



## Short Communication

## With God on our side: Religious primes reduce the envisioned physical formidability of a menacing adversary

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## ABSTRACT

The imagined support of benevolent supernatural agents attenuates anxiety and risk perception. Here, we extend these findings to judgments of the threat posed by a potentially violent adversary. Conceptual representations of bodily size and strength summarize factors that determine the relative threat posed by foes. The proximity of allies moderates the envisioned physical formidability of adversaries, suggesting that cues of access to supernatural allies will reduce the envisioned physical formidability of a threatening target. Across two studies, subtle cues of both supernatural and earthly social support reduced the envisioned physical formidability of a violent criminal. These manipulations had no effect on the perceived likelihood of encountering non-conflictual physical danger, raising the possibility that imagined supernatural support leads participants to view themselves not as shielded from encountering perilous situations, but as protected should perils arise.

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## 1. Introduction

Belief in supernatural agents is a ubiquitous feature of human societies (Atran & Norenzayan, 2004; Guthrie, 1993). Supernatural agents appear to be represented via mechanisms supporting everyday social cognition: God, gods, angels, demons, and spirits are conceptualized as persons (Barrett, 2000; Boyer, 2003). Correspondingly, brain areas associated with representing the minds of other people are activated when imagining God's mind (Kapogiannis et al., 2009; Schjødt, Stodkilde-Jørgensen, Geertz, & Roepstorff, 2009). In convergent psychobiological evidence, endogenous oxytocin – a hormone associated with social bonding – correlates with self-reported spirituality (Holbrook, Hahn-Holbrook, & Holt-Lunstad, 2015).

Reminders of supernatural allies appear to attenuate risk perception, paralleling the role of social support in reducing anxiety in challenging circumstances (Kamarck, Manuck, & Jennings, 1990), and consistent with understandings of supernatural entities as capable of protecting believers from harm. Subtle reminders of God have been observed to increase willingness to take physical risks, an effect mediated by decreased perceptions of the self as

likely to be injured (Kupor, Laurin, & Levav, 2015). Subliminal primes of the word “God” predict behavioral risk-taking in the BART task, as does trait intrinsic religiosity (Chan, Tong, & Tan, 2014). Importantly, the risk-taking measures in these studies do not invoke moral prohibitions: belief in supernatural agents has been associated with diminished risk taking in studies involving morally proscribed behaviors (Noussair, Trautmann, van de Kuilen, & Vellekoop, 2013). These effects, while superficially contradicting the premise that belief in supernatural support decreases risk-perception, plausibly owe to religious prohibitions on forms of risk-taking considered immoral, as reminders of God are known to decrease such behavior (Mazar, Amir, & Ariely, 2008; Shariff & Norenzayan, 2011).

Religious beliefs, rituals, and institutions include elements orthogonal to belief in supernatural agents. Nonetheless, as belief in supernatural agents is central to religiosity, links between religiosity and risk-sensitivity are likely related to representations of supernatural support. Consistent with this, faith has been linked with propensities for aggression on behalf of in-groups (Kruglanski, Chen, Dechesne, Fishman, & Orehek, 2009; Sosis, Phillips, & Alcorta, 2012) and is negatively associated with fear of death (Holbrook, Izuma, Deblieck, Fessler, & Iacoboni, in press; Jong, Halberstadt, & Bluemke, 2013), suggesting that religiosity lessens perceived risk in contexts of interpersonal threat. Subliminal primes of religious concepts (e.g., “divine”) similarly enhance costly punishment of others' unfair behavior in economic games

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(McKay, Efferson, Whitehouse, & Fehr, 2011). Hence, existing literature indicates that cues of supernatural support may reduce perceptions of threat in contexts of potential interpersonal violence.

In work on representations of interpersonal threat, our research group has proposed that conceptualizations of bodily size and strength are used to summarize one's tactical assets and liabilities relative to a foe's. Larger, stronger individuals often win conflicts, making physical size/strength an intuitive conceptual metaphor for reasoning about relative threat, regardless of whether relevant determinants (e.g., access to firearms) are objectively connected to brawn. Heuristically encoding threat determinants in terms of physical formidability theoretically facilitates fast, adaptive decision-making in circumstances of potential violent conflict (Fessler, Holbrook, & Snyder, 2012). In convergent support of this *formidability representation hypothesis*, estimated size and strength are influenced by the possession of weapons (Fessler et al., 2012), cues of the propensity to take physical risks (Fessler, Holbrook, Tiokhin, & Snyder, 2014; Fessler, Tiokhin, Holbrook, Gervais, & Snyder, 2014), individual differences in physical strength (Fessler, Holbrook, & Gervais, 2014), temporary incapacitation (Fessler & Holbrook, 2013a), parenthood of vulnerable children (Fessler, Holbrook, Pollack, & Hahn-Holbrook, 2014), risk that sexual assault will result in pregnancy (Fessler, Holbrook, & Fleischman, 2015), racial stereotypes regarding violence (Holbrook, Fessler, & Navarrete, *in press*), and the leadership quality of enemy coalitions (Holbrook & Fessler, 2013). Of particular relevance to the proposition that representations of supernatural allies can diminish threat-perception when confronting a hostile adversary, the proximity of allies has been found to moderate the envisioned physical formidability of prospective enemies (Fessler & Holbrook, 2013b), as has walking in synchrony with potential allies (Fessler & Holbrook, 2014). Integrating these results with findings that cues of supernatural support can reduce perceived risk, we hypothesize that cues of access to supernatural allies will reduce the envisioned physical formidability of a violent adversary.

In Study 1a, we implicitly primed participants with thoughts of supernatural allies, then solicited ratings of a threatening target's bodily characteristics. In Study 1b, because supernatural allies are theoretically processed via mechanisms employed to register the presence of actual allies, we extended this design by also manipulating cues of earthly companions. In Study 1b, we additionally collected ratings of the likelihood of experiencing non-conflictual harm, to explore whether cues of supernatural support influence judgments specific to interpersonal violence, or reduce generic perceptions of the world as hazardous.

## 2. Methods

### 2.1. Participants and overview of procedure

#### 2.1.1. Study 1a

U.S. MechanicalTurk.com participants were recruited for \$0.50. Data were pre-screened for completeness, study duration of at least five minutes, plausible target height estimation reflective of taking the task seriously (i.e., between 5 and 7 feet), and correctly answering a "catch question". The final sample consisted of 253 adults (52.2% female; 73.5% White;  $M_{age} = 33.94$ ,  $SD = 11.96$ ; 33.2% atheist/agnostic).

In a between-subjects design, participants were randomly assigned to a Supernatural Ally versus control word-scramble manipulation that implicitly primed participants with either religious or neutral words (Shariff & Norenzayan, 2007; modified from Srull & Wyer, 1979; see SOM). Some of the religious words directly referenced supernatural agents (e.g., "God") while others referenced closely related concepts (e.g., "sacred"). Participants unscrambled 10 five-word sequences, dropping one word, to reveal

grammatical sentences of four words each. For instance, in the Supernatural Ally condition, "she felt the spirit" could be produced by rearranging the sequence "felt she eradicate spirit the." The control condition contained only neutral sentences unrelated to supernatural or actual social support (e.g., "he saw the train"); the experimental condition contained 5 sentences germane to the target theme camouflaged with 5 unrelated sentences, all presented in random order.

Next, participants estimated the bodily traits of a threatening male based on a cropped facial photograph. The image, presented in color, was a composite of 25 different men displaying a neutral expression, created following Tiddeman, Burt, and Perrett (2001). The target was described as a convicted armed robber.

Estimated physical formidability was composited using standardized values for envisioned height, size, and muscularity (see Fig. 1;  $\alpha = .59$ ).<sup>1</sup>

#### 2.1.2. Study 1b

Participants were recruited, compensated, and screened as previously, leaving a final sample of 689 adults (45.6% female; 76.8% White;  $M_{age} = 32.72$ ,  $SD = 11.67$ ; 36.1% atheist/agnostic), including three participants who declined to disclose their sex.

In addition to the Supernatural Ally and control conditions, a novel Physical Ally manipulation implicitly primed participants with words related to social support (e.g., sentences such as "friends give good advice"). Next, in counterbalanced order, participants estimated (i) the height, size, and muscularity of the target ( $\alpha = .50$ ) and (ii) the likelihood of experiencing hazardous, non-conflictual misfortune (see SOM). The likelihood of nonviolent misfortune was rated with regard to five scenarios (1 = *Extremely unlikely*; 8 = *Extremely likely*;  $\alpha = .94$ ; e.g., "Being in a building that catches fire").

At the conclusion of both Studies, participants answered demographic items, including religious affiliation, and were debriefed.

## 3. Results

### 3.1. Preliminary analyses

No significant interactions with condition or main effects of sex, atheism/agnosticism, or order (Study 1b) were observed for the composite or individual dimensions of estimated formidability,  $ps .07-.99$ . In addition, age, sex, and atheism/agnosticism did not inadvertently differ between conditions in either study,  $ps .24-.90$ .

### 3.2. Envisioned physical formidability (Study 1a)

As hypothesized, the target individual's envisioned physical formidability was greater in the control condition ( $M = .10$ ,  $SD = .72$ ) than in the Supernatural Ally condition ( $M = -.12$ ,  $SD = .75$ ),  $F(1, 251) = 5.17$ ,  $p = .024$ ,  $\eta^2_p = .02$ , 95% CI  $[-.40, -.03]$ .

We next assessed effects of condition on the individual dimensions of physical formidability (see Table 1). The shift in estimated composite formidability appears to have been driven by ratings of the overall size of the target, which significantly decreased in the Supernatural Ally condition, with only a comparable trend for estimated target height and no effect for muscularity.

### 3.3. Envisioned physical formidability (Study 1b)

The target's envisioned physical formidability was greater in the control condition ( $M = .12$ ,  $SD = .68$ ) than in the Supernatural

<sup>1</sup> Although a score of at least .7 is generally considered necessary to establish reliability, lower scores can be acceptable if, as here, the measure is theoretically cogent and composed of few and notably nonredundant items (Robinson, Wrightsman, & Andrews, 1991).

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