dissociation (see Rubin & Yasien-Esmael, 2004; Wilkan, 1988), Arabs seem to experience negative emotional consequences following negative outcomes without engaging in the cognitive processes that are thought to make those emotions functional (Buchanan et al., 2016). However, as discussed above, Arabs may be quite adept at regulating such negative emotion (adjusting to the situation) by taking comfort in the fact that both good and bad outcomes reflect God's will. Thus, the fact that Arabs avoid a process that may be functional in Western cultures does not mean that their choice to do so is dysfunctional (see also Ross et al., 1983). In fact, lamenting negative outcomes may be disruptive to the group or collective, thus conflicting with adjustment norms emphasized in interdependent societies (see Morling et al., 2002). Further investigating the alternative mechanisms that Arabs use to adjust to significant negative events or shift from upward to downward counterfactual thinking would help more fully articulate how beliefs in divine control reduce upward counterfactual thinking, and whether or how doing so is functional in this cultural context. Moreover, given the broad impact of counterfactual thinking on other aspects of reasoning and motivation (Roese & Epstude, 2017), future work is needed to examine how cultural context and event severity affects counterfactual functionality.

### **Limitations and Future Research**

All studies used scenario situations focused on accidents. Future research should examine whether findings change when participants reflect on meaningful personal experiences rather than vignettes, given that counterfactual processes may show meaningful

differences across these contexts (De Brigard & Giovanello, 2012; Özbek et al., 2016; Schacter et al., 2015).

These initial studies replicate and extend work from a well-studied Western democracy, to a Middle-Eastern federation of monarchies. To maintain comparability across samples, and reflecting challenges associated with conducting research in non-Western, non-democratic societies, we exclusively used student samples. Because non-Western student samples tend to be more Westernized and individualistic than other groups within the same culture (Ma & Schoeneman, 1997), we believe that it is particularly compelling that we found reliable effects within our limited sample. However, given that counterfactual thinking and related emotions change across the lifespan, particularly for older adults (Wrosch & Heckhausen, 2002), future work considering a broader age range would be valuable.

It is also important to remember that our “American” sample was specifically a White, non-Hispanic American sample at a relatively affluent institution (median family income is above \$100,000 annually) in the Midwest. Different socioeconomic and racial/ethnic groups within the US differ in primary and secondary control (Stephens et al., 2014) and in fate beliefs (Ross et al., 1983). Our US sample was selected specifically because it is demographically likely to be high in primary control relative to other possible subgroups of Americans. To the extent that an American sample reflected a different demographic composition with different primary control and fate beliefs, “cultural” differences may be attenuated.

In addition, it is unclear to what extent the results we report here were influenced by cultural versus religious context. However, the two are likely to be deeply intertwined and are difficult to separate in our current sample. In fact, in Study 5, we found that Arab identification and religiosity were strongly correlated, suggesting a close link between spirituality and the Arab identity in this population, regardless of religion. Other research

shows that practices that are thought to be steeped in religion actually vary across cultural contexts (see Wilkan, 1988), providing further evidence that the two become importantly intermixed and may yield emergent psychological properties. However, other research looking at culture and religion have shown that they exert independent main effects on fate beliefs (Norenzayan & Lee, 2010). If the effect is similar in our population as research from economic, sociological, and literary scholarship suggest, then we might expect some weakening of differences with Arab samples who are not Muslim. Similar confounds exist to a lesser degree for White American versus Christian religious identity in our American sample. Although our sample reflects the approximate percentage of White Americans who are Christian (Pew Forum, 2014), non-Christian religions as well as Christian subgroups differ on their emphasis on primary control versus control by fate or divine agents, and thus again, a broader sample of Americans may produce different “cultural” effects.

### **Conclusions**

Although counterfactual thinking is a common, influential cognitive process for many people, counterfactual thoughts are not emphasized equally around the world. This work suggests that counterfactual thoughts are most likely to be endorsed in cultures that emphasize influence over one’s environment, and substantially less likely to be endorsed in cultures that emphasize external control by God or fate, especially when events in question are perceived as determined by those powers. Our current understanding of counterfactual thinking, thus, may not generalize to all non-Western samples. Rather, how a culture emphasizes origins of control may critically moderate counterfactual thought.

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