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

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Holbrook, Colin
Fessler, Daniel M.T., University of California, Los Angeles
Pollack, Jeremy S.

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

menacing adversary

Colin Holbrook[a], Daniel M. T. Fessler[a], and Jeremy Pollack[b]

Department of Anthropology and Center for Behavior, Evolution, & Culture[a]

University of California, Los Angeles

Los Angeles, CA, 90095

Department of Anthropology[b]

California State University, Fullerton

Fullerton, CA, 92831

Author Note

Correspondence concerning this paper should be addressed to Colin Holbrook, Center for

Behavior, Evolution and Culture, Department of Anthropology, 341 Haines Hall, University of

California, Los Angeles, Los Angeles, CA 90095-1553 USA. E-mail: cholbrook01@ucla.edu

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.

Keywords: violence, social cognition, religion, threat-detection

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-Jorgensen, 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 (Jong, Bluemke, & Halberstadt, 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 (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, Tiokhin, Holbrook, Gervais, & Snyder, 2014; Fessler, Holbrook, Tiokhin, & 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 & Norenzan, 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 et al. (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 Figure 1; α = .59).[1]

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.
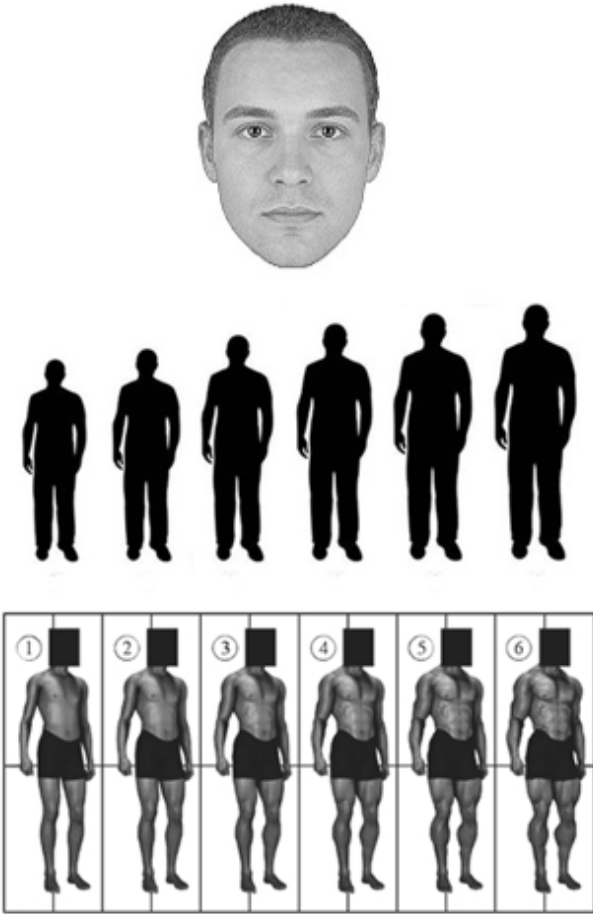
Figure 1. Participants estimated the physical formidability of a target described as a convicted armed robber based on a cropped facial photograph. Height was measured in feet and inches; size was measured according to a silhouette array; muscularity was measured using a pictorial array modified with permission from Frederick and Peplau (2007).

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, η^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.

Table 1

Mean Estimated Height, Size, and Muscularity (Study 1a)

	Control	Supernatural				
	Mean (SD)	*Mean (SD)*	*F*	*p*	η^2_p	95% CI
Height	72.61 (1.96)	72.15 (1.78)	3.77	.053	.02	.93, -.01
Muscularity	2.31 (.77)	2.28 (.84)	.15	.737	.00	.25, -.17
Size	3.92 (.82)	3.62 (.88)	7.53	.007	.03	.51, .08

Note. N = 253. Estimated height is given in inches.

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 Ally ($M = -.06$, $SD = .64$) or Physical Ally ($M = -.07$, $SD = .77$) conditions (see Figure 2), $F(1, 686) = 5.29$, $p = .005$, $\eta^2_p = .02$. Planned contrasts confirmed that the control condition significantly differed from the Supernatural Ally ($p = .008$, 95% CI [-.31, -.05]) and Physical Ally conditions ($p = .003$, 95% CI [-.32, -.06]), which did not differ from each other, $p = .88$.
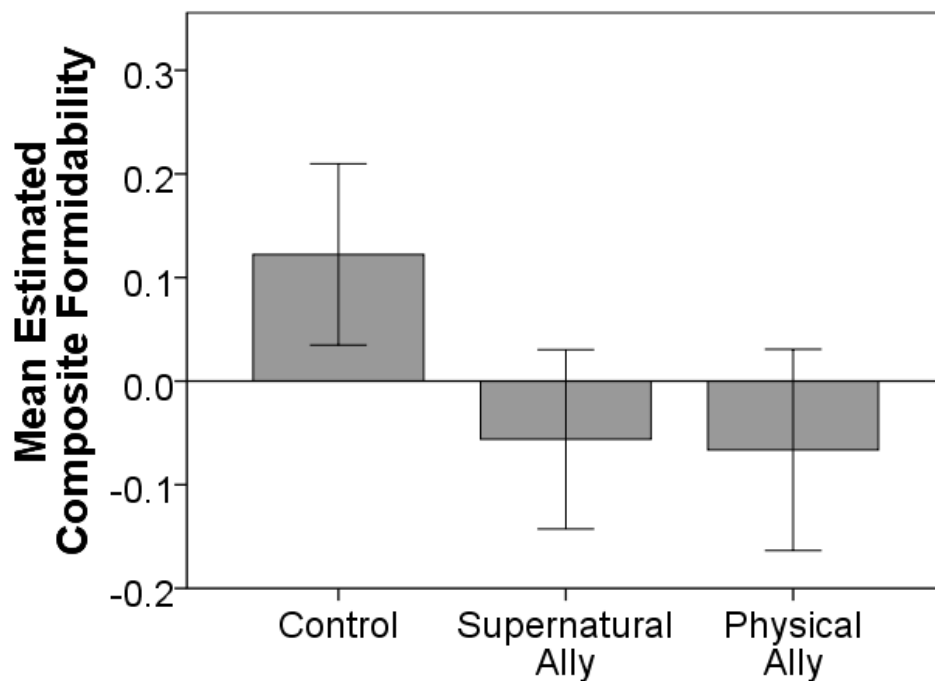

Figure 2. In Study 1b, participants implicitly primed with cues of either supernatural or physical allies envisioned the target criminal as less physically formidable than did participants in the control condition (standardized scores). The error bars reflect 95% CI.

We next assessed the effect of condition on the individual dimensions of physical formidability (see Table 2). As previously, participants in the Supernatural Ally condition estimated the target to be smaller in overall size than did control participants. Departing from the pattern observed in Study 1a, there was no similar trend with regard to estimated height, but instead a trend toward reduction in estimated muscularity. Participants in the Physical Ally condition estimated the target to be of decreased height, muscularity, and (in a marginal trend) overall size relative to controls. As predicted, the estimates for all three bodily dimensions in the Ally conditions did not significantly differ.

Table 2

Mean Estimated Height, Size, and Muscularity (Study 1b)

	Control	Supernatural			Physical Ally		
	Mean (SD)	*Mean (SD)*	*p*	95% CI	*Mean (SD)*	*p*	95% CI
Height	72.15 (1.95)	72.08 (1.73)	.717	-.29, .43	71.78 (2.06)	.034	.03, .72
Muscularity	2.20 (.74)	2.06 (.72)	.054	.00, .29	2.05 (.85)	.035	.01, .29
Size	3.86 (.81)	3.58 (.88)	.001	.12, .45	3.70 (.94)	.050	.00, .32

Note. $N = 689$. Estimated height is given in inches. *P* and 95% CI values refer to comparisons of the adjacent experimental condition to the control condition. The experimental conditions did not significantly differ from one another on any of the three dimensions, *p*s .08 - .91.

3.4 Estimated likelihood of misfortune. We observed no effect of condition or order, ps > .28, on the estimated likelihood of misfortune. However, atheists/agnostics estimated non-conflictual misfortune to be slightly less probable ($M = 2.29$, $SD = .91$) than did believers ($M = 2.46$, $SD = 1.07$), $F(1, 687) = 4.80$, $p = .029$, $\eta^2_p = .01$, 95% CI [.02, .33]. There were no interactions between condition and atheism/agnosticism, $p > .09$.

4. Discussion

In two studies, cues of supernatural support reduced the envisioned physical formidability of a violent criminal. In Study 1b, this implicit priming method conceptually replicated the effect of the literal proximity of allies previously observed in field studies (Fessler & Holbrook, 2013b). Notably, the effect sizes of these subtle manipulations ($\eta^2_p = .02$ in both studies) were small relative to when allies were actually nearby in our research group's previous research (η^2_ps .06 - .08); future investigations may therefore manipulate perceived supernatural support using real-world methods (e.g., prayer) of comparable ecological validity to the presence of flesh-and-blood compatriots. It is also remarkable that the primes of supernatural or physical support employed here made no reference to potential benefits should violent conflict erupt. Future studies might assess whether reminding participants of supernatural protection against hazards, or of "wrathful" supernatural punishment of enemies, impacts the potency of such manipulations on judgments relevant to danger. Likewise, individual differences in the extent to which participants conceptualize supernatural agents as benevolently disposed toward them, harmful toward adversaries, or protective of the self should be tested as potentially moderating assessments of threatening targets or interacting with the effects of supernatural primes.

We hypothesized that cues of supernatural or physical support would attenuate perceptions of a prospective adversary's formidability via overlapping mechanisms. The results

were generally consistent with this perspective, as the effects of supernatural or physical ally primes in Study 1b on the target's composite physical formidability were equivalent, and as the estimates of the target's height, muscularity, and overall size did not significantly differ between the ally conditions. However, we did observe some differences between the influence of supernatural and physical ally primes on estimates of the three individual dimensions used to measure physical formidability (see Table 2). Although these differences may owe to noise in the data, it is notable that the physical ally manipulation exerted effects on all three measures in Study 1b.

The most consistent effects of priming supernatural support were observed for estimates of overall size. Indeed, although the preceding literature utilizing these measures of physical formidability has found generally consistent effects mutually obtaining for estimated height, size, and muscularity (i.e., as observed in the Physical Ally manipulation of Study 1b), it should be noted that the observed reductions in estimated height in Study 1a, and in estimated muscularity in Study 1b, were nonsignificant trends and may have been flukes. The unanticipated greater impact of the supernatural manipulation on envisioned overall size may stem from an effect of supernatural primes on the conceptual connotations of the silhouette images. Further research (e.g., utilizing a nonvisual size scale) should ascertain whether this difference replicates and, if so, what it reflects.

We found no effect of supernatural or physical ally cues on the estimated likelihood of encountering non-conflictual danger, which was actually higher among believers than atheists/agnostics. Rather than contradicting prior findings linking perceived supernatural support with lowered risk perception, this finding may indicate that imagined supernatural support leads participants to perceive themselves not as shielded from encountering perilous

situations, but as protected should hazards arise. However, this interpretation should be tested, for example, by measuring the estimated likelihood of encountering violence in addition to the relative threat posed by a target.

We also observed no interaction between atheism/agnosticism and the effects of the supernatural manipulation. This may owe to the subtle, peripherally conscious word-association prime utilized. If supernatural agents are indeed represented using neurocognitive resources employed to represent physical agents, then our implicit manipulation may have essentially primed the presence of allies to the nonbelievers in our sample. Future research employing more overt, consciously considered reminders of supernatural agents might find little effect on non-believers. It is also possible that primes of supernatural support are influential with regard to formidability representation irrespective of belief, in contrast to domains such as prosocial motivation, for which belief typically moderates the influence of religious primes (Shariff, Willard, Andersen, & Norenzayan, 2015).

Our results complement the longstanding claim that religious faith can palliate anxiety toward threats. Relatedly, Norris and Inglehart's (2004) analyses of cross-national survey data reveal that religiosity tracks risk (e.g., related to poverty or warfare) in societies around the globe. They frame this relationship as evidence that religious belief is motivated by a need to relieve the anxiety engendered by living under perilous, uncertain conditions. However, anxiety attenuation may be a proximate mediator of facultative behavioral responses to threatening circumstances moreso than a functional end in itself (Holbrook, 2016). For example, in environments rife with interpersonal violence, believing that one is supernaturally supported may facilitate overestimating one's prospects of winning in a conflict. Such "positive illusions" can adaptively promote success by hardening resolve to fight or intimidating opponents (Johnson &

Fowler, 2011; Wrangham, 1999). Importantly, the claim that belief in supernatural agents can facilitate these adaptive responses in some contexts should not be confused with a proposal regarding the evolutionary origins of supernatural cognition. Beliefs in supernatural agents are more plausibly attributable to by-products of psychological adaptations evolved for navigating everyday social interactions, rather than any single motivation or function (Boyer, 2003). Further, in some contexts, belief in supernatural agents (e.g., vengeful spirits) is linked with heightened anxiety (Boyer & Bergstrom, 2008; Keesing, 1982).

We have framed the observed decreases in envisioned bodily formidability as evidence that subtle cues of supernatural or earthly social support can decrease perceived threat. Although the emerging literature supports the assumption that the imagined physical formidability of an overtly threatening target indirectly proxies the degree of threat attributed to that individual, future tests of the formidability representation hypothesis should assess whether shifts in attributions of physical formidability mediate shifts in explicit threat ratings. Because framing targets as threatening can lead to ceiling effects in threat ratings, it may be useful to employ less overtly dangerous targets. In addition, we suggest measuring not only perceptions of the capacity of targets to harm, but also participants' perceptions of their own ability to withstand injury, as the latter may be more illuminating with respect to representations of the self as formidable.

5. Conclusion

Although we did not directly measure aggression or risk-taking, the present results may articulate with the growing literature showing that religious cognition can potentiate aggression (e.g., Atran & Ginges, 2012; Kruglanski et al., 2009; McKay et al., 2011) by attenuating the perceived threat that enemies pose. Conversely, representations of the self as supported by

spiritual beings are also historically linked to non-violence and reconciliation. The parallel role of spirituality in facilitating both belligerence and peaceful co-existence doubtless owes to interactions between individual, social, and situational determinants. Intriguingly, both aggression and refraining from aggression against threatening others appear tied to reductions in fear in many contexts, as willingness to either inflict or incur damage can relate to perceptions of the self as relatively invulnerable. Future research might assess the impact of reminders of supernatural support on decisions to aggress or not, as both may be mediated by perceived formidability, and moderated by factors that encourage aggressive versus non-violent responses to conflict.

Author Contributions

Acknowledgments

Footnotes

[1] 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 composed of few and notably nonredundant items (Robinson, Wrightsman, & Andrews, 1991).

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Supplementary Online Material

to accompany

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

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- Control Word Scramble Manipulation

- Supernatural Ally Word Scramble Manipulation

- Physical Ally Word Scramble Manipulation

- References

Control Word Scramble (Studies 1a and 1b)

Instructions: Unscramble the following groups of words to make a four-word phrase or sentence by dropping the irrelevant word. For example:

high winds the flies plane → the plane flies high

She was always worried: fall was worried she always

Replace the old shoe: shoes give replace old the

Have a good holiday: retrace good have holiday a

He saw the train: saw hammer he the train

He tied his shoes: predictable tied shoes his he

Do it once more: more paper it once do

He finished it yesterday: yesterday it finished track he

I was somewhat prepared: prepared somewhat I was retired

I mailed it over: send I over it mailed

Her presence was appreciated: appreciated presence was imagine her

The ten scrambled phrases were presented in random order. Participants typed their solutions into open responses boxes.

(This measure was taken from Sharriff & Norenzayan, 2007.)

Supernatural Ally Word Scramble (Studies 1a and 1b)

Instructions: Unscramble the following groups of words to make a four-word phrase or sentence by dropping the irrelevant word. For example:

high winds the flies plane → the plane flies high

Prime phrases:

She felt the spirit: felt she eradicate spirit the

The dessert was divine: dessert divine was fork the

Give thanks to God: shoe thanks give God to

The book was sacred: sacred was book refer the

Prophets reveal the future: reveal the future simple prophets

Masking phrases:

Do it once more: more paper it once do

He finished it yesterday: yesterday it finished track he

I was somewhat prepared: prepared somewhat I was retired

I mailed it over: send I over it mailed

Her presence was appreciated: appreciated presence was imagine her

The ten scrambled phrases were presented in random order. Participants typed their solutions into open responses boxes.

(This measure was taken from Sharriff & Norenzayan, 2007.)

Physical Ally Word Scramble (Study 1b)

Instructions: Unscramble the following groups of words to make a four-word phrase or sentence by dropping the irrelevant word. For example:

high winds the flies plane → the plane flies high

Prime phrases:

She felt very supported: felt she eradicate supported very

We shared the dessert: dessert shared the fork we

Be thankful for companions: shoe thankful be companions for

They held hands together: together hands held refer they

Friends give good advice: give good advice sample friends

Masking phrases:

Do it once more: more paper it once do

He finished it yesterday: yesterday it finished track he

I was somewhat prepared: prepared somewhat I was retired

I mailed it over: send I over it mailed

Her presence was appreciated: appreciated presence was imagine her

The ten scrambled phrases were presented in random order. Participants typed their solutions into open responses boxes.

(This measure was modified from Sharriff & Norenzayan, 2007.)

References

Shariff, A. F., & Norenzayan, A. (2007). God is watching you: Priming God concepts increases

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