Representations of Religious Words: Insights for Religious Priming Research

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Researchers often expose participants to a series of words (e.g., religion, God, faith) to activate religious concepts and observe their subsequent effects on people's thoughts, feelings, and behaviors. This research has revealed many important effects of experimentally manipulated religious cognition in domains ranging from prosocial behavior to prejudice. However, it is not exactly clear what constitutes a "religious cognition," and no research has yet investigated conceptual distinctions between different kinds of religious prime words. In the present research we used a card-sorting task to examine laypeople's subjective understanding of religious prime words, and the central categories or dimensions of these religious concepts. Using multidimensional scaling, property fitting, and cluster analysis methods to analyze the proximities among the words, we find evidence for the mental representation of three relatively distinct kinds of religious concepts: agents (e.g., God, angel), spiritual/abstract (e.g., faith, belief), and institutional/concrete (e.g., shrine, scripture). Theoretical and methodological implications for religious priming research are discussed.

Keywords: religious cognition, religion, God, priming, multidimensional scaling, cluster analysis.

Meanwhile the very fact that there are so many and so different [definitions of religion] from one another is enough to prove that the word "religion" cannot stand for any single principle or essence, but is rather a collective name.
                                                                                                    – James ([1902]1988)

INTRODUCTION

Psychologists of religion have long been interested in the varieties of religious experience, and investigated whether different ways of being religious can have divergent effects on people's thoughts, feelings, and behaviors. Over 100 years ago, William James ([1902]1988) distinguished between *personal* and *institutional* religion. Whereas personal religion places emphasis on the believer's relationship with the divine, institutional religion places emphasis on the rituals, theology, and organization that orient the believer within a religious group. James's insight that religion is a complex multidimensional construct has been a recurring theme in the field, and has inspired important research investigating how different ways of being religious can affect people's attitudes and behaviors. Other distinctions have also been made, such as committed versus consensual religion (Allen and Spilka 1967), coalitional versus devotional religiosity (Hansen and Norenzayan 2006), and religiousness versus spirituality (Zinnbauer and Pargament 2005). In all of these cases, researchers have appreciated the complex nature of religion by measuring different

ways of being religious and using these insights to derive novel insights into the influence of religion on people's lives.

Until recently, most studies on the psychology of religion involved measuring different aspects of religiosity and correlating these measures with other beliefs, attitudes, and behaviors of interest. But, in the last decade, a new era of experimental research in the psychology of religion has emerged, adopting priming methodologies commonly used in cognitive and social psychology. These methods allow researchers to manipulate religious cognition, rather than just measure different ways of being religious, and therefore provide insight into the causal effect of religious cognition. To date, religious priming studies have revealed some important effects. For example, priming people with religious concepts (e.g., the word "prayer" or the idea of an omnipotent God) can decrease the accessibility of sinful temptations (e.g., drugs, junk food) that may otherwise interfere with their goals (Fishbach, Friedman, and Kruglanski 2003; Laurin, Kay, and Fitzsimons 2012). Exposure to religious prime words (e.g., God, sacred, prophet) can improve emotional regulation by decreasing the anxiety and distress associated with uncertainty (Inzlicht and Tullet 2010; Inzlicht, Tullet, and Good 2011). And religious primes also curb selfish impulses, causing increased honesty (Randolph-Seng and Nielsen 2007) and charitable giving behavior in economic tasks such as the dictator game and prisoner's dilemma (Ahmed and Salas 2011; Shariff and Norenzayan 2007). However, religious primes have also been found to *decrease* the likelihood of prosocial attitudes and behavior in some contexts (e.g., Ginges, Hansen, and Norenzayan 2009; Johnson, Rowatt, and LaBouff 2010; Saroglou, Corneille, and Van Cappellen 2009). There is thus some divergence in the effects of different kinds of religious primes, and there is no clear consensus on the underlying mechanism that is driving these experimental effects.

Divergent effects of religious primes may result, at least in part, from the multiple priming methods often employed by researchers. For example, it is common to include words related to supernatural agents (e.g., God, spirit), religious practices (e.g., prayer, worship), and religious adjectives (e.g., sacred, divine) as part of a single manipulation of religious cognition. In fact, most researchers use four or more words to manipulate religious cognition (cf. Preston, Ritter, and Hernandez 2010; Wenger 2004). That is, researchers often prime participants with a variety of different religious concepts without distinguishing among them. Given that little is known about the different kinds of religious concepts that can be experimentally manipulated, it is difficult to determine exactly what may be driving different effects. An important next step for researchers to better understand the experimental effect of manipulating religious cognition is to be more precise about its content. Researchers interested in the psychology of religion have long observed distinct aspects of belief and practice, and individual differences in type of religious belief. Like these other researchers, we suggest that religion is complex, and should not be treated as a single entity. Rather, religion is comprised of different concepts and aspects related to the sacred, which may in turn carry different psychological associations (Preston, Ritter, and Hernandez 2010). Importantly, such distinctions may be lost in multiple-priming methods where several different religious terms are primed together in a single condition to activate "religious cognition," broadly construed. In this research, we examine the religious prime words commonly used by researchers and aim to distinguish between different religious concepts. From this, we hope to reveal the key components that underlie "religious cognition," and suggest how these components have a distinct influence on attitudes, motivation, and behavior.

THE PRESENT RESEARCH

The goal of the present research was to create a conceptual map of the numerous religious concepts commonly used in religious priming research—to reveal both the common associations and distinctions between different religious terms. To do this, we created a list of terms commonly used in religious priming studies, and used an open card-sorting task that could reveal the latent

dimensions participants use to judge the stimuli without explicitly asking for ratings on an experimenter-imposed dimension (Coxon 1999). In a typical open card-sorting task, participants are given a stack of index cards—each with one word written on it—and asked to sort the words into meaningful piles according to their own criteria. Participants in the present studies completed a computer-based adaptation of an open card-sorting task. After engaging in a practice exercise and reading through a set of religious words, participants were asked to sort the words into two to five piles by clicking on words with their mouse. We then used two complementary methods to analyze the proximities—or "psychological distance"—between the religious prime words. First, we used multidimensional scaling (MDS) to create a spatial representation of the data, where distances between words correspond to their proximity. Property vectors were subsequently fit to the space to aid in the interpretation of the dimensions underlying participants' representations. Second, we used an additive tree analysis to create a "neighborhood" representation of the proximities. In other words, whereas MDS focuses on large distances in the space and is useful in uncovering any latent dimensions that participants are using to categorize the words, the additive tree analysis focuses on small distances and is useful in uncovering clusters of similar words. According to Kruskal and Wish (1978:45), these complementary analyses are ideal in that—rather than competing with each other—the clustering approach can be used to supplement and clarify dimensional interpretations.

By appreciating the psychological distinctions that people make between different kinds of religious cognition, we hope to provide a useful framework for resolving inconsistencies in previous research as well as inform the theory and methods of future research.

Study 1

Study 1 aimed to investigate psychological distinctions between different kinds of religious words that have been used in previous priming research. Participants were presented with a series of religious words and asked to sort them into meaningful piles. We used MDS, property fitting, and clustering analysis techniques to create and interpret the resulting spatial representation of religious concepts.

Method

Participants

One hundred twenty-six participants completed the card-sorting task. Thirty-six participants were undergraduate students recruited through the Psychology Subject Pool at the University of Illinois at Urbana-Champaign and participated in our lab for partial course credit. The other 90 participants were recruited online from the United States through Amazon Mechanical Turk (MTurk). Fifteen people (4 subject pool; 11 MTurk) were excluded for either failing to follow directions (e.g., creating one-word piles) or creating meaningless piles (e.g., words that start with the letter "S"), leaving 111 participants (37 men, 73 women, 1 transgender; mean age = 32.7 years, $SD = 13.8$) included in the analysis. Participants were mostly white (75 percent) and Christian (61 percent).

Stimuli

To gather a list of words for participants to sort, we began by surveying the literature for words that have been used to prime religious concepts (Ahmed and Salas 2011; Fishbach, Friedman, and Kruglanski 2003; Gervais and Norenzayan 2012; Inzlicht and Tullett 2010; Johnson, Rowatt, and LaBouff 2010; Laurin, Kay, and Fitzsimons 2012; McKay et al. 2011; Pichon, Boccato, and Saroglou 2007; Preston, Ritter, and Hernandez 2010; Randolph-Seng and Nielsen 2007; Rounding et al. 2012; Saroglou, Corneille, and Van Cappellen 2009; Shariff and Norenzayan 2007; Wenger

2003, 2004). From this list we used our judgment to replace synonyms (e.g., Jesus, Christ) with only one exemplar (e.g., Jesus). We also removed words judged to be less common (e.g., aureole, beatitude) and not specifically related to religion (e.g., wedding, tradition) to arrive at a final list of 32: angel, baptism, belief, Bible, bless, Christmas, church, commandments, communion, cross, divine, faith, God, gospel, heaven, holy, Jesus, messiah, miracle, pilgrimage, prayer, preacher, prophet, religion, Sabbath, sacred, saint, salvation, sermon, soul, spirit, and worship.

Procedure

To become familiarized with the interface and how to create piles, participants first completed a two-pile practice card sort using food items as an example. We emphasized that there are no right or wrong answers, and that participants should use whatever criteria makes sense to them to create their piles. Six words appeared on the screen (carrot, apple, celery, orange, onion, and banana), and as a word was clicked it appeared in a "pile" at the bottom of the screen. After creating their first pile, participants clicked a button to "make another pile," at which point all the words reappeared on the screen and another pile could be created (this procedure allowed the same word to appear in more than one pile if deemed necessary by the participant). Finally, after creating the two practice piles, the words representing each pile appeared on the screen and participants were asked to give a name to each one corresponding to the criteria they used to sort the words.

After the practice session ended, participants proceeded to the main task. The 32 religious words appeared on the screen in the same random order for all participants, and participants were asked to sort them into anywhere from two to five piles. A "reset" button was available while sorting each pile if participants made an error or changed their mind. At the end of the card sort, participants reported their age, gender, ethnicity, religious affiliation, religiosity, belief in God, and political identity. Religiosity ("how religious are you?") and belief in God ("how much do you believe in God?") were measured on five-point scales (1 = *not at all*; 5 = *very strongly*). Political identity was also measured on a five-point scale (1 = *strongly liberal*; 5 = *strongly conservative*).

Results and Discussion

Descriptive Statistics

Participants were moderately religious ($M = 2.9$, $SD = 1.5$), held a moderately strong belief in God ($M = 3.8$, $SD = 1.5$), and were normally distributed across the political identity spectrum ($M = 2.9$, $SD = 1.1$). A total of 371 piles were created, with each participant sorting an average of 3.4 piles ($SD = 1.0$).

Preparing Data for Analysis

The most straightforward way to investigate the relation between objects in a card-sorting task is to examine their co-occurrence; that is, to look at the extent to which the prime words appear together in the same pile. Here we created three kinds of co-occurrence matrices for analysis. The first was a simple co-occurrence matrix created by counting the number of times each pair of words appeared in the same pile. This simple measure can be limited, however, in that it does not take into account individual differences in the size of piles that people tend to make. Specifically, some people tend to make many fine distinctions between objects and create many piles (the "splitter"), whereas others tend to recognize few differences between the objects and create fewer piles (the "lumper": Coxon 1999). The simple co-occurrence matrix thus weights each pair of objects equally regardless of whether they appeared together in a small or large pile. The remaining two co-occurrence matrices we created used a weighted transformation of the simple co-occurrence matrix to take the size of the pile into account (Burton 1975). One was a co-occurrence matrix weighted by pile size, and the other was a co-occurrence matrix

weighted by the reciprocal of pile size. In other words, the former transformation weighted prime words as being more similar if they appeared together in a large pile (emphasizing broad discriminations), and the latter transformation weighted prime words as being more similar if they appeared together in a small pile (emphasizing fine discriminations). Each co-occurrence matrix was subsequently transformed into a dissimilarity matrix for analysis. Dissimilarity matrices were created by computing (1 – Jaccard's Index), where Jaccard's Index is defined by the (unweighted or weighted) ratio of the intersection of two prime words (i.e., the number of times the two words appear in the same pile) to their union (i.e., the number of times the two words appear in any pile). The matrices used in the analyses presented below are available in the Appendix.

MDS and Property Fitting

Raw data consisted of a 371 (piles) × 32 (religious primes) matrix. For each of the 371 piles, a binary coding (1 = present, 0 = absent) was used to represent the contents of each pile. This raw data matrix was imported into MATLAB (The MathWorks Inc.) and custom M-files were written to calculate the three dissimilarity matrices used for analysis. Using SYSTAT 13 software (SYSTAT Inc.), stimulus spaces with one-, two-, and three-dimensional solutions were created for each of the three dissimilarity matrices using Guttman's (1968) coefficient of alienation scaling method. Although the two- and three-dimensional analyses produced reasonable solutions for all three dissimilarity matrices, the two-dimensional solution on the matrix weighted by pile size accounted for the most variance (RSQ = .90, final stress = .15) *and* yielded the most interpretable map of the possible dimensions underlying people's conceptualization of the religious words.[1] This solution is presented in Figure 1.

To confirm the reliability of this two-dimensional solution across the data collected in the lab and online through MTurk, we created a separate dissimilarity matrix for each sample and examined the correlation among the inter-point distances. The 496 dissimilarities were highly correlated across samples, $r(494) = .84$, $p < .001$. We also obtained the coordinates of the two-dimensional solution separately for each sample and submitted them to a Procrustes transformation using MATLAB. This analysis is useful to determine how well two MDS solutions "match" by transforming one solution onto another, and returns a dissimilarity measure between 0 and 1 where numbers closer to zero imply more similar shapes. Indeed, both the dissimilarity measure ($d = .18$) and a visual inspection of the transformation suggested there were no substantive differences in the spatial representation between the two samples.

The conceptual map in Figure 1 provides a spatial representation of the religious words that may be clustered into different groups of religious concepts. Specifically, three relatively discrete clusters or "neighborhoods" emerged in the space. The first cluster appeared to center on religious agents. That is, these concepts described some person or being with religious or divine attributes (e.g., God, saint, prophet). The second cluster emerged toward the bottom of the space, and appeared to center on spiritual or abstract concepts relating to individual relationship to the sacred (e.g., faith, miracle, heaven). Finally, a third cluster emerged toward the top of the space, and appeared to center on concrete objects or practices relating to the institutional aspect of religion (e.g., baptism, sermon, Christmas).

Although we had some initial intuitions about the underlying dimensions of the spatial representation, we sought to confirm them using property fitting.[2] To conduct our property fitting analyses, a separate sample of 18 undergraduate students was recruited to rate each of the 32 religious words along two dimensions that we hypothesized to underlie the spatial representation:

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[1]2-D simple (unweighted) matrix RSQ = .88, final stress = .16; 2-D matrix weighted by reciprocal of pile size RSQ = .84, final stress = .18. We therefore used the matrix weighted by pile size in all subsequent analyses.

[2]MDS procedures scale distances, not axes, and so the X-Y axes of the two-dimensional space have no inherent meaning. Rather, all directions in the coordinate space should be examined for meaningful dimensionality.
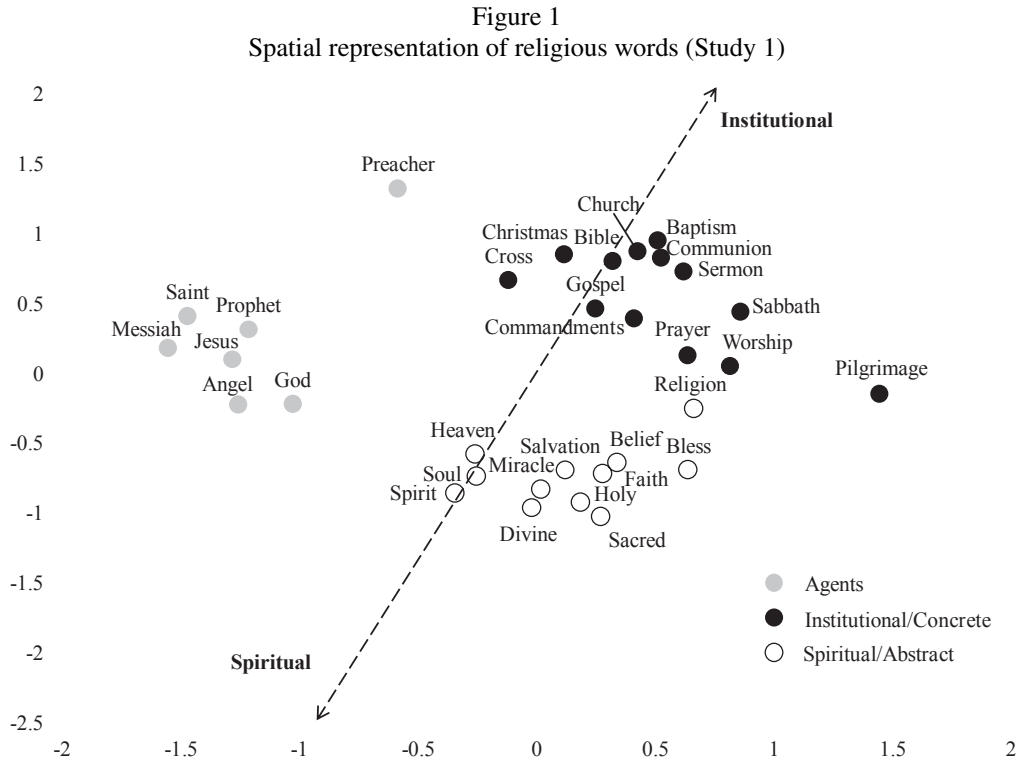
Figure 1
Spatial representation of religious words (Study 1)

Note: Data points are colored according to the results of the additive tree analysis (see Figure 2). The dotted property vector was fit post-hoc to aid in the interpretation of the dimensionality of the space.

Table 1: Property of fitting analyses along agency and institutional/spiritual dimensions

	Regression Coefficients		
	Dimension 1 (X)	Dimension 2 (Y)	Multiple Correlation
Study 1			
Agency ($n = 18$)	−.63	.27	.47[*]
Institutional vs. spiritual ($n = 18$)	−.81	−2.20	.90[**]
Study 2			
Agency ($n = 25$)	−1.46	1.64	.85[**]
Institutional vs. spiritual ($n = 26$)	−2.03	−.79	.88[**]

*Note: *$p < .05$; **$p < .01$.*

agency and institutional/spiritual (see Table 1). For each of the two-dimensions, mean ratings of each word were regressed onto the coordinates of the two-dimensional space (see Kruskal and Wish 1978 for a description of this procedure). Only the institutional/spiritual property vector—whose correlation with the MDS solution exceeded .70, $p < .001$—is superimposed on the two-dimensional representation in Figure 1. The property vector representing our hypothesized agency dimension did not provide a statistically sufficient fit ($r > .70$ recommended), leaving the dimension orthogonal to institutional/spiritual unspecified. To further aid our interpretation of the two-dimensional space, we next turned to a clustering representation of the proximities.

Figure 2
Additive tree representation of religious words (Study 1)
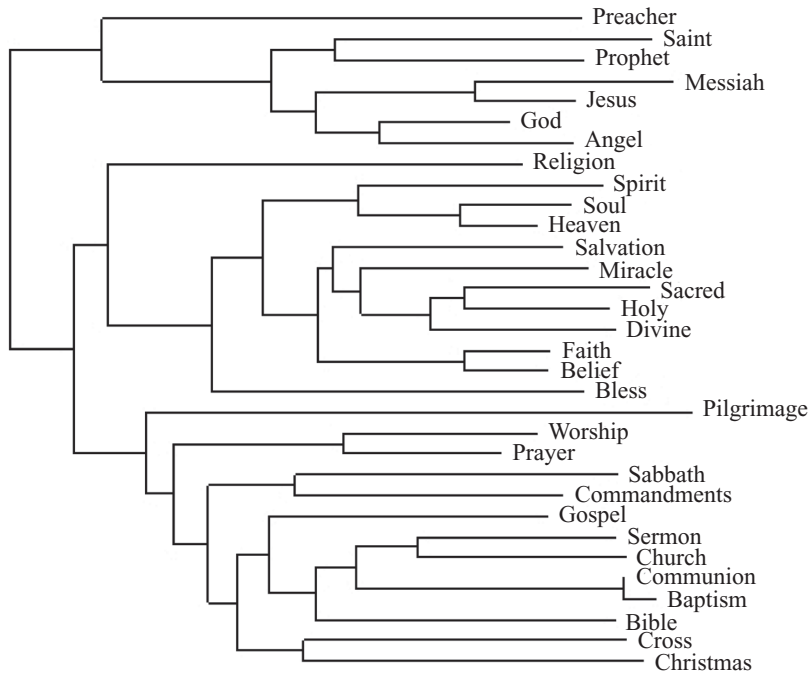
Additive Tree Analysis

Using the open-source MATLAB Toolbox provided and described by Hubert, Köhn, and Steinley (2009), we submitted the dissimilarity matrix to an exploratory finding routine—ATREEFND.M—that returns a least-squares matrix satisfying the additive tree constraints. After 100 random starts to avoid the influence of local optima, the best fitting additive tree accounted for 82 percent of the variance and is displayed in Figure 2. Substantively, the additive tree result complements the spatial (MDS) solution nicely. That is, the three main "branches" of the tree correspond to the three "neighborhoods" in the two-dimensional space: one branch clearly represents the religious agents, another represents the relatively spiritual/abstract religious words, and another represents the relatively institutional/concrete religious words. To further aid in the interpretation of the two-dimensional space, the points in Figure 1 have been colored according to the results of the additive tree analysis.

These results suggest that people are readily able to distinguish between at least three categories of religious words: religious agents, spiritual/abstract religious concepts, and institutional/concrete religious concepts. These distinct clusters in the conceptual map strongly suggest that the multiple prime methods—i.e., priming participants with a battery of words to activate religious cognition—may not be the best strategy. Rather, researchers should attend more precisely to the kinds of religious cognition they are priming. In Study 2 we sought to confirm the reliability of these findings across a more generic sample of religious words.

STUDY 2

Study 1 provided initial evidence for three distinct clusters of religious concepts: agents, spiritual/abstract, and institutional/concrete. However, one limitation of Study 1 is that many of the prime words were Christian-specific concepts (e.g., Bible, Christmas). Study 2 therefore

extended these findings by excluding Christian-specific words and replacing them with more generic religious terms (e.g., scripture, holy day).

Method

Participants

One hundred seventy-four participants completed the card-sorting task. Seventy-two participants were undergraduate students recruited through the Psychology Subject Pool at the University of Illinois at Urbana-Champaign and participated in our lab for partial course credit. The other 102 participants were recruited online from the United States through MTurk. Eighteen people (9 subject pool; 9 MTurk) were excluded for either failing to follow directions or creating meaningless piles, leaving 156 participants (64 men, 91 women, 1 not reporting; mean age $=$ 28.7, $SD = 12.1$) included in the analysis. As in Study 1, participants were mostly white (72 percent) and Christian (66 percent).

Stimuli

From the list of 32 words used in Study 1 we used our judgment to remove words explicitly associated with Christianity (e.g., Bible, cross, Jesus). We also removed adjectives (e.g., divine, sacred) so that all remaining words were nouns, and people would not rely on the grammatical properties of the words to make their categories. Finally, we added some of our own generic religious words (e.g., doctrine, ritual, scripture) to arrive at a final list of 23 words: altar, angel, belief, clergy, creed, doctrine, faith, God, heaven, holy day, miracle, pilgrimage, prayer, prophet, religion, revelation, ritual, saint, scripture, sermon, shrine, soul, and spirit.

Procedure

The procedure was identical to Study 1, with the only exception being the list of words that appeared on the screen for sorting.

## Results and Discussion

Descriptive Statistics

Overall, participants were moderately religious ($M = 2.8$, $SD = 1.3$), held a moderately strong belief in God ($M = 3.5$, $SD = 1.5$), and were slightly left of center on the political identity scale ($M = 2.6$, $SD = 1.1$). A total of 502 piles were created, with each participant sorting an average of 3.2 piles ($SD = 1.1$).

MDS and Property Fitting

Raw data consisted of a 502 (piles) $\times$ 23 (religious primes) matrix. Following the same procedures described in Study 1, the three dissimilarity matrices were created for analysis and stimulus spaces with one-, two-, and three-dimensional solutions were created for each one. The two-dimensional solution on the matrix weighted by pile size again accounted for the most variance (RSQ $= .95$, final stress $= .11$) *and* yielded the most interpretable map.[3] This solution is presented in Figure 3. We used the same procedures described in Study 1 to examine the reliability of this two-dimensional solution across the lab and MTurk samples. The dissimilarities among the religious words were again highly correlated across the two samples, $r(251) = .86$, $p < .001$, and the Procrustes transformation of the MTurk solution onto the lab solution revealed a highly similar spatial representation ($d = .12$).

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[3]2-D simple (unweighted) matrix RSQ $= .93$, final stress $= .13$; 2-D matrix weighted by reciprocal of pile size RSQ $=$ .89, final stress $= .16$.

Figure 3
Spatial representation of religious words (Study 2)
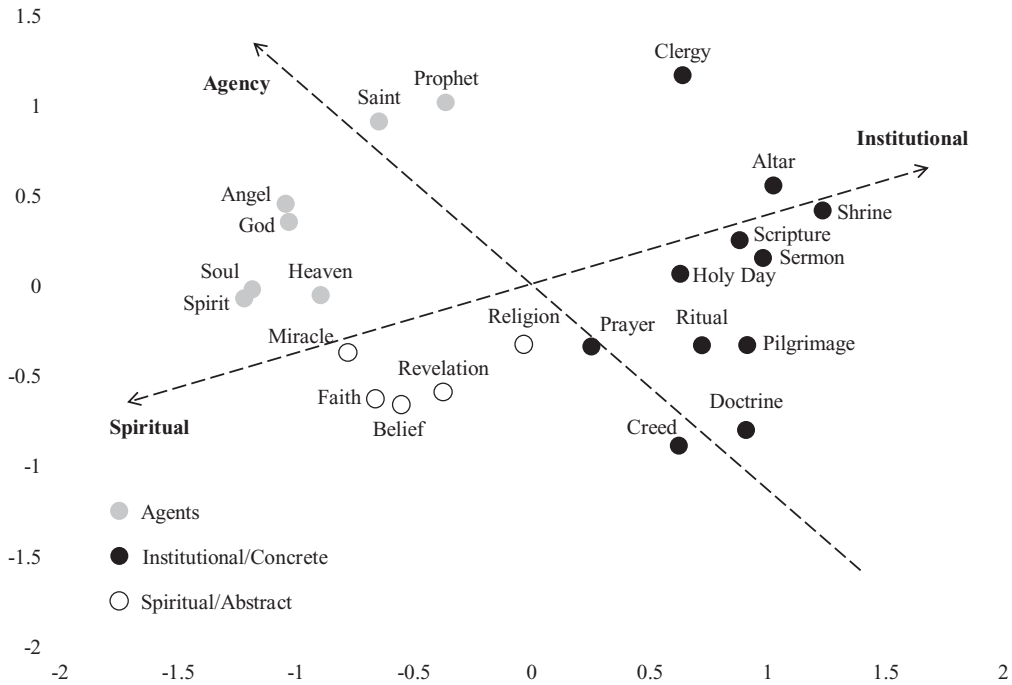
Note: Data points are colored according to the results of the additive tree analysis (see Figure 4). The dotted property vectors were fit post-hoc to aid in the interpretation of the dimensionality of the space.

Consistent with the results of Study 1, the two-dimensional scaling analysis revealed a readily interpretable spatial representation of the religious words. Specifically, religious agents appear together toward the top left portion of the space, the relatively spiritual/abstract religious words appear together toward the bottom left portion of the space, and the relatively institutional/concrete religious words appear together toward the right side of the space.

Property fitting procedures were identical to Study 1, except we recruited separate samples of participants on-line through MTurk to rate each of our hypothesized dimensions (see Table 1). An examination of the property vectors representing both the agency and institutional/spiritual dimensions revealed correlations with the MDS solution exceeding .70 ($p < .001$). These are superimposed on the two-dimensional representation in Figure 3. Consistent with the results of Study 1, these property vectors provide a straightforward interpretation of the two dimensional space. The religious primes can be understood as possessing more or less agency, and more or less related to institutional/concrete versus spiritual/abstract religious concepts.

Additive Tree Analysis

The dissimilarity matrix was next submitted to Hubert and colleagues' (2009) exploratory finding routine—ATREEFND.M—with 100 random starts to return a least-squares matrix satisfying the additive tree constraints. The best fitting additive tree accounted for 82 percent of the variance and is displayed in Figure 4. As in Study 1, the additive tree complements the results of the spatial representation and reveals a similar interpretation. The first main branch breaks off into two sub-branches: religious agents (e.g., God, angel) and spiritual/abstract (e.g., faith, miracle). The second main branch represents the relatively more institutional/concrete religious words (e.g., altar, pilgrimage). The points in Figure 3 have been colored according to the results

Figure 4
Additive tree representation of religious words (Study 2)
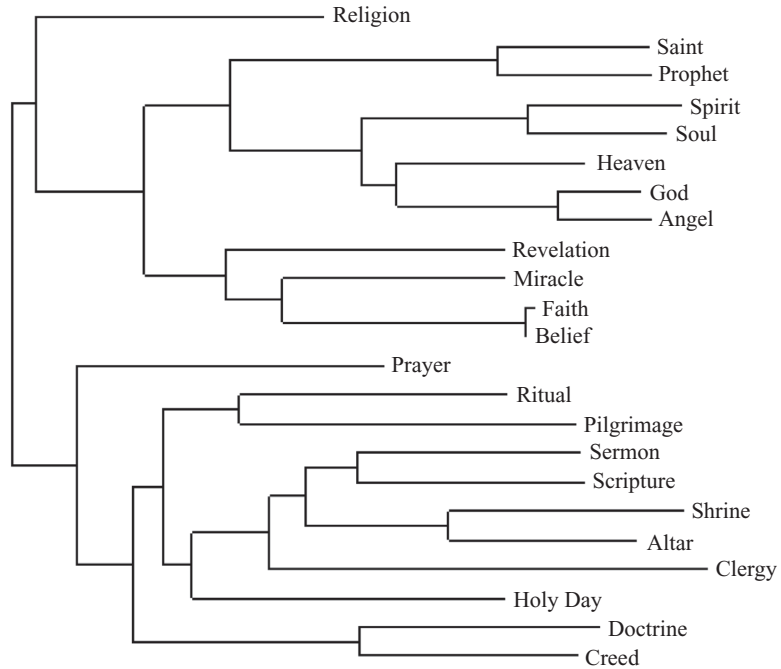
of the additive tree analysis to aid interpretation of the two-dimensional space. Study 2 thus provides further evidence for the mental representation of at least three relatively distinct kinds of religious primes.

General Description

What aspects comprise the sacred? Scholars have long argued that religion and belief are made up of different components, and suggested different ways that the sacred could be divided (e.g., Allen and Spilka 1967; Allport and Ross 1967). The present research contributes to this tradition by examining distinct clusters within a broad range of religious concepts. But here we did not impose theoretical categories *a priori*. Rather, we allowed the underlying categories to emerge from laypersons' subjective judgment of various religious concepts. In two studies, participants sorted religious words into meaningful piles based on their own criteria. Using both MDS and cluster analysis techniques to analyze the proximities among the words, we found evidence for a psychological distinction between three kinds of religious prime words: religious agents (e.g., God, angel), spiritual/abstract (e.g., belief, revelation), and institutional/concrete (e.g., ritual, scripture).

This framework has some important theoretical parallels with previous research, both within and outside the domain of religion. Within the religious domain, research reveals that people may describe themselves as being religious, spiritual, or both (Zinnbauer and Pargament 2005). This same distinction between religion and spirituality emerges as two distinct aspects in the conceptual map. Moreover, institutional aspects of religion (i.e., the specific beliefs, rituals, and gatherings that appear in our institutional/concrete cluster) are often cited as a strong cultural force that binds people into moral communities and allows for large-scale cooperation with unrelated individuals (e.g., Haidt 2007; Henrich et al. 2010; Sosis and Alcorta 2003). The distinct cluster of religious agent concepts also fits in with a growing literature that has observed the importance of supernatural agency in religious thought, and their impact on human behavior

(e.g., Atran and Norenzayan 2004; Boyer 2001). That is, supernatural agents' concern for human morality, combined with special powers to monitor behavior and punish wrongdoing, likely played an important role in the evolution of large-scale cooperation (e.g., Bering and Johnson 2006; Norenzayan and Shariff 2008).

Interestingly, there also appears to be an important division between the concrete and abstract concepts that closely maps onto distinctions between institutional and spiritual words.[4] That is, some religious words appear to reflect relatively concrete objects (e.g., altar, scripture) or activities (e.g., communion, ritual) whereas other religious words reflect more abstract concepts (e.g., God, heaven). This has some parallels with construal level theory, which suggests that abstract versus concrete thinking can have divergent effects on people's thoughts and behaviors (Trope and Liberman 2010). For example, thinking abstractly can lead to reduced prejudice against out-groups, at least in part because it leads to a more open and fairness-oriented mindset (Luguri, Napier, and Dovidio 2012). An interesting possibility for further research thus relates to the concrete versus abstract mindsets that may be primed by different kinds of religious cognition, and their corresponding differential effects.

Of course, the present studies are not without limitations. Although we find evidence for three relatively distinct kinds of religious concepts, we do not directly demonstrate that these categories have different effects when used as religious primes. However, these findings do imply that these categories represent distinct forms of religious cognition that can differentially influence behavior when activated via priming techniques. For example, we expect that supernatural agent primes—relative to spiritual or institutional primes—are likely to be driving effects related to feelings of being watched (e.g., Gervais and Norenzayan 2012). On the other hand, we expect institutional primes to be more likely to activate a concrete mindset, make people more concerned for religious practice and one's in-group, and be primarily responsible for findings such as increased out-group derogation (e.g., Johnson, Rowatt, and LaBouff 2010). Finally, we would expect spiritual primes to activate a more abstract mindset and concerns for one's own relationship to the divine, perhaps increasing goals for personal purity or spiritual well-being (e.g., Preston and Ritter 2012). Indeed, some support for these competing predictions has already been found. For example, in a study of support for religious violence, Israelis reported more support for violent retaliation when asked about the frequency of synagogue attendance (an institutional/concrete component), but *less* support when asked about frequency of prayer (a relatively more spiritual/abstract component) (Ginges, Hansen, and Norenzayan 2009). In another study, priming participants with the word "God" caused increased cooperation with out-group members, whereas priming participants with the word "religion" caused increased cooperation with in-group members (Preston and Ritter in press; Preston, Ritter, and Hernandez 2010).

Although we have focused here on the use of words to manipulate religious cognition, researchers have manipulated religious cognition in a variety of different ways. We would expect the insights presented here to naturally extend to alternative methods as well. Examples include exposing people to a picture of the Pope or a church (Baldwin, Carrell, and Lopez 1990; Pichon and Saroglou 2009), reading stories about God (Bushman et al. 2007), asking explicit questions about prayer or religious attendance (Ginges, Hansen, and Norenzayan 2009), and recruiting people who happen to be passing by a religious building (LaBouff et al. 2011). Thus we would expect different effects after exposing participants to a picture of a church (an institutional/concrete prime) versus a picture of God (an agent/abstract prime). Along these same lines, some researchers have already begun to consider subtle distinctions between different kinds of God concepts, thus

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[4]Indeed, we found that a concrete versus abstract property vector fit the two-dimensional space similar to institutional versus spiritual in both Studies 1 and 2 (Study 1: Dimension 1 = −.31, Dimension 2 = −2.48, r = .92; Study 2: Dimension 1 = −2.11, Dimension 2 = −2.03, r = .95). We excluded this additional property vector from the figures to maintain clarity, but emphasize that there is no single "correct" interpretation of the spatial representations presented here.

highlighting the problems inherent to treating "God" as a single construct. For example, the effect of activating God concepts on temptation resistance depends on people's perception of God's omniscience (Laurin, Kay, and Fitzsimons 2012); anthropomorphic (vs. abstract/theological) concepts of God are associated with viewing violations of the Ten Commandments as more morally wrong (Morewedge and Clear 2008); and people are less likely to cheat if they view God as angry and punishing rather than loving and compassionate (Shariff and Norenzayan 2011). The present research complements these efforts, but represents the first in-depth investigation of the psychological distinctions among religious words that may be used to extend and clarify religious priming research.

It is important to note that while participants in these studies were able to distinguish between theoretically distinct dimensions of religious cognition, we do not suggest that these categories are completely unrelated. All of the words we investigated are clearly connected to religion in a broad sense, and therefore could be used to activate religious thoughts more generally. The problem we see with previous research manipulating religious cognition, however, is not a failure to activate general concepts of religion, but the inability to *interpret* its effect. What is "religious cognition"? We need to address this basic question before we can determine what is driving the effects of religious primes. Our findings here suggest that religious cognition is not a single construct. Rather, religious cognition is comprised of (at least) three distinct but interrelated kinds of concepts. Priming different aspects all together may activate religion broadly, but doing so conflates important conceptual distinctions. By disentangling different kinds of religious cognition and appreciating the contexts in which they occur, we become better equipped to understand the mechanisms underlying their effects. It is thus our hope that the categories of religious primes we find here will provide a framework to clarify existing paradoxes and yield important theoretical and methodological insights for experimental research.

Conclusion

A growing number of researchers are using priming methods to expose people to religious concepts and measure their effect on thoughts, feelings, and behaviors. Although this research has resulted in many interesting and important findings, the mechanism(s) underlying these effects remains largely unspecified. Part of this ambiguity has resulted from a failure to distinguish between different kinds of religious cognition. In two studies we found that participants make reliable psychological distinctions between three kinds of religious words: agents, spiritual/abstract, and institutional/concrete. As religious priming methods become more prevalent across the field of psychology, we hope these insights will be used to inspire, clarify, and advance future theory and research on religious cognition.

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SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article at the publisher's website:

Appendix. Proximity Matrices (Studies 1 and 2).