

# “Pray for Those Who Mistreat You”: Effects of Prayer on Anger and Aggression

Personality and Social Psychology Bulletin  
 XX(X) 1–8  
 © 2011 by the Society for Personality  
 and Social Psychology, Inc  
 Reprints and permission:  
[sagepub.com/journalsPermissions.nav](http://sagepub.com/journalsPermissions.nav)  
 DOI: 10.1177/0146167211402215  
<http://pspb.sagepub.com>



Ryan H. Bremner<sup>1</sup>, Sander L. Koole<sup>2</sup>, and Brad J. Bushman<sup>2,3</sup>

## Abstract

Although some religious teachings have been used to justify aggression, most religious teachings promote peace in human affairs. Three experiments tested the hypothesis that praying for others brings out the more peaceful side of religion by reducing anger and aggression after a provocation. In Experiment 1, praying for a stranger led provoked participants to report less anger than control participants who thought about a stranger. In Experiment 2, provoked participants who prayed for the person who angered them were less aggressive toward that person than were participants who thought about the person who angered them. In Experiment 3, provoked participants who prayed for a friend in need showed a less angry appraisal style than did people who thought about a friend in need. These results are consistent with recent evolutionary theories, which suggest that religious practices can promote cooperation among nonkin or in situations in which reciprocity is highly unlikely.

## Keywords

prayer, anger, aggression

Received June 20, 2010; revision accepted January 9, 2011

... Bless those who curse you, pray for those who mistreat you.

Luke 6:28, Bible

O my God and God of my ancestors, save us today and every day from anger . . .

Rabbi Yehudah Ha-Nasi, Talmud

Culture and religion represent two of the most distinctive aspects of human nature. As intensely cultural animals, many humans routinely navigate their lives in large-scale societies, interacting with others whom they never met before and most likely will never meet again. At the same time, most humans have adopted some form of religion, a system of values and practices coupled with beliefs in a morally concerned deity (or deities). In recent years, evolutionary theorists have proposed that the joint emergence of more complex culture and moralistic religion in the human species is no coincidence. More specifically, religion may have promoted cooperation among nonkin and in situations in which reciprocity is highly unlikely or even impossible (Boyd & Richerson, 2002; Henrich et al. 2010; Norenzayan & Shariff, 2008; Wilson & Wilson, 2007). From this perspective, religion may have enabled humans to live

together in large groups, thereby setting the stage for the evolution of complex human cultures.

Preliminary research supports the idea that religiosity can motivate prosocial behavior, even when reputational and reciprocity concerns have been minimized. For example, one study found that exposing participants to religious words (e.g., *holy* or *heaven*) decreased cheating on a subsequent test (Randolph-Seng & Nielsen, 2007). In a related vein, two experiments showed that priming God-related concepts increased generosity toward a stranger in an economic game (Shariff & Norenzayan, 2007).

These experiments are important because they suggest that priming religious stimuli can play a causal role in motivating prosocial behavior. Nevertheless, aspects of the methodology used in these priming experiments limit their potential applicability to religiosity in everyday life.

<sup>1</sup>University of Michigan, Ann Arbor, MI, USA

<sup>2</sup>VU University, Amsterdam, The Netherlands

<sup>3</sup>The Ohio State University, Columbus, OH, USA

## Corresponding Author:

Brad J. Bushman, The Ohio State University, School of Communication,  
 3127 Derby Hall, 154 North Oval Mall, Columbus, OH 43210-1339  
 Email: [bushman.20@osu.edu](mailto:bushman.20@osu.edu)

First, the relevant studies were conducted in laboratory settings that were largely devoid of emotion (Randolph-Seng & Nielsen, 2007; Shariff & Norenzayan, 2007). As such, it remains to be seen whether religiosity can foster prosocial behavior in everyday social interactions that are frequently emotionally charged. Second, relevant studies have used priming methods (i.e., unscrambling jumbled sentences) that were deliberately designed to be subtle and inconspicuous. Social cognition research has shown that subtle primes have considerably larger effects on behavior than blatant primes, presumably because people tend to correct for the influence of blatant primes (Bless & Schwarz, 2010; Martin, 1986). Moreover, priming effects often become eliminated or even reversed when people are allowed to actively respond to the primes (Fiedler, Bluemke, & Unkelbach, 2009; Martin, 1986; Sparrow & Wegner, 2006). Together, these findings suggest that the role of priming processes may be limited in everyday religious behavior, given that many religious practices require the conscious and active involvement of individuals. As such, it seems important to go beyond passive priming methods in establishing the influence of religiosity on prosocial behavior.

To investigate the role of religiosity on prosocial behavior, it is desirable to focus on an intrinsically religious practice that actively involves individuals and that lends itself to experimental manipulation. One such practice is prayer. Prayer is common to virtually all religions and represents one of the most central and universally enacted forms of religious behavior. Indeed, prayer has been said to form the “living heart” of religion (Heiler, 1932). People often turn to prayer in situations where they experience intense negative feelings, such as anger, grief, or fear. Indeed, prior research has linked prayer to successful coping with stressful events, such as cardiac surgery (Ai et al., 2007) and the September 11, 2001, terrorist attacks (Ai, Tice, Peterson, & Huang, 2005). Furthermore, there is reason to believe that prayer may increase prosocial thought and behavior. For one thing, many religious texts have linked prayer to values such as compassion and generosity. In line with such notions, family therapists have observed that prayer can alleviate anger and facilitate open communication among couples (Lambert & Dollahite, 2006). Indeed, recent empirical studies have shown that prayer can promote forgiveness in close relationships (Lambert, Fincham, Stillman, Graham, & Beach, 2010).

On the basis of recent evolutionary models of religion (e.g., Wilson & Wilson, 2007), however, we might predict that prayer can even reduce anger and aggression in contexts where reciprocity is extremely unlikely. To test this prediction, participants in the present experiments were first insulted by a stranger, after which we manipulated whether participants either prayed for a person other than themselves or simply thought about a person other than themselves. Experiment 1 investigated whether prayer can reduce angry feelings toward an insulting target person. Experiment 2 investigated whether prayer can reduce aggressive behavior toward an insulting target person. Experiment 3 investigated whether prayer leads people to change the patterns of cognitive appraisals that underlie anger and

hostility, an emotion-regulatory strategy known as “cognitive reappraisal” (Gross, 1998).

## Experiment 1

Experiment 1 provided an initial test of the hypothesis that prayer reduces anger. To this end, participants were first insulted by a stranger, after which we experimentally manipulated whether participants prayed for a college student with a serious illness. When praying for someone, participants’ attention was removed from the insult that had been delivered to them earlier. Accordingly, it is important to establish that the effects of prayer are not simply due to distraction. We therefore designed our prayer manipulation so that half of the participants prayed and the other half merely thought about the very ill college student. If the effects of praying for another person are merely attributable to distraction, then just thinking about that person should have similar effects as prayer. However, if prayer down-regulates anger through a more active process than distraction, participants who were praying for another person might display greater reductions in anger than participants thinking about that person.

## Method

**Participants.** Participants were 53 American college students (31 women).

**Procedure.** Participants were told that they would participate in a series of pilot studies. First, they completed the Profile of Mood Scales (POMS; Shacham, 1983), which measures anger (7 items), fatigue (6 items), depression (8 items), vigor (5 items), and tension (6 items). All items are scored using 5-point scales (1 = *very slightly or not at all* to 5 = *extremely*) and then summed for the various scales (Cronbach’s  $\alpha > .70$ ).

Next, participants were given 5 min to write an essay about an event that made them feel very angry. While the essay was given to their ostensible partner for evaluation (whom they were told they would never meet), participants evaluated the “partner’s” essay. All participants received negative ratings on several rating dimensions (e.g., organization, writing style). There was also a handwritten comment stating: “This is one of the worst essays I’ve ever read!” This negative feedback has been shown to make people very angry (e.g., Bushman & Baumeister, 1998).

In the next “pilot study,” participants read a newspaper story about a student named Maureen who had become very ill with neuroblastoma, a rare form of cancer that affects the nervous system. To induce empathy, participants were asked to imagine how Maureen feels about what happened and how it affected her life. Participants were randomly assigned to either pray for or think about Maureen for 5 min. It is important to note that our thinking manipulation differs from instructions that are used to induce “ruminative thinking” (Rusting & Nolen-Hoeksema, 1998). Rumination inductions typically lead people to focus inwardly on their thoughts and feelings (e.g., Bushman, Bonacci, Pedersen, Vasquez, & Miller, 2005; Rusting &

Nolen-Hoeksema, 1998). This inward focus was lacking from our thinking manipulation, given that participants thought about Maureen rather than about themselves.

We did not ask participants to report on the content of their prayers or thoughts because such self-reports might increase suspicion and hence contaminate the main dependent variables in our experiments. However, before the present experiments, we conducted extensive pilot research in which we asked participants to report on the content of their prayers and thoughts. These pilot studies consistently showed that our experimental instructions used in Experiments 1-3 led participants to engage in a spontaneous dialogue between the self and the divine, in which they plead for the target's well-being. Some illustrative examples of the prayers from our pilot studies were:

Father in Heaven, I pray that you will heal Maureen who is very sick. Lord, I pray that she will receive a lot of support and love from others in this difficult time. And I pray that her family members will support each other and that they may experience Your love. Lord, I can imagine that this is a very difficult situation for Maureen and her family and friends, but I pray that she will receive strength from You to be courageous and not to lose hope.

I told God that this really touches me, I prayed that I hope that God will help Maureen because she really needs it. A girl like this does not deserve something this bad, so I hope that many people will be willing to help her.

Some representative examples of what participants were thinking in the "think about Maureen" condition follow:

I felt sad. Life is unfair. Why do some people get sick and not others?

I felt compassion for Maureen and her family, what this poor girl and her loved ones must be going through. This should not happen at such a young age. She should be enjoying life, instead of being sick. I find such things really unfair.

Afterward, participants completed the POMS again (Cronbach's  $\alpha > .70$ ) and questions about their religious affiliation, frequency of church attendance, and prayer frequency. Because participant sex, religious affiliation, frequency of church attendance, and prayer frequency did not affect the results in any of the experiments, these variables will not be discussed further. A debriefing followed.

## Results and Discussion

Self-reported anger increased among provoked participants, paired  $t(52) = 4.88, p < .002 (M = 1.45 \text{ vs. } M = 2.05), d = 0.67$ . Thus, the provocation manipulation was effective.

**Table 1.** Effects of Prayer Versus Thinking About a Person in Need on Feelings of Anger, Tension, Depression, Fatigue, and Vigor (Experiment 1)

Mood scale	Pray	Think
Anger	1.78 <sub>a</sub>	2.34 <sub>b</sub>
Tension	2.22 <sub>a</sub>	2.07 <sub>a</sub>
Depression	1.85 <sub>a</sub>	1.74 <sub>a</sub>
Fatigue	2.44 <sub>a</sub>	2.52 <sub>a</sub>
Vigor	1.99 <sub>a</sub>	2.00 <sub>a</sub>

Note: Means are adjusted for baseline levels of the given mood state. Subscripts refer to within-row comparisons. Means with different subscripts are significantly different from each other at the .05 significance level.

Data were analyzed using ANCOVA. The independent variable was whether provoked participants prayed for or thought about Maureen (the very ill college student). The dependent variable was how angry participants felt afterward. The covariate was baseline level of anger. As expected, participants who prayed for Maureen were significantly less angry than were participants who thought about her,  $F(1, 50) = 4.74, p < .03, d = 0.62$  (see Table 1). As expected, the effects of prayer were specific to anger. Prayer had no effect on tension, depression, fatigue, or vigor—the other emotions measured by the POMS (see Table 1). In summary, Experiment 1 showed that praying for someone in need was more effective in reducing anger toward a provocateur than was thinking about someone in need.

## Experiment 2

Experiment 1 showed that prayer reduced self-reported anger. Past research indicates that self-reports may offer a more flattering picture of religious individuals than their actual behavior does (Batson, 1976). Accordingly, Experiment 2 tested whether prayer could reduce the effects of provocation on actual aggressive behavior.

The results for the thinking condition in Experiment 1 already suggested that the effects of prayer differ from passive distraction (i.e., merely thinking about a person in need). Nevertheless, past research has shown that distraction can be a highly effective way of getting rid of angry impulses (e.g., Bushman, 2002; Bushman et al., 2005). We therefore sought to obtain further evidence that the effects of prayer are not due to distraction. If distraction drives the effects of prayer, we would expect the effects of prayer to become weaker if the act of prayer forces individuals to direct their attention to the cause of the provocation. To test this possibility, we asked participants in Experiment 2 to pray for their ostensible partner who had provoked them instead of praying for an unknown person in need. Finally, we added a no-provocation control condition. We predicted that prayer would reduce aggression in provoked individuals.

## Method

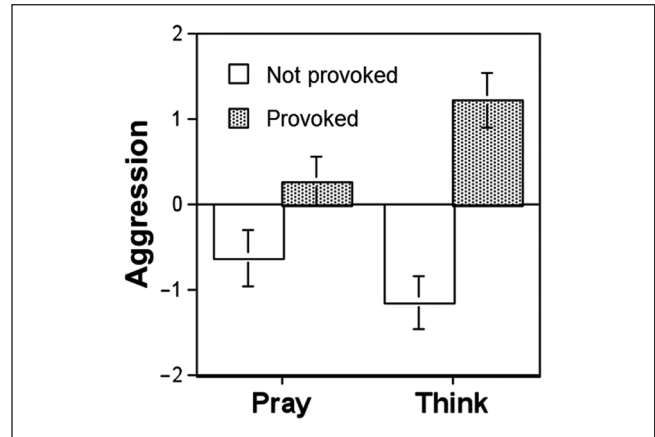
**Participants.** Participants were 94 American college students (57 women).

**Procedure.** The procedure for Experiment 2 was similar to Experiment 1. Participants were told that the researchers were studying impression formation and that the participants would complete a number of tasks with another participant that would allow them to form an impression of him or her. Participants were told they would not meet their partner because many impressions are formed in situations without face-to-face interaction, such as when interacting with someone in a chat room on the Internet. The other participant was said to be a college student of the same sex, but in actuality there was no other participant. First, participants wrote an essay that they would later exchange with their ostensible partner, presumably so they could form an impression of their partner. The actual purpose of the essay was to manipulate anger. By the flip of a coin, participants were assigned to angered or nonangered conditions. Participants in the provocation condition were given 5 min to write an essay about an event that made them feel very angry, whereas participants in the no-provocation (control) condition were given 5 min to write an essay about the layout of the university's campus, as in Experiment 1.

Next, while their own essay was given to their ostensible partner for evaluation (whom they were told they would never meet), participants evaluated their "partner's" essay. The participants in the provocation condition subsequently received the same negative essay feedback as in Experiment 1, whereas the participants in the no-provocation control condition received positive ratings and a handwritten comment from their "partner" stating "Good job. Nice essay."

Participants were then asked to either pray for or think about their partner for 5 min, presumably to help them form a more valid impression of the person. Participants were told that scientific studies have shown that *praying for/thinking about* someone allows information gathered about that person to become more fully integrated. The design was therefore a 2 (provoked vs. not provoked)  $\times$  2 (prayer vs. thinking) factorial design.

After receiving essay feedback and praying or thinking, participants completed a competitive reaction time task (Taylor, 1967), a reliable and valid laboratory measure of aggression that has been used for decades (e.g., Giancola & Zeichner, 1995). Participants were told that the task would give them an impression of what their partner was like in a competitive situation. Participants were told that they and their "partner" would have to press a button as fast as possible on each of 25 trials and that whoever was slower would receive a blast of noise through headphones. In advance of each trial, participants set the level of noise their "partner" would receive, from 60 dB (Level 1) to 105 dB (Level 10, about the same volume as a fire alarm). A nonaggressive no-noise option (Level 0) was also provided. They could also control how long their "partner" suffered by setting the noise duration from 0 to 2.5 s. The



**Figure 1.** Effects of praying for a provocative partner versus thinking about a provocative partner on aggression (Experiment 2) Note: Aggression scores were obtained by standardizing and summing noise intensity and duration levels on Trial 1. After Trial 1, tit-for-tat responding occurred. Capped vertical bars denote 1 SE.

"partner" set random noise levels throughout the task. Basically, within the ethical limits of the laboratory, participants controlled a weapon that could be used to blast their partner with painful noise. A debriefing followed.

## Results and Discussion

Twelve participants were discarded (1 refused to pray, 1 played with a mobile phone during the experiment instead of following the procedure, 2 were suspicious, and 8 were confused because of language barriers or misunderstanding instructions). Thus, the final sample consisted of 82 college students (53 women).

To create a more reliable measure of aggression, noise intensity and duration levels on Trial 1 were standardized and averaged. Trial 1 provides the best measure of unprovoked aggression because participants have heard no noise yet and they are unsure about what level of noise their partner will set for them. After Trial 1, aggression converged on what participants believed their partner had done (i.e., tit-for-tat responding). This is consistent with many findings that confirm the importance of reciprocation norms in determining levels of aggressive behavior (Axelrod, 1984).

Data were analyzed using a 2 (provoked vs. not provoked)  $\times$  2 (prayer vs. thinking) ANOVA. Provoked participants were more aggressive than unprovoked participants,  $F(1, 76) = 26.65$ ,  $p < .001$ ,  $d = 1.35$ , indicating that the provocation manipulation was effective. More important, the predicted interaction between provocation and prayer was found,  $F(1, 76) = 5.43$ ,  $p < .03$  (see Figure 1). Simple effects tests showed that in the thinking condition, being provoked increased aggression,  $F(1, 76) = 27.65$ ,  $p < .001$ . By contrast, in the prayer condition, being provoked had no significant effect on aggression ( $F < 1$ ). In sum, praying undid the effects of being provoked on aggression.

**Table 2.** Effects of Provocation and Prayer on Likelihood Estimates of Personally and Interpersonally Caused Events (Experiment 3)

	Provocation			No provocation		
	Event type		AAS	Event type		AAS
	Personal	Impersonal		Personal	Impersonal	
Prayer	4.55 (1.21)	4.09 (1.44)	0.45 (1.69)	4.63 (0.65)	3.70 (1.09)	0.93 (0.81)
Thinking	4.76 (1.07)	3.37 (0.78)	1.39 (1.01)	4.20 (1.46)	3.96 (1.41)	0.23 (0.63)

Note: Standard deviations are in parentheses. AAS = angry appraisal style, computed as the difference between the estimated likelihood of personally versus impersonally caused events.

It should be noted that in Experiment 2, participants were asked to pray for the person who provoked them, so that their attention remained focused on the provocation throughout the task. Nevertheless, the effects of prayer in Experiment 2 were conceptually similar to those of Experiment 1, which used a manipulation that focused participants on other target persons. It thus appears that prayer can down-regulate angry impulses regardless of whether it diverts attention away from the provocation.

### Experiment 3

Anger influences not just overt behavior but also thought processes and social inferences. Indeed, prior research has shown that the appraisal that other people are responsible for one's misfortune is central to the experience of anger (Smith & Ellsworth, 1985). Because people perceive events as more likely when these are easier to imagine (Kahneman, Slovic, & Tversky, 1982), angry people tend to find it easier to imagine events caused by other people and consequently judge these events as more likely (Keltner, Ellsworth, & Edwards, 1993). Agency appraisals (and corresponding judgments of the likelihood of ambiguous events) thus represent an important marker of the dynamics of anger. Experiment 3 examined whether prayer can undo this effect of anger on cognitive appraisals. To increase the generalizability of our findings, participants prayed for someone they knew personally rather than a stranger or another student from the same university.

### Method

**Participants.** Participants were 56 Christian students (38 women) at a Dutch university.

**Procedure.** Students were informed that they would participate in some pilot studies. By the flip of a coin, participants were either provoked or not provoked. In the provocation condition, participants wrote about a situation that made them very angry and then received criticism from a "trained psychologist" about the way they had written the essay. To induce rumination, they were also directed to focus their attention on thoughts that

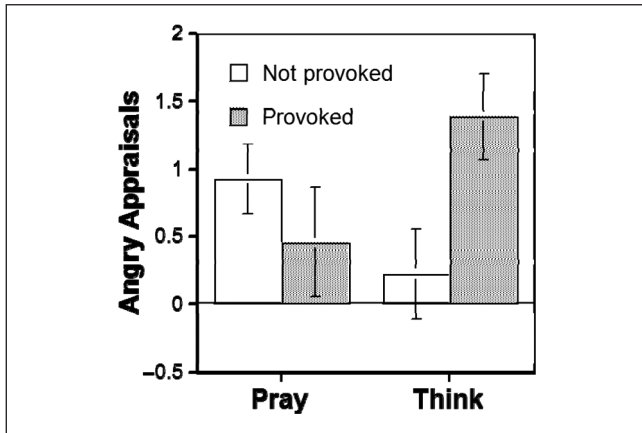
were emotion- and self-focused (e.g., "Why do people respond to you the way they do?"; see Rusting & Nolen-Hoeksema, 1998). In the no-provocation condition, participants wrote about an enjoyable meal and then received praise from a "trained psychologist" about the way they had written the essay. They also reflected on their concrete experiences (e.g., "The air that you're breathing"; see Rusting & Nolen-Hoeksema, 1998).

In the next "pilot study," participants spent 5 min praying for or thinking about a person they knew who could use some extra help or support. The final "pilot study" was ostensibly about "estimating likelihoods" (see Keltner et al., 1993). Participants judged the likelihood of each of 10 life events (5 negative, 5 positive) on a scale from 1 = *not at all likely* to 9 = *very likely*. Half of the events were described as the result of personal agency (e.g., "You miss an important flight because of a careless cab driver"); the other half were described as the result of situational factors (e.g., "You lose most of your money because of an economic recession"). A debriefing followed.

### Results and Discussion

Likelihood ratings of personal and impersonal events are displayed in Table 2. We analyzed participants' likelihood estimates in a 2 (provoked vs. unprovoked; between subjects)  $\times$  2 (prayer vs. thinking; between subjects)  $\times$  2 (event caused by personal vs. situational factors; within subjects) mixed ANOVA. The analysis yielded a main effect of event type,  $F(1, 52) = 15.38, p < .001$ . Overall, participants perceived events caused by personal factors to be more likely than events caused by situational factors ( $M = 4.48$  vs.  $M = 3.85$ ). The only other significant effect was the predicted interaction between provocation and prayer,  $F(1, 52) = 4.52, p < .04$ . Separate analyses on likelihood estimates for personal versus situational events yielded no significant effects.

To facilitate interpretation of the effects of prayer, we computed anger-related appraisal styles from the difference between the mean for events caused by personal agents from the mean for events caused by impersonal factors, as has been done in previous research (see Keltner et al., 1993). A 2 (provoked vs.



**Figure 2.** Effects of praying for a friend versus thinking about a friend on angry appraisal style in angered and nonangered participants (Experiment 3)

Note: Capped vertical bars denote 1 SE.

unprovoked)  $\times$  2 (prayer vs. thinking) ANOVA on appraisal styles yielded the predicted interaction between provocation and prayer,  $F(1, 52) = 4.52, p < .04$  (see Figure 2). In the thinking condition, provocation increased anger-related appraisals,  $F(1, 52) = 4.40, p < .05, d = 0.58$ . By contrast, in the prayer condition, provocation had no significant effect on anger-related appraisals. Thus, praying undid the effects of a provocation on participants' anger-related appraisals. Separate analyses of the effects of prayer in the provocation condition and the control condition yielded no significant effects,  $ps > .13$ .

## General Discussion

Following an insult, prayer reduced anger (Experiment 1) and actual aggressive behavior (Experiment 2). Prayer further undid the effects of being insulted on cognitive appraisals that typically accompany anger (Experiment 3). Anger-related appraisals were assessed in a task that appeared to participants as unrelated to anger, so that the effects of prayer do not seem to be driven by social desirability concerns. Moreover, it seems unlikely that the effects of prayer were due to passive distraction, given that merely thinking about someone who was unrelated to the insult did not have the same effects as prayer (Experiment 1), and praying for the person who delivered the insult had conceptually similar effects as praying for someone who was unrelated to the insult (Experiment 2).

The present findings provide an important extension to previous studies showing that religious stimuli may enhance prosocial behavior (Randolph-Seng & Nielsen, 2007; Shariff & Norenzayan, 2007). Whereas the latter studies used rather subtle priming procedures that are not very emotionally involving to participants, the present studies showed that similar effects may be obtained when individuals engage in prayer, a more common and engaging form of religious stimulation than unscrambling grammatically incorrect sentences. Because

prayer is an integral part of virtually all known religions, the present studies suggest that the prosocial effects of religiosity are likely to be applicable to many everyday settings in which religion is practiced. In addition, whereas prior studies used a neutral experimental context that was largely devoid of emotion, the present studies used an experimental context that aroused strong feelings of anger. As such, the present studies suggest that prosocial effects of religiosity extend to emotionally "hot" interpersonal situations.

The present studies also extend recent research on prayer (Lambert et al., 2010) by showing that prayer may amplify prosocial behavior toward a person whom participants had never met (and whom they were told they would never meet). These new findings are highly relevant in the context of recent evolutionary models, which have suggested that religiosity may promote prosocial behavior among nonkin and in situations in which reciprocity is not possible (Boyd & Richerson, 2002; Henrich et al., 2010; Norenzayan & Shariff, 2008; Wilson & Wilson, 2007). Prayer may thus promote adaptive social functioning by allowing people to extend the boundaries of the ingroup. Indeed, it is conceivable that the prosocial effects of prayer and other forms of religiosity allowed early humans to organize themselves into larger groups and create more complex forms of culture (Atran & Norenzayan, 2004).

The effects observed in the present experiments were medium to large in size (see Cohen, 1988), suggesting that prayer may be an effective way to down-regulate anger and aggression. Still, we caution against oversimplifying the psychological effects of prayer. Prayer is a complex and multifaceted process, and most religious traditions devote considerable time and effort to teaching their adherents various skills and orientations that are appropriate to prayer. These typically involve a benevolent and peaceful stance toward others, but there certainly are exceptions. For example, a pastor of a Baptist church in Arizona prayed for U.S. President Barack Obama to die and go to hell (CNN, 2009). Such vengeful types of prayer are likely to trigger angry ruminations and may thus fuel rather than extinguish anger and aggression (e.g., Bushman, 2002; Bushman et al., 2005). Moreover, from an evolutionary perspective, it is likely that the prosocial effects of prayer extend only to others who can be considered ingroup members. In future work, it would be important to examine the role of prayer when people are dealing with unambiguous outgroups, such as ideological opponents or members of stereotyped groups. We are currently investigating this issue.

More generally, the prosocial effects of prayer may be distinct from the effects of other forms of religiosity. A recent large-scale study ( $N = 4,704$ ) across six religions (Hinduism, Russian Christian Orthodoxy, Judaism, Islam, Protestantism, and Catholicism) in six nations (India, Russia, Israel, Indonesia, the United Kingdom, and Mexico) found that attendance at religious services was positively related to hostility toward outgroups (Ginges, Hansen, & Norenzayan, 2009, Study 4). However, in the same study, there was a small trend for frequency of prayer to be negatively associated with outgroup hostility. The effect of prayer frequency was not statistically

reliable across the entire sample, perhaps because the study did not control for the type or contents of prayer. Taken together, the findings from this research and the findings from the present experiments suggest that private prayer with a focus on others may be a more beneficial way of regulating anger and aggression than other forms of religious expression.

### Limitations, Strengths, and Future Research

The present experiments focused on one type of prayer, namely, verbal, colloquial prayers for another person. This type of prayer is common in everyday life and has been regarded as a prototypical form of prayer by various scholars (Heiler, 1932; Poloma & Pendleton, 1991). Moreover, conceptually similar effects were obtained when participants prayed for a target person they had never interacted with before (Experiment 1), a person who had just provoked them (Experiment 2), or a personal acquaintance (Experiment 3). As such, the present findings have some generality across different targets of prayer. Still, it would be useful to manipulate both the target and the nature of prayer in future research. For instance, future studies could examine whether prayer has different effects when people are praying for themselves, given that self-focus may interfere with down-regulation of anger and aggression (Rusting & Nolen-Hoeksema, 1998). Likewise, future research may examine the impact of other types of prayer, such as meditative prayer, prayer using a fixed text, or repetition of special words or rituals (Poloma & Pendleton, 1991; see also Cahn & Polich, 2006).

More research is also needed to pinpoint the exact mechanism whereby prayer may reduce anger and aggression. Currently, the most plausible mechanism that underlies the present effects of prayer appears to be cognitive reappraisal, an emotion-regulatory strategy whereby people change their interpretation of emotion-eliciting events (Ochsner & Gross, 2008). Experiment 3 showed prayer led participants to display fewer anger-related appraisals, such that participants were less likely to attribute events to personal agents. According to cognitive theories of emotion, appraisal patterns play a causal role in generating emotions (Lazarus & Folkman, 1984; Scherer, Schorr, & Johnstone, 2001). Consequently, the influence of prayer on anger-related appraisals may explain why prayer reduced anger and aggression in Experiments 1 and 2. However, this appraisal account must remain tentative because we could not conduct a formal mediation analysis in the present research. Moreover, the emotion-regulatory effects of prayer may be driven by multiple mechanisms. Future research should further address the mechanisms that mediate the effects of prayer and anger and aggression.

Beyond questions of underlying mechanisms, however, the present evidence that prayer can play a causal role in down-regulating anger and aggressive behavior is important in its own right. Scholars have also recently pleaded for more behavioral research in psychological science (Baumeister, Vohs, & Funder, 2007), and our research is fully compatible with such

pleas. Given that behavioral effects of prayer have been rarely documented, the present findings are significant and greatly enhance our understanding of the psychological significance of prayer.

### Conclusion

Over the past decades, a number of researchers have tried to document the effects of prayer on the targets of prayer, a controversial research program that has predictably yielded very meager results (Masters, Spielmann, & Goodson, 2006). The present work indicates that prayer actually can have meaningful effects, but among a different group of individuals—those doing the praying. Indeed, prayer was found to have pervasive effects on the emotional experience, social behavior, and cognitive appraisals of praying individuals. Whenever people are confronting their own anger and tendencies to aggress, they might consider the age-old advice of praying for one's enemies. Even when such prayers do not directly benefit those enemies, prayer may still help people coexist more peacefully.

### Authors' Note

Preparation for this article was facilitated by a fellowship to Sander Koole at the Center for Advanced Study in the Behavioral Sciences at Stanford University.

### Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the authorship and/or publication of this article.

### Funding

The authors disclosed receipt of the following financial support for the research and/or authorship of this article: Grant 12428 from the Templeton Foundation.

### References

- Ai, A. L., Peterson, C., Tice, T. N., Huang, B., Rodgers, W., & Bolling, S. F. (2007). The influence of prayer coping on mental health among cardiac surgery patients: The role of optimism and acute distress. *Journal of Health Psychology, 12*, 580-596. doi:10.1177/1359105307078164
- Ai, A. L., Tice, T. N., Peterson, C., & Huang, B. (2005). Prayers, spiritual support, and positive attitudes in coping with the September 11 national crisis. *Journal of Personality, 73*, 763-791. doi:10.1111/j.1467-6494.2005.00328.x
- Atran, S., & Norenzayan, A. (2004). Religion's evolutionary landscape: Counterintuition, commitment, compassion, communion. *Behavioral and Brain Sciences, 27*, 713-770.
- Axelrod, R. (1984). *The evolution of cooperation*. New York, NY: Basic Books.
- Batson, C. D. (1976). Religion as prosocial: Agent or double agent? *Journal for the Scientific Study of Religion, 15*, 29-45.
- Baumeister, R. F., Vohs, K. D., & Funder, D. C. (2007). Psychology as the science of self-reports and finger movements: Whatever

- happened to actual behavior? *Perspectives on Psychological Science*, 2, 396-403. doi:10.1111/j.1745-6916.2007.00051.x
- Bless, H., & Schwarz, N. (2010). Mental construal and the emergence of assimilation and contrast effects: The inclusion/exclusion model. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 42, pp. 319-373). doi:10.1016/S0065-2601(10)42006-7
- Boyd, R., & Richerson, P. J. (2002). Group beneficial norms can spread rapidly in a structured population. *Journal of Theoretical Biology*, 215, 287-296.
- Bushman, B. J. (2002). Does venting anger feed or extinguish the flame? Catharsis, rumination, distraction, anger, and aggressive responding. *Personality and Social Psychology Bulletin*, 28, 724-731.
- Bushman, B. J., & Baumeister, R. F. (1998). Threatened egotism, narcissism, self-esteem, and direct and displaced aggression: Does self-love or self-hate lead to violence? *Journal of Personality and Social Psychology*, 75, 219-229.
- Bushman, B. J., Bonacci, A. M., Pedersen, W. C., Vasquez, E. A., & Miller, N. (2005). Chewing on it can chew you up: Effects of rumination on triggered displaced aggression. *Journal of Personality and Social Psychology*, 88, 969-983.
- Cahn, B. R., & Polich, J. (2006). Meditation states and traits: EEG, ERP, and neuroimaging studies. *Psychological Bulletin*, 132, 180-211.
- CNN. (2009, August 28). *Death threats against Obama increase by 400 percent*. Retrieved from <http://pubrecord.org/multimedia/4273/during-sermon-arizona-pastor-tells/>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). New York, NY: Academic Press.
- Fiedler, F., Bluemke, M., & Unkelbach, C. (2009). Exerting control over allegedly automatic associative processes. In J. P. Forgas, R. Baumeister, & D. Tice (Eds.), *The psychology of self-regulation: Cognitive, affective, and motivational processes* (pp. 249-269). Philadelphia, PA: Psychology Press.
- Giancola, P., & Zeichner, A. (1995). Construct validity of a competitive reaction-time aggression paradigm. *Aggressive Behavior*, 21, 199-204.
- Ginges, J., Hansen, I. G., & Norenzayan, A. (2009). Religion and support for suicide attacks. *Psychological Science*, 20, 224-230.
- Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology*, 2, 271-299.
- Heiler, F. (1932). *Prayer: A study in the history and psychology of religion*. New York, NY: Oxford University Press.
- Henrich, J., Ensminger, J., McElreath, R., Barr, A., Barrett, C., Bolyanatz, A., . . . Ziker, J. (2010). Markets, religion, community size, and the evolution of fairness and punishment. *Science*, 327(5972), 1480-1484.
- Kahneman, D., Slovic, P., & Tversky, A. (1982). *Judgment under uncertainty: Heuristics and biases*. Cambridge, UK: Cambridge University Press.
- Keltner, D., Ellsworth, P. C., & Edwards, K. (1993). Beyond simple pessimism: Effects of sadness and anger on social perception. *Journal of Personality and Social Psychology*, 64, 740-752.
- Lambert, N. M., & Dollahite, D. C. (2006). How religiosity helps couples prevent, resolve, and overcome marital conflict. *Family Relations*, 55, 439-449.
- Lambert, N. M., Fincham, F. D., Stillman, T. F., Graham, S. M., & Beach, S. R. H. (2010). Motivating change in relationships: Can prayer increase forgiveness? *Psychological Science*, 21, 126-132.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal and coping*. New York, NY: Springer.
- Martin, L. L. (1986). Set/reset: Use and disuse of concepts in impression formation. *Journal of Personality and Social Psychology*, 51, 493-504.
- Masters, K. S., Spielmanns, G. I., & Goodson, J. T. (2006). Are there demonstrable effects of distant intercessory prayer? A meta-analytic review. *Annals of Behavioral Medicine*, 31, 337-342.
- Norenzayan, A., & Shariff, A. F. (2008). The origin and evolution of religious prosociality. *Science*, 322 (5898), 58-62.
- Ochsner, K. N., & Gross, J. J. (2008). Cognitive emotion regulation: Insights from social cognitive and affective neuroscience. *Currents Directions in Psychological Science*, 17, 153-158.
- Poloma, M. M., & Pendleton, B. F. (1991). The effects of prayer and prayer experiences on measures of general well-being. *Journal of Psychology and Theology*, 19, 71-83.
- Randolph-Seng, B., & Nielsen, M. E. (2007). Honesty: One effect of primed religious representations. *International Journal for the Psychology of Religion*, 17, 303-315.
- Rusting, C. L., & Nolen-Hoeksema, S. (1998). Regulating responses to anger: Effects of rumination and distraction on angry mood. *Journal of Personality and Social Psychology*, 74, 790-803.
- Scherer, K. R., Schorr, A., & Johnstone, T. (Eds.). (2001). *Appraisal processes in emotion: Theory, methods, research*. New York, NY: Oxford University Press.
- Shacham, S. (1983). A shortened version of the Profile of Mood States. *Journal of Personality Assessment*, 47, 305-306.
- Shariff, A. F., & Norenzayan, A. (2007). God is watching you: Priming God concepts increases prosocial behavior in an anonymous economic game. *Psychological Science*, 18, 803-809.
- Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality and Social Psychology*, 48, 813-838. doi:10.1037/0022-3514.48.4.813
- Sparrow, B., & Wegner, D. M. (2006). Unpriming: The deactivation of thoughts through expression. *Journal of Personality and Social Psychology*, 91, 1009-1019.
- Taylor, S. (1967). Aggressive behavior and physiological arousal as a function of provocation and the tendency to inhibit aggression. *Journal of Personality*, 35, 297-310.
- Wilson, D. S., & Wilson, E. O. (2007). Evolution: Survival of the selfless. *The New Scientist*, 196(2628), 42-46. doi:10.1016/S0262-4079(07)62792-4