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Deity Representation: A Prototype Approach

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Summary

This research systematically evaluates via prototype analysis how conceptualizations of Western adult's monotheistic God are structured. Over 4 studies, using U.S. student and community samples of predominantly Christians, features of God are identified, feature centrality is documented, and centrality influence on cognition is evaluated. Studies 1 and 2 produced considerable overlap in feature frequency and centrality ratings across the samples, with "God is love" being the most frequently listed central feature. In Studies 3 (choice latency) and 4 (recall and recognition memory), the centrality of features influenced cognitive processes: central features were more quickly identified as features of God than peripheral features; were correctly recognized more often; and central features were correctly recalled more often than peripheral features. Results indicated that participants meaningfully judged centrality and that centrality affected cognition. Thus, the two criteria necessary for demonstrating deity representations adhere to a prototype structure were met. Implications and future directions are discussed.

Keywords

cognition – deity – features – prototype – representation

1   Introduction

The way we structure the content of knowledge influences our perceptions and behaviors (Solomon, 1999). Understanding the construction of a deity concept can give us insight into the cognitive processes that motivate and justify such diverse behaviors as helping to care for the less fortunate to misguided acts of violence in the name of God and religion. Social cognitive research on schemas has provided a theoretical framework for investigating cognitive representations of deities and has led to growth in the cognitive science of religion. Comprised of exemplars and prototypes, schemas are cognitive structures that represent knowledge about a concept including its attributes and the relations among those attributes that influence important cognitive functions such as attentional focus, memory encoding and retrieval, and decision-making processes (Baldwin, 1992; Fiske & Linville, 1980; Fiske & Taylor, 1991; Gardner, 1985; Taylor & Crocker, 1981). In essence, schemas help determine how we perceive and interact with the world, influencing how we think and what we do. Despite progress in work on religious schemas/concepts (Davis, Mauch, & Moriarty, 2013; McIntosh, 1995) and descriptive accounts of deity features of the Christian God (Lindeman, Pyysiainen, & Saariluoma, 2002), structured and systematic empirical investigations into the cognitive structure of deity representations are lacking (see Barrett, 2007). We therefore argue that an initial step in understanding religious and deity schema is to document a deity prototype; an anchoring and central component of a potentially overarching religious schema (Rosch, 1975).

2   Prototype Approach

Understanding the relationship between cognition and behavior begins with an examination of the structure and content of mental representations (Kintsch, 1988, 1998; Rosch, 1975). The way in which material is represented and stored in memory has profound influences on judgment making and problem solving processes (Kintsch, 1988; 1998; Rosch, 1975). One effective method of assessing the structure of a mental representation is through prototype analysis, which contrasts with the classical view of concepts.

The classical view of concepts is based on necessary and sufficient conditions. Category membership is an all-or-none phenomenon; any instance that meets the criteria is a member and all others are not. This implies that all members of a category are equally representative of the category. In contrast, Rosch (1975) argued that many natural language categories (languages of

ordinary, everyday use that have naturally developed as opposed to languages that are more formal or constructed such as used in computer programing or formal logic) do not conform to this view of concepts. Instead, Rosch suggested that concepts resemble a prototype; defined as a fuzzy collection of clustered features that determine category membership by possession of many central features of the prototype. Category membership is then determined by the extent of similarity (or likeness) to which an item or experience best represents the category (i.e., a prototype).

Thus, category members can be ordered in terms of their degree of similarity to the construct prototype. For example, something has a greater chance of being categorized as a bird if it is similar to a prototypical bird (e.g., a robin) than if it is similar to a non-prototypical exemplar (e.g., an ostrich). Accordingly, a prototypically organized concept has an internal structure in which some of its features are more strongly related with the concept than other features. Thus, the prototype approach differs from the classical approach as it involves tagging and marking central features rather than identifying necessary and/or sufficient features. Thus there are no all-or-none criteria, as not all instances of a concept are expected to share all of the features of the prototype.

Rosch (1975) specified two conditions that are necessary for a concept to manifest a prototype structure: (1) people must be able to identify its features and be able to reliably rate their centrality to the concept, and (2) the centrality of a feature should affect cognitive processes. These conditions provide a link between representational process and cognitions and behaviors (see examples in Kearns & Fincham, 2004; Lambert, Fincham, & Graham, 2011; Lambert, Graham, & Fincham, 2009). Thus, activation of a prototype leads to features closely associated with that prototype to be more easily accessible (in memory) than features that are not as closely associated (Cantor & Mischel, 1979). Activation of a God prototype in a memory task would make it difficult for individuals to distinguish between central features of God presented during an initial acquisition phase and other central features of God that were not presented during this phase but are still closely associated with the concept. In contrast, peripheral features would be expected to be more easily distinguished as they are less closely associated with the concept of God. Because central features should be more salient in memory than peripheral features, we can expect that individuals will correctly recognize and recall more central features of God. In addition, they should also be more likely to erroneously recognize and recall more central features. These predictions have been supported in prototype research involving memory recall and recognition tasks for other concepts (e.g., Fehr, 1988; Kearns & Fincham, 2004; Lambert et al., 2011).

3   Levels of Cognitive Processing

Although incomplete and lacking systematic empirical development, research on schemas and descriptors of deities has provided important measurement insights. Theoretical considerations derived from the fields of schema automation, attention, working memory, and cognitive load that have been applied to investigations of supernatural entities suggest that representations may vary according to the nature of the level of processing of the assessment task (Barrett, 1998, 1999; Barrett & Keil, 1996; Barrett & Van Orman, 1996; Cowan, 1988, 1995, 2010; Fougnie, 2008; Sweller, 1988, 1989, 1993). Assessments that allow deliberative processing are susceptible to social conformity and orthodoxy pressures (Barrett, 1998; Barrett & Keil, 1996; Jong, 2013). In fact, participants report more theologically consistent qualities of deities during a more explicit task (survey response) than during a more implicit task (reaction time tasks, see Jong, 2013, for review).

The above observations necessitate the use of assessments that supplement deliberate responses with more implicit, automatic ones (e.g., reaction time tasks) as the decision making processes that are elicited from these tasks access the underlying knowledge base of representations differently (see Barrett & Keil, 1996; Cohen, Shariff, & Hill, 2008). We applied these suggestions to generate testable hypotheses relating to the levels of cognitive processing to better understand the structure of deity representations. For example, the expectation that classification of central features are more accessible in memory as they are more closely associated with God, led us to hypothesize that central features will be more quickly identified as features of God than peripheral features.

4   Usefulness of the Layperson Perspective

There are an increasing number of studies that have examined cognitive properties of deity representations (see Barrett, 2011; Fincham, May, & Kamble, 2018), anthropomorphized aspects of deity representations (see Heiphetz, Lane, Waytz, & Young, 2016; Shtulman & Lindeman, 2016), or that include deity representation to examine its impact on various outcomes, ranging from prosociality through manuscript authorship to racial prejudice (Dijksterhuis, Preston, Wegner, & Aarts, 2008; Gervais, 2014; Johnson, Rowatt, & LaBouff, 2010; Shariff & Norenzayan, 2007). Knowing lay perspectives of God has great potential utility in this growing literature; for example, concern has arisen regarding

the reliability and boundary conditions of religious primes (see Shariff, Willard, Andersen, & Norenzayan, 2016) and the current studies will identify central deity features thereby potentially allowing consistency in methodology to increase when investigators seek to prime the deity. Finally, it is assumed in the literature on the cognitive science of religion that a supernatural agent such as the deity is not a unique domain of human experience (Xygalatas, 2016) and hence investigation of mental representation of the deity will potentially provide further evidence to support this assumption if it is shown that, like natural concepts, deity representation conforms to a prototype structure.

The most direct evidence we have that mental representations of deities are prototypically structured comes from Fincham et al. (2018). Over four studies, they provide evidence that representations of the divine in Hinduism are consistent with that of the prototype structure commonly found in the representation of natural objects. They also show that this structure can be used to identify boundary conditions pertaining to priming studies, therefore showing the utility for the identification of the prototype structure. The demonstration that representations of the divine in a polytheistic religion conform to a prototype structure is particularly noteworthy given the immense diversity found in Hinduism.

5 Research Overview

To progress beyond descriptive attempts at defining features associated with God(s) and Deities (Barrett, 1998; Lindeman et al., 2002) and examine the deity structure in a monotheistic religion, the current research extends the use of prototype analysis to evaluate how conceptualizations of a monotheistic God are structured. It serves to provide an understanding, for both laypersons and scientists, of the representational structure of God. This understanding will not only pertain to the features identified as central to deity representation but also to the impact cognitive processes have on the assessment and construction of the representation. This research gives rise to the following goals and research questions (RQ):

Goal 1—To determine the content and structure of deity representations via a prototype approach.

    RQ 1: Will individual differences arise among participants regarding features identified as characteristics of the deity?

    RQ 2: Will participants reliably rate the centrality of identified features?

Goal 2—To determine how prototype structure affects cognitive process.

> RQ 3: Will centrality ratings affect cognition in respect to a deity representation?
>
> RQ 4: Will varying levels of cognitive processing impact deity representations?

Studies 1 and 2 (addressing goal 1) examine feature frequency and feature centrality and use both U.S. undergraduate student (1a, 2a) and community adult (1b, 2b) samples of predominately Christian denomination. Studies 3 and 4 (addressing goal 2) examine how centrality of features influence cognitive processes for laboratory based cognitive tasks (binomial choice task, recall, and recognition memory task). Specific hypotheses are outlined later as each study is described.

6 Study 1a and 1b: Compilation of Deity Features

When investigating phenomena by means of a prototype approach, lists of features about the construct in question must be collected initially (e.g., Fehr, 1988; Fehr & Russell, 1984). Accordingly, Study 1 documents features that laypersons view as characteristic of God. Study 1a utilizes a sample of undergraduate students and Study 1b utilizes a community sample of adults. Participants were instructed to list, in a free-response format, features perceived to be characteristic of their conception of God. Relating to RQ 1, we expected discrepancies to occur (variability) between participants regarding features identified as characteristic of the deity.

7 Method

7.1 *Participants*
Prior to study participation, all participants gave informed consent as approved by the university institutional review board. The participant group for Study 1a was composed of 310 undergraduate students attending a large state university in the southeast region of the United States. Student participants were recruited through campus advertisements and from classrooms as an option for voluntary extra class credit. Participants reporting that they did not believe in the existence of God (atheism), were agnostic in their beliefs, or who identified with non-monotheistic religious affiliations (e.g., Hindu) were excluded from further data collection and analyses, leaving 273 participants

(M_{age} = 19.25 years, SD = 1.22, range 18-25, 87% female). Respondents self-identified as Caucasian (67%), Hispanic/Latino (14%), African American (12%), Asian (3%), Native American (1%), and Other (3%). Respondents indicated their religious affiliations to be Christian (91%), Jewish (6%), and Muslim (3%).

The participant group for Study 1b was composed of 92 adults sampled through Amazon's Mechanical Turk. Participants who reported belief in a monotheistic deity and were age > 18 were included in the sample (M_{age} = 31.99 years, SD = 9.63, range 18-70, 47% female). Respondents self-identified as Caucasian (70%), Hispanic/Latino (4%), African American (11%), Asian (9%), Native American (5%), and Other (1%). Respondents indicated their religious affiliation to be Christian (100%).

7.2   *Procedure*

Through use of an online survey, participants were asked via a prompt (adapted from Lambert et al., 2011) to list features of their deity in a free response format. Participants were shown the following prompt:

This is a study on the characteristics and attributes that people think of when they think of the word God. Imagine that you are explaining God to someone who has no knowledge or experience of God. Does God have certain traits? Does God usually act in certain ways? How does God make you feel? Please list characteristics that describe whatever or whoever you conceive God to be. These can be written as single words or descriptive phrases. Write whatever comes to mind. The things you list do not have to be similar. You might, for example, describe God somewhat differently in various situations. Include the obvious. However, try not to just free-associate. We're interested in the way you think about God.

After participants were shown the prompt, they were presented with blank text windows to list features.

8   Results and Discussion

A verbatim list of features was compiled for each sample. The total number of individual responses was 4,764 for sample 1a and 1,451 for sample 2a. To organize responses and group features into parsimonious linguistic units, a sorting procedure employed by Fehr (1988; see also Lambert et al., 2009; Rosenberg & Jones, 1972; Rosenberg & Sedlak 1972) was used. First, duplicate responses were eliminated followed by extraction of monoleximic items. Phrases or sentences were judged as to whether the phrase or sentence in question referenced only a single feature, or whether it could be divided (coded) into two or more

linguistic units (attributes). Features prefaced or followed by a simple modifier or a longer descriptive phrase were coded as a single feature (e.g., "Very understanding" coded as "Understanding", "He is a healer" coded as "Healer"). This resulted in 260 linguistic units for sample 1a and 171 for sample 1b.

Following the second step in Fehr's (1988) procedure, two research assistants independently placed linguistic units into attribute categories. Linguistic units were listed as the same attribute only in cases for which: (a) they were merely different as grammatical forms of the same word, or (b) they were judged to be similar or identical in meaning. Responses judged to be similar or identical in meaning were collapsed into one attribute category according to conservative standards (e.g., "Comforter", "Comforting", "Comfort" all coded as "Comforter"). Based on these criteria, 124 attribute categories were identified in sample 1a and 109 in sample 1b. Interrater reliability was indexed by Cohen's Kappa (which takes into account chance agreement by raters) and was demonstrated to be acceptable, K = .77 for sample 1a and K = .79 for sample 1b. Discrepancies occurring between coders were resolved by a third coder. Finally, idiosyncratic responses were excluded. Only features listed by at least two or more respondents were retained. Eighty-five deity features were retained for inclusion in sample 1a and 69 in sample 1b. The frequency scores of these features was computed and indexed by percentage of participant responses (See Table 1).

TABLE 1   Deity feature listings and centrality ratings for undergraduate student samples and community samples in Study 1 and 2

Undergraduate Deity Features	Respondents	Mean Centrality	*SD*	Community Deity Features	Respondents	Mean Centrality	*SD*
Love	96.37%	1.54	1.12	Love	63.04%	1.90	1.82
Forgiving	38.46%	1.63	1.22	All Powerful (omnipotent)	52.17%	2.47	2.10
All Knowing	33.33%	1.90	1.42	All Knowing	31.52%	2.43	2.11
All Powerful (omnipotent)	32.23%	1.94	1.52	Creator	29.35%	2.34	2.21
Protector	27.11%	1.89	1.44	Forgiving	27.17%	2.03	1.91
Holy	26.37%	1.99	1.64	Prayer	27.17%	2.22	1.87
Guidance	24.18%	1.77	1.37	Protector	26.09%	2.01	1.82
Savior	21.25%	1.94	1.43	Ruler	23.91%	2.36	1.99
Prayer	19.05%	2.29	1.56	Kind	22.83%	2.15	1.96
Father	18.68%	2.32	2.04	Good (Great)	20.56%	2.27	2.13
Helper	18.32%	1.98	1.28	Guidance	20.65%	2.10	1.89

TABLE 1   Deity feature listings and centrality ratings (*cont.*)

Undergraduate Deity Features	Respondents	Mean Centrality	SD	Community Deity Features	Respondents	Mean Centrality	SD
Kind	18.32%	2.03	1.47	Holy	19.57%	2.15	1.92
Almighty	17.95%	1.99	1.56	Peace	18.48%	2.03	1.75
Creator	17.22%	1.84	1.49	Eternal	16.30%	2.09	1.83
Jesus	17.22%	2.24	2.02	Everywhere (Omnipresent)	16.30%	2.44	2.19
Comforter	16.12%	2.13	1.46	Father	16.30%	2.44	1.94
Healer	16.12%	2.09	1.51	Awesome	14.13%	2.60	2.32
Strong	15.75%	1.99	1.50	Caring	14.13%	2.40	2.02
Peace	15.38%	1.79	1.25	Giving	14.13%	2.19	1.87
Perfect	15.02%	2.75	2.16	Helper	13.04%	2.28	1.96
Trust (Trustworthy)	15.02%	1.79	1.34	Healer	11.96%	2.41	2.05
Afterlife	13.55%	1.96	1.54	Jesus	11.96%	2.27	1.96
Faith (Faithful)	13.19%	1.85	1.33	Strong	11.96%	2.12	1.91
Life	13.19%	1.85	1.34	Trustworthy	11.96%	2.02	1.81
Amazing	12.82%	2.06	1.44	Compassionate	10.87%	2.46	2.21
Friend	12.09%	2.74	1.84	Merciful	10.87%	2.02	1.85
Hope	11.72%	1.76	1.28	Teacher	10.87%	2.14	1.86
Spiritual	11.72%	1.97	1.49	Friend	9.78%	2.21	1.98
Everywhere (Omnipresent)	11.36%	1.79	1.37	Hope	9.78%	2.11	1.89
Reliable	11.36%	1.97	1.42	Life	9.78%	2.14	1.90
Safe	10.99%	1.94	1.43	Perfect	9.78%	2.08	1.86
Good	10.62%	1.99	1.51	Judge	8.69%	3.01	2.39
Merciful	10.62%	1.93	1.43	Just/Fair	8.69%	2.23	1.97
Righteous	10.62%	2.16	1.64	Truth	8.69%	1.94	1.70
Understanding	10.62%	1.86	1.39	Only one (alone)	7.61%	5.38	2.67
Compassionate	9.52%	2.00	1.41	Accepting	6.52%	2.91	2.26
Eternal	9.52%	2.04	1.57	Comforter	6.52%	2.55	2.15
Just/Fair	9.16%	2.30	1.66	Destroyer	6.52%	3.54	1.99
Miracles	9.16%	1.85	1.36	Grace	6.52%	2.23	1.94
Mysterious	9.16%	3.91	1.97	Nature	6.52%	2.63	2.12
Patience	9.16%	1.90	1.38	Reliable	6.52%	2.41	1.97
Trinity	8.79%	2.51	1.92	Beautiful	5.43%	2.97	2.25
Happiness (Joy)	8.06%	2.04	1.44	Faith (Faithful)	5.43%	2.29	1.96

TABLE 1   Deity feature listings and centrality ratings (*cont.*)

Undergraduate Deity Features	Respondents	Mean Centrality	SD	Community Deity Features	Respondents	Mean Centrality	SD
Beautiful	6.96%	2.51	1.81	Holy Spirit	5.43%	2.33	1.93
Bible	6.96%	2.83	2.16	Soul	5.43%	3.15	1.98
Caring	6.96%	1.86	1.32	Supporting	5.43%	2.69	1.90
Grace	6.59%	2.09	1.60	Wise	5.43%	2.84	1.98
Male	6.59%	3.73	2.43	Bible	4.35%	2.71	2.21
Worship	6.59%	2.20	1.68	Communicates	4.35%	3.01	2.01
King	6.23%	2.55	2.05	Curse	4.35%	3.41	1.98
Holy Spirit	5.86%	2.16	1.79	Everything	4.35%	2.81	2.02
Lord	5.86%	2.09	1.79	Fulfilling	4.35%	2.13	1.78
Moral	5.49%	2.22	1.62	Moral	4.35%	2.23	1.82
Sacrifice	5.49%	2.21	1.79	Religion	4.35%	2.56	2.09
Humble	5.13%	2.05	1.53	Spiritual	4.35%	2.18	1.81
Jealous	5.13%	5.10	2.53	Trinity	4.35%	2.63	2.10
Judge	5.13%	3.86	1.95	Unchanging	4.35%	3.54	1.98
Alive	4.76%	2.33	1.84	Worship	4.35%	2.34	2.03
Belief	4.76%	1.86	1.29	Active	3.26%	2.58	1.96
Brave	4.76%	2.18	1.56	Afterlife	3.26%	2.50	2.06
Empowering	4.76%	2.06	1.41	Committed	3.26%	2.91	2.13
Light	4.76%	2.04	1.55	Entertaining	3.26%	3.85	2.01
Church	4.40%	3.15	2.19	Empowering	3.26%	2.47	1.85
Active	4.03%	2.23	1.42	Energy	3.26%	3.97	1.97
Teacher	4.03%	1.86	1.38	Freedom	3.26%	3.21	1.98
Angels	3.66%	2.31	1.67	Incomprehensible	3.26%	3.04	2.25
Glory	3.66%	2.12	1.66	Light	3.26%	2.34	2.11
Truth	3.66%	1.83	1.38	Patient	3.26%	2.13	1.78
Generous	3.30%	1.88	1.36	Understanding	3.26%	2.10	1.83
Infinite	3.30%	1.88	1.41				
Honest	2.93%	1.84	1.36				
Invisible	2.93%	3.43	2.17				
Selfless	2.93%	1.93	1.51				
Religion	2.56%	2.50	1.98				
Sin	2.56%	3.95	2.35				
Everything	2.20%	1.88	1.42				
Ruler	2.20%	2.53	1.93				
Fulfilling	1.83%	1.96	1.45				

TABLE 1   Deity feature listings and centrality ratings (*cont.*)

Undergraduate Deity Features	Respondents	Mean Centrality	*SD*	Community Deity Features	Respondents	Mean Centrality	*SD*
Listener	1.47%	1.98	1.49				
Sinless	1.47%	2.94	1.98				
Smart	1.47%	2.47	1.82				
Nature	1.10%	2.35	1.72				
No gender	1.10%	4.59	2.21				
Sovereign	1.10%	2.71	1.78				
Undeserving	1.10%	3.38	2.24				

In line with RQ 1 expectations, substantial variability was demonstrated between participants regarding features identified as characteristic of God. This feature variability is consistent with a prototypic structure as opposed to a classical conception based on necessary and sufficient features of a concept. Although no one feature was identified by all participants, "love" was identified as the most frequently endorsed feature representative of God in both samples with endorsement at 96% for student participants and 63% for community participants.

Furthermore, there appears to be substantial overlap in the endorsed items (4 out of the top 5 most highly endorsed features of the student sample appear in the top 5 items of the community sample). Additionally, while more unique features where listed for the student sample as opposed to the community sample (most likely a function of sample size differences, $n = 273$ vs. $n = 92$) and greater consensus in regards to "love" occurred in the student sample, the average amount of sample feature endorsement was almost identical (10.87% for the student sample and 11.53% in the community sample). By using both student and community samples we can have greater confidence in the representativeness of the features identified.

9   Study 2a and 2b: Centrality Ratings

In line with prototype analysis, in addition to participants having identified features as representative of a concept they must also make meaningful judgments about whether the features are central or peripheral to the concept. Furthermore, there must be considerable agreement regarding the centrality

judgments. Therefore, Study 2 identifies features rated as more central, or more peripheral to the concept of God and evaluates the agreement between raters of these judgments. Relating to RQ 2, we expect participants to reliably rate the centrality of identified features and produce a relationship between feature frequency and centrality rating.

10   Method

10.1   *Participants*

All participants gave their written informed consent prior to study participation as approved by the university's institutional review board. The participant group for Study 2a was composed of 395 undergraduate students attending a large state university in the southeast region of the United States. Student participants were recruited through campus advertisements and from classrooms as an option for voluntary class credit. Participants reporting disbelief in the existence of God (atheism), agnostic belief, or non-monotheistic religious affiliations (e.g., Hindu) were excluded from further data collection and analyses, leaving 338 participants remaining (M_{age} = 19.59 years, SD = 1.98, range 18-25, 89% female). Respondents self-identified as Caucasian (65%), Hispanic/Latino (17%), African American (11%), Asian (3%), Native American (1%), and Other (3%). Respondents indicated their religious affiliations to be Christian (92%), Jewish (7%), and Muslim (1%).

The participant group for Study 2b was composed of 113 adults sampled through Amazon's Mechanical Turk. Participants reporting belief in a monotheistic deity and age > 18 were included in sampling (M_{age} = 35.26 years, SD = 13.03, range 18-74, 57% female). Respondents self-identified as Caucasian (68%), Hispanic/Latino (6%), African American (9%), Asian (11%), Native American (1%), and Other (5%). Respondents indicated their religious affiliations to be Christian (100%).

10.2   *Procedure*

Using features identified in Study 1, participants were asked to rate features for their centrality presented in a randomized order. They were asked how well each feature characterized God using an 8 point scale (1 = very central/very important, 8 = not central/not important). Participants were shown the following prompt:

In a previous study, we asked people to tell us their views on God. Specifically, we asked them to "list the characteristics or attributes of God that come to mind." Below are the responses of some of the people in our earlier study. Please read

each of the descriptions of God below. After you have read each one, please rate
how central or important you think each of the features are to the concept of God.

11   Results and Discussion

Mean centrality ratings were computed for each feature and are displayed in
Table 1. To evaluate the reliability of the means an intraclass correlation coef-
ficient (ICC; which is equivalent to the mean of all possible split-half correla-
tions of the all the participants with respect to the features) was computed. An
additional analysis, based on a flipped data matrix and treating the features
as cases and the participants as items, was used to produce an index of the
internal consistency of the ratings (similar to Cronbach's alpha). Pearson cor-
relations evaluated the relationship between feature frequency and centrality.

Substantial evidence regarding the reliability of these means was indicated
with a strong ICC value (.93, $p < .001$ in sample 2a, .91, $p < .001$ in sample 2a) and
high internal consistency of the ratings from the flipped data matrix ($\alpha = .97$
in sample 2a, $\alpha = .95$ in sample 2b). Evaluation of the relationship between the
mean centrality ratings with the frequencies from Study 1 indicated a positive
relationship in both samples ($r = .32$, $p = .003$ in sample 2a; $r = .34$, $p = .005$).

Supporting the prediction relating to RQ 2, the current findings indicate
that participants from both samples a) identified certain features as more
prototypical of God than others b) agreed on these ratings (reliably rated the
centrality of features) and c) produced a relationship between feature frequen-
cy and centrality rating. These findings fulfill the first condition Rosch (1975)
identified as necessary for a concept to display a prototype structure; identifi-
cation of concept features and the reliable rating of feature centrality.

12   Study 3a and 3b: Binomial Choice Task

As specified by Rosch (1975), the second condition necessary for a concept to
display a prototype structure is that feature centrality should affect how one
thinks about the concept (i.e., cognitive processes). Accordingly, Studies 3
and 4 examine how feature centrality affects thinking about God. Specifically,
Study 3 applies another modality of assessment (reaction time) to examine if
deities are prototypically structured and influence cognition. As discussed ear-
lier, assessment tasks that rely on deliberative processing (survey responses)
are more susceptible to social conformity and orthodoxy pressures. Reaction
time tasks therefore help to supplement explicit, deliberative responses with

more implicit, automatic ones to more clearly elicit decision making processes that access the underlying knowledge base of representations and are therefore less biased by social pressures and orthodoxy (Barrett & Keil, 1996; Cohen et al., 2008).

Study 3 therefore seeks to examine subconscious associations on the endorsement of features central to deity prototype structure. Through a reaction time paradigm, this study evaluates RQ 3 (the influence of centrality ratings on cognition) and RQ 4 (the impact of varying levels of cognition through explicit [feature endorsement] and implicit [reaction time] processing). In Study 3, participants engaged in a reaction time task presented via a computer in which they categorized central and peripherals features as either characteristic of God or not (yes/no). It was expected that feature endorsement would correspond to findings established in Study 2, with central features being more likely to be endorsed as representative of God than peripheral features. Additionally, with the expectation that classification of central features are more accessible in memory as they are more closely associated with God, central features will be more quickly identified (less response latency) as features of God than peripheral features. Study 3 was conducted with two separate samples: sample 3a was used as an initial study sample and sample 3b was used as a replication study sample.

13   Method

13.1   *Participants*
Participants gave written consent prior to study participation as approved by the university's institutional review board. Students were recruited from classrooms and completed the study as one means of obtaining a small amount of extra class credit. For Studies 3a and 3b the samples comprised 96 and 94 undergraduate students, respectively. Sampling of $n = 90$ was sufficient to achieve power of .80 assuming an alpha of .05 and an effect size based on meta-analytic findings of previous religious priming research (moderately sized effect of $g = 0.40$; Shariff et al., 2016). Again, participants who did not believe in the existence of God (atheists), reported agnostic beliefs, or identified with non-monotheistic religions (e.g., Hindu) were excluded from further data collection and analyses. For sample 3a, exclusion criteria resulted in 90 remaining participants ($M_{age} = 19.48$ years, $SD = 1.45$, range 18-25, 93% female). Respondents self-identified as Caucasian (71%), Hispanic/Latino (11%), African American (10%), Asian (2%), Native American (1%), and Other (5%). Respondents indicated their religious affiliations to be Christian (91%), Jewish (8%), and Muslim (1%).

For sample 3b, exclusion criteria resulted in 90 remaining participants (M_{age} = 20.11 years, SD = 1.32, range 18-25, 96% female). Respondents self-identified as Caucasian (73%), Hispanic/Latino (13%), African American (9%), Asian (1%), Native American (1%), and Other (3%). Respondents indicated their religious affiliations to be Christian (89%), Jewish (10%), and Muslim (1%).

13.2   *Measures*

Participants engaged in a binomial choice (yes/no) reaction time task presented via a computer in which they categorized central and peripheral features as either characteristic of God or not via DirectRT software. Additionally, three control conditions were included in the feature categorization task: a positive feature category, a negative feature category, and a normed feature category. The control condition used frequency normed words demonstrated to occur approximately as frequently in conversational language as religiously related words such as "God", "religion", "faith", and "prayer" (Davies & Gardner, 2010). Previous testing by the first author has demonstrated that the normed positive and negative words have non-significant priming and non-associative influences with religious imagery during lexical decision tasks in over 30,000 trials using 1024 participants.

In this study we used the centrality ratings established in Study 2a and classified features as either central (higher centrality rating) or peripheral according to a median split. Then 20 central features and 20 peripheral features were randomly selected for use. Positive control features included: joy, humor, laughter, champion, friendly, affection, mother, win, cash, comedy, fun, romantic, victory, success. Negative control features included: depressed, slave, abuse, tragedy, failure, grief, poverty, death, sad, unhappy, murderer, cancer, rejected, and funeral. Normed control features included: idea, pride, famous, game, ambition, and interest. Following the precedent of Lambert et al. (2009), we compared a group of features with higher versus lower mean centrality (which facilitates use of analysis of variance) but must acknowledge that such a division of centrality is artificial and that centrality is continuous rather than dichotomous.

13.3   *Procedure*

Participants were instructed that their task was to make a yes or no decision, as fast and as accurately as possible, as to whether or not the word that appeared on the computer screen is a descriptor of their personal understanding of God. After practice trials, the feature (central, peripheral, control positive, control negative, or control normed) was presented for 2 seconds. After a response was given, a masking screen appeared before allowing the participant to continue to the next trial. All words from each feature category (central,

peripheral, control positive, control negative, control normed) were presented to every participant (within subject) in randomized order.

As there is a demonstrated curvilinear relationship between religiousness and accessibility of religious beliefs (Cohen et al., 2008), religiousness was assessed. To avoid any priming effect religiousness was assessed 15 minutes after the binomial reaction time task following completion of an unrelated filler task (reading a neutral passage of prose which participants rated on interest level). Religiousness was measured with the 9-item religiousness scale used in previous reaction time research (Cohen et al., 2008). Responses range from 1 (strongly disagree) to 5 (strongly agree) with composite scores ranging from 9 to 45. Sample items include: "My personal religious beliefs are very important to me", "I practice the requirements of my religion or faith." Cronbach alpha was .96 in sample 3a and .97 in sample 3b. Religiousness scores in sample 3a (M = 30.95, SD = 9.66) and sample 3b (M = 28.99, SD = 7.97) were included as a covariate in statistical analyses.

14   Results and Discussion

Descriptive statistics of mean response latency for feature categorization per study condition as well as average frequency of dichotomous categorization for sample 3a and 3b are displayed in Table 2. Chi-square test(s) of independence with follow-up contrast cell comparisons were used to evaluate differences in the frequency of deity feature endorsement per study condition. Contrasts were calculated with adjust critical values ($\sqrt{x^2}$ of omnibus x^2 analysis) as per Sharpe (2015).

An omnibus chi-square test of independence indicated a significant difference in the frequency of endorsement of features as being representative of a deity (or not) for both samples, x^2 (4) = 139.74, p < .001 in sample 3a and x^2 (4) = 93.30, p < .001 in sample 3b. Follow-up chi-square cell contrast comparisons indicate central features to be endorsed as more representative of a deity than peripheral, control positive, control negative, or control normed features in both samples (all p_s < .05, critical value x^2 = 3.08).

A repeated measures ANCOVA was conducted to examine whether reaction times varied as a function of feature category (central, peripheral, control positive, control negative, or control normed) with religiousness used as a covariate. Averaged reaction time values were calculated (summation of feature category items' reaction times divided by number of feature items in category) for each feature category. Preliminary analysis via Mauchly's test indicated the assumption of sphericity was not met (p < .05), thus we report

TABLE 2   Descriptive statistics of mean response latency for feature categorization per fea-
ture condition and percentage of dichotomous categorization for sample 3a and 3b

Study 3a	Response Latency		Mean Frequency Endorsed		% Endorsed as Deity Feature
	Mean	SD	Yes	No	
Central	952.21	585.47	84.55	5.45	93.94
Peripheral	1263.72	374.10	46.85	43.15	52.06
Positive	1040.14	256.93	55.64	34.36	61.82
Negative	1120.81	345.66	6.93	83.07	7.70
Normed	1116.87	310.00	51.33	38.67	57.03
$n = 90$					
Study 3b					
	Mean	SD	Yes	No	
Central	985.73	349.70	79.15	10.85	87.94
Peripheral	1295.96	434.18	44.30	45.70	49.22
Positive	1125.40	393.46	56.07	33.93	62.30
Negative	1198.36	415.56	16.14	73.86	17.93
Normed	1284.82	599.09	52.83	37.17	58.70
$n = 90$					

the Greenhouse-Geisser epsilon correction (.466 in sample 3a, .773 in sample 3b). Controlling for religiousness, repeated measures ANCOVA demonstrated a significant difference in study conditions for both samples, $F(4, 148) = 16.84$, $p < .001$, partial eta^2 = .448 in sample 3a and $F(4, 272) = 30.63$, $p < .001$, partial eta^2 = .588 in sample 3b. However, religiousness was not a significant covariate in either sample, $F(4, 148) = 1.32$, $p < .265$, partial η^2 = .016 in sample 3a and in $F(4, 272) = 1.27$, $p < .265$, partial η^2 = .016 in sample 3b. Follow up post-test comparisons using Bonferroni corrections for sample 3a indicated central features were categorized significantly faster than peripheral features ($p < .001$, Cohen's $d = -.634$), but response latency did not differ in comparison to positive feature ($p = .999$, Cohen's $d = -.194$), negative features ($p = .078$, Cohen's $d = -.349$), or normed features ($p = .142$, Cohen's $d = -.350$). In sample 3b, follow up post-test comparisons using Bonferroni corrections again indicated central features were categorized faster than peripheral features ($p < .001$, Cohen's $d = -.787$), as

well as positive features (p <.001, Cohen's d = -.377), negative features (p <.001, Cohen's d = -.555), and normed features (p <.001, Cohen's d = -.610).

These findings provide support for Rosch's (1975) second criterion for establishing that the mental representation of God is consistent with a prototypical structure; demonstrating that centrality influences how one thinks about the concept (i.e., influence on cognitive processes) thus supporting RQ 3 and RQ 4. First, findings indicated that features classified as central and peripheral in Study 2 were indeed classified according to expectations in two independent samples: central features were viewed as more representative features of God than peripheral features. Second, and relating to the influence on cognitive processes, response time latency demonstrated that features classified as central were endorsed as more representative of God *faster* than features classified as peripheral and control conditions (especially in the replication study).

This study supplemented deliberative questions with reaction time data as varying levels of cognition (mental representation and decision making at explicit and implicit levels) were assessed. As these reaction time findings are more implicit by nature they help reveal more subconscious associations which suggest that mental representation of God is prototypically structured at deeper levels of cognition. Also of note is the lack of importance religiousness had on the latency findings as well as the robustness of these findings as demonstrated by the replication study.

15   Study 4: Recall and Recognition Memory Sentence Completion Tasks

As in Study 3, Study 4 examines how feature centrality affects thinking about God. Specifically, Study 4 utilizes a sentence completion task to examine recall and recognition memory to evaluate RQ 3. In this study participants viewed a series of central and peripheral deity statements presented sequentially on a computer screen (acquisition task) followed by a distractor task and then a recognition sentence completion task ("God is ____", e.g., forgiving) asking them whether they had seen the statement during the acquisition phase.

Based upon prototype theory (Rosch, 1975), if deities are prototypically structured, we expect the content of this structure to affect cognition (i.e., recall and recognition). In line with prototype theory, we predict that for recall 1) central deity features would be correctly recalled more often than would peripheral deity features and 2) central deity features that had not been presented during the acquisition phase would be falsely recalled more often than would peripheral deity features. Regarding recognition, we predict that

for the presented items, 1) central deity features would be correctly recognized more often than would peripheral deity features and that 2) that central deity features that were not presented during the acquisition phase would be falsely recognized more often than would peripheral deity features.

16   Method

16.1   *Participants*

All participants gave their written consent prior to study participation as approved by the university's institutional review board. The sample comprised 97 undergraduate students attending a large state university in the southeast region of the United States. Student participants were recruited from classrooms as an option for voluntary extra class credit. As in previous studies, participants reporting atheist or agnostic beliefs or who identified with non-monotheistic religious affiliations (e.g., Hindu) were excluded from further data collection and analyses, leaving 90 participants (M_{age} = 19.54 years, SD = 1.17, range 18-25, 95% female). Respondents identified as Caucasian (72%), Hispanic/Latino (11%), African American (10%), Asian (2%), Native American (1%), and Other (4%). Self-identified religious affiliations were Christian (92%), Jewish (7%), and Muslim (1%).

16.2   *Method*

Participants completed an acquisition task followed by a recall and recognition sentence completion task (adapted with modification from Kearns & Fincham, 2004). Recall and recognition tasks were conducted within-subjects.

16.2.1   Acquisition Task

Participants viewed a series of God statements (acquisition phase) presented sequentially on a computer screen. They were instructed to pay attention to the statements as they would later be asked questions about them. Each statement ("God is ____", e.g., forgiving) was constructed by randomly selecting 20 peripheral features and 20 central features obtained in Study 2. Statements were randomly divided into two groups with each comprising 10 central and 10 peripheral statements. Half of the participants received one set of 20 statements (Group 1) and the other half received a different set of 20 statements (Group 2). Each group viewed the statements (4 seconds each) in a different random order. After viewing the statements, participants engaged in a short (4 minute) interference task (listing in alphabetical order as many states in the United States as possible).

16.2.2   Recall Task

Following acquisition, participants were instructed to recall, in 3 minutes, as many of the statements as possible. Three judges coded participant responses. No cases occurred where judges disagreed on response items. Items not corresponding to the deity prototype materials were scored as incorrect responses. The number of correctly recalled central and peripheral features as well as the number of incorrectly recalled central and peripheral features were computed resulting in four scores for each participant.

16.2.3   Recognition Task

Following recall and a distractor task (list as many countries in the world for 4 minutes), each participant was presented with a set of 40 statements. The statements consisted of 20 statements that the participant had viewed during the acquisition phase as well as the 20 statements that had been presented to the other half of the participants. The participant was instructed to indicate whether they had seen the statement during the acquisition segment. The full feature list was portrayed in order to ensure measurement of recognition and not recall.

17   Results and Discussion

To examine if recall and recognition memory ratings varied as a function of attribute centrality (central or peripheral) a mixed factorial ANCOVAS was conducted, with group (A or B) as a between subjects variable and centrality condition as the within subjects variable. Religiousness (M = 33.18, SD = 7.64) served as a covariate in the analyses.

17.1   *Recall Memory*

The first prediction was that central features would be correctly recalled more often than peripheral features. This prediction was supported as participants correctly recalled an average of 4.54 (SD = 1.95) out of 10 central features as opposed to an average of 3.61 (SD = 1.73) peripheral features, $F(1, 87)$ = 11.70, $p < .001$, partial eta^2 = .060. The second prediction was that central features that had not been presented during the acquisition task would be erroneously recalled to a greater extent than would peripheral features. This prediction was also supported with an average of 2.20 (SD = 1.11) central features falsely recalled as opposed to an average of 1.37 (SD = 0.96) peripheral features, $F(1, 87)$ = 30.29, $p < .001$, partial eta^2 = .141. There were no other significant main

effects or interactions, nor was religiousness found to be a significant covariate ($p < .05$).

17.2   *Recognition Memory*

The first prediction was that for presented features, central features would be correctly recognized more than peripheral features. This prediction was supported as an average of 7.83 ($SD = 1.85$) out of 10 central features were correctly recognized in comparison to an average of 7.30 (1.67) peripheral features, $F(1, 87) = 3.99$, $p = .049$, partial eta^2 = .025. The second prediction for recall memory was that central features that were not presented during the acquisition task would be falsely recognized more often than peripheral features. Again this prediction was confirmed with an average of 4.48 ($SD = 2.30$) out of 10 central features being falsely recognized as opposed to an average of 1.19 ($SD = 1.73$) peripheral features, $F(1, 87) = 110.29$, $p < .001$, partial eta^2 = .399. As with the recall scores, there were no other significant main effects or interactions, nor was religiousness found to be a significant covariate ($p < .05$) for recognition memory scores.

The main findings of this study demonstrate that the centrality of God features influence cognition in respect to God thus fulfilling the criteria necessary for demonstrating that God is prototypically organized. All given predictions were supported as central features were correctly recognized/recalled more often than peripheral features and central features that were not presented during the acquisition phase were falsely recognized/recalled more often than peripheral ones.

18   **General Discussion**

The overall goal of the current studies was to examine the content and structure of layperson perspectives of the concept of a Western monotheistic God from data reported from predominantly U.S. Christians to determine whether they are amenable to a prototype analysis. If so, this would provide further data to support the assumption that the mental representation of a supernatural agent, the deity, is not a unique domain of human existence but conforms to that of the representation of everyday, natural (ordinary) language concepts. Study 1 produced considerable overlap in feature frequency listings from student and community samples, with "love" being the most frequently listed characteristic of God. Study 2 showed that laypersons are able to reliably rate feature centrality. These feature centrality ratings were then used to identify central and peripheral features of God which differentially influenced

cognition in Studies 3 and 4. Adhering to prototype analysis predictions, central features were more quickly identified (via response time latency) as characteristics of God than peripheral features, central features were correctly recalled/recognized more often than peripheral features, and central features that were not presented during acquisition were falsely recalled/recognized more often than peripheral features. Overall, the results converged to indicate that participants found it meaningful to judge deity features in terms of their centrality and that centrality affected cognition (e.g., accessibility and memory). Thus the two criteria necessary for demonstrating deity representations adhere to a prototype structure were met.

In contrast to the classical view of concept definition, this research suggests prototype theory to be a superior alternative approach to understanding deity representation. Whereas the classical view proposes category membership to be an all-or-nothing phenomenon (e.g., all members of a category are equally represented in regard to feature endorsement), prototype theory proposes that if a concept is prototypically organized it has an internal cognitive structure in which some features are more strongly associated with the concept than are other features. Prototype theory also diverges from the classical view in that it involves identification of central features (that vary in strength of association) rather than critical features (which are necessarily required features). Thus for prototype theory, this suggests that not all instances of a God concept are expected to share all of the features of the prototype.

Although these competing theories allow for testable predictions regarding the internal structure of mental representations, advocating a prototype approach for a God concept comes with caveats and important qualifications. First, it should be noted that although prototype theory suggests variability regarding what features to include/exclude in terms of a layperson's definition of God, we do not suggest that God cannot be defined. Furthermore, we do not propose that layperson conceptions need to correspond directly to experts' conceptions. Finally, we are also not proposing that the scientific study of God must rely on layperson conceptions to most accurately understand the concept of God. Instead, we contend that the use of theories regarding the internal structure of mental representations, such as prototype theory, can help to better advance the scientific study of God.

In regarding prior work on God representations, the present findings correspond well with the prototype findings of Hinduism in Fincham et al. (2018). The present research and that of Fincham et al. contrasted prototype theory with the classical view of concept definition in regard to laypersons perspectives of higher powers; Western adults' concept of a monotheistic God in this research and Eastern adults' concept of polytheistic God(s) in Fincham et al.

(2018). For example, both report that in regard to feature centrality, the most central deity attribute in both student and community samples was "love". In addition, in comparing the top 20 features/attributes found in the current research and that of Fincham et al. (2018), there is over 50% overlap in the attributes reported. The comparative findings suggest that cognitive representation of the divine for both mono and polytheistic religions are consistent with that of the prototype structure commonly found in the representation of natural objects. Furthermore, in both this research and that of Fincham et al. (2018), the feature frequency documentation and feature centrality findings across all the samples (student and community) show that "God is love" as the most frequently listed feature and most central feature. This evidence provides a compelling case that thinking about supernatural agents does not represent a unique domain of human experience but instead reflects a potential core component of human cognition. A potentially interesting avenue for future deity research would be to compare the fuzzy boundary conditions of category membership of prototype theory to the all-or-nothing category membership criteria of the classical perspective of concept definition in more conservative groups in Abrahamic religions (e.g., Evangelicals in Christianity, Wahhabis in Islam, Chassidim in Judaism). A more theologically constrained belief in God from a more conservative religious base might result in a deity concept that has less variability and contains attributes/features that are necessary for deity endorsement (i.e., the all-or-nothing claim of the classical view of category membership). This projected finding would then contrast with prototype theory (i.e., falsifying prototype theory) and better support a classical view of concept definition.

The present findings also have the potential to address inconsistent findings obtained in studies that prime religion (Shariff et al., 2016). In previous studies priming God it is quite possible that features that differ in centrality occur across studies resulting in differential potency of the prime used and hence potentially the inconsistent findings. The present research can address this issue because it identifies the most central features of the deity which can be used to allow priming of the deity in a way that is more reliable and uniform across studies. The same suggestion of incorporating use of feature centrality may also apply for future research examining the relationship between deity features or representations and outcomes pertaining to satisfaction with life (Zahl & Gibson, 2012), cheating behaviors (Shariff & Norenzayan, 2011), and a host of other positive and negative social attitudes and behaviors (for example, see the work being done by Johnson, Li, Cohen, & Okun, 2013; and Johnson, Okun, Cohen, Sharp, & Hook, 2018).

This research also moves beyond previous prototype analysis approaches (e.g., gratitude, prayer, forgiveness) by attempting to examine varying levels of cognition via a reaction time research paradigm. In using response latency the present research taps into nonconscious cognition (automatic processing) in a manner that is not found in prior prototype analyses of concepts related to religion. The reaction time findings suggest that a deity prototype may exist or be reported (to a certain extent) independently of social conformity and orthodoxy pressures manifested in conscious cognition (controlled processing). However, considerable additional research is necessary to understand fully how deeply centrality influences cognitive processes. Existing theoretical and empirical work in cognitive science provides a guide to possible future fruitful endeavors in this domain. For instance, research on anthropomorphized deity traits might adapt the concept of centrality to their research paradigms and evaluate how psychological vs. physiological anthropomorphic traits differ in associative strength (Shtulman & Lindeman, 2016). In regard to the influence of deity representation on cognition, the effect of visual and audio priming, the degree of cognitive resource allocation (e.g., cognitive load; see Barrett, 1998, 1999; Barrett & Keil, 1996; Barrett & Van Orman, 1996) and further analysis of the effect of level of cognitive processing of the assessment task (i.e., implicit vs. explicit tasks) appear ripe for exploration.

As an example, research in decision making informs us that tasks requiring little cognitive effort potentially engage more rational (algorithmic) decision making mechanisms than tasks under greater cognitive demands (e.g., heuristic mechanisms; degree of cognitive resource allocation and load; see Barrett, 1999; Cowan, 2010). Extrapolating these findings to deity representation research, one could with justification predict that greater cognitive demands during the assessment of a deity representation may produce more automatic responses that are less socially biased as well as fewer, although more salient, core prototype features. Thus, a multitude of research possibilities exist within the field of deity representation research through synthesis with cognitive science.

In turning to pursue these exciting research possibilities it will be important to bear in mind that (a) the nature of schemas and prototypes are conditional on prior knowledge, (b) situational factors place constrictions on their content, and (c) access to this knowledge influences the quantity and quality of deity representation (Barrett, 2007). Factors such as age, family dynamics, and culture place constraints and set limitations on the content that is available to form the structure of deity representation. For example, children, having a less comprehensive knowledge base report deity features that differ in both

quantity (less features and behaviors) as well as quality (less anthropomorphized features of God) from those of older children and adults (Heller, 1986; however for a comprehensive review to the contrary, see Heiphetz et al., 2016). Furthermore, the importance that culture plays in constraining and informing the structure and content of conceptualizations of deities is highlighted in what Barrett (1998) contends are the two leading theories of divine beings and religious concepts: Guthrie's (1993) perceptual schema theory and Boyer's (1994) cognitive optimum theory. Guthrie's (1993) perceptual schema theory emphasizes the anthropomorphization of deity features from humanistic qualities embedded and derived within one's cultural norms (i.e., importance of procreation, forgiveness, gender equality). Although Boyer's (1994) cognitive optimum theory contends that religious concepts possess features that are mainly anthropomorphic and culturally specific, they also possess a few salient, non-normative anthropomorphic features that enhance the probability of the concept being remembered and passed on (i.e., invisible, immortal, omnipotent). In this regard it is interesting to note the similarity of reported attributes of deity representations of the current monotheist research and the polytheistic Hinduism in Fincham et al. (2018) as Hindu-Indian individuals commonly worship both individualized family ancestors and communal gods that may not even exist or be known to other Hindus; practices of individualism that are absent from Christianity (Mullatti, 1995). Thus, in totality, the lack of measurement of the family structure and the presence of cultural/religious variation in the current data (including measurement of the non-religious or those of atheistic belief or that of differing regions within the US) are limitations for the current research.

Importantly, a prototype analysis of the layperson conception of God provides a strong foundational understanding of the features and attributes comprising the cognitive representation of a deity. This understanding is vital for theoretical development and practical implication. It allows research to further elaborate on how both deliberate as well as automatic cognitive processes work to structure and modify deity representations. Furthermore, identification of deity features provides a foundation for understanding, from a cognitive science perspective, the intergenerational transmission of deity representation and has the potential also to inform our knowledge of religious and cultural variations in conceptions of the deity. Finally, and potentially of most interest to applied researchers and policy makers, a clearer understanding of the features comprising the concept of God and the cognitive process they influence highlight prospective outcomes that may be influenced by modifications to these representations (e.g., prosociality, attribution of authorship and action, moral judgments, and behaviors).

19   Funding Note

References

Baldwin, M. W. (1992). Relational schemas and the processing of social information. *Psychological Bulletin*, *112*(3), 461-484.

Barrett, J. L. (1998). Cognitive constraints on Hindu concepts of the divine. *Journal for the Scientific Study of Religion*, *37*, 608-619.

Barrett, J. L. (1999). Theological correctness: Cognitive constrain and the study of religion. *Method and Theory in the Study of Religion*, *11*, 325-339.

Barrett, J. L. (2007). Cognitive science of religion: What is it and why is it? *Religion Compass*, *1*, 768-786. doi:10.1111/j.1749–8171.2007.00042.x.

Barrett, J. L. (2011). *Cognitive science, religion, and theology: From human minds to divine minds*. Philadelphia: Templeton Press.

Barrett, J. L., & Keil, F. C. (1996). Conceptualizing a nonnatural entity: Anthropomorphism in God concepts. *Cognitive Psychology*, *31*, 219-247. doi:10.1006/cogp.1996.0017.

Barrett, J. L., & Van Orman, B. (1996). The effects of image use in worship on God concepts. *Journal of Psychology and Christianity*, *15*(1), 38-45.

Boyer, P. (1994). *The naturalness of religious ideas*. Los Angeles/Berkeley: University of California Press.

Cantor, N., & Mischel, W. (1979). Prototypicality and personality: Effects on free recall and personality impressions. *Journal of Research in Personality*, *13*(2), 187-205.

Cohen, A. B., Shariff, A. F., & Hill, P. C. (2008). The accessibility of religious beliefs. *Journal of Research in Personality*, *42*, 1408-1417.

Cowan, N. (1988). Evolving conceptions of memory storage, selective attention, and their mutual constraints within the human information processing system. *Psychological Bulletin*, *104*, 163-191.

Cowan, N. (1995). Memory theories from A to Z. *Contemporary Psychology*, *40*, 552-555.

Cowan, N. (2010). The magical mystery four: How is working memory capacity limited and why? *Current Directions in Psychological Science*, *19*, 51-57.

Davies, M., & Gardner, D. (2010). *A frequency dictionary of American English: Word sketches, collocates, and thematic lists*. Routledge.

Davis, E. B., Mauch, J. C., & Moriarty, G. L. (2013). God images and God concepts: Definitions, development, and dynamics. *Psychology of Religion and Spirituality*, *5*(1), 51-60.

Dijksterhuis, A., Preston, J., Wegner, D. M., & Aarts, H. (2008). Effects of subliminal priming of self and God on self-attribution of authorship for events. *Journal of Experimental Social Psychology 44*, 2-9.

Fehr, B. (1988). Prototype analysis of the concepts of love and commitment. *Journal of Personality and Social Psychology*, *55*, 557-579.

Fehr, B., & Russell, J. A. (1984). Concept of emotion viewed from a prototype perspective. *Journal of Experimental Psychology: General*, *113*, 464-486.

Fincham, F. D., May, R. W., & Kamble, S. V. (2018). Are Hindu representations of the divine prototypically structured? *Psychology of Religion and Spirituality*. Advance online publication. http://dx.doi.org/10.1037/rel0000166.

Fiske, S. T., & Linville, P. W. (1980). What does the schema concept buy us? *Symposium on Social Knowing, Personality and Social Psychology Bulletin*, *6*, 543-557.

Fiske, S. T., & Taylor, S. E. (1991). *Social Cognition* (2nd ed). New York, NY: McGraw-Hill.

Fougnie, D. (2008). The relationship between attention and working memory. In N. B. Johansen (Ed.), *New research on short-term memory* (pp. 1-45). New York: Nova Science Publishers.

Gardner, R. C. (1985). *Social psychology and second language learning: The role of attitudes and motivation.* London, GB: Edward Arnold.

Gervais, W. M. (2014). Good for God? Religious motivation reduces perceived responsibility for and morality of good deeds. *Journal of Experimental Psychology: General*, *143*(4), 1616-1626. http://dx.doi.org/10.1037/a0036678.

Guthrie, S. E. (1993). *Faces in the clouds: A new theory of religion.* New York: Oxford University Press.

Heiphetz, L., Lane, J. D., Waytz, A., & Young, L. (2016). How children and adults represent God's mind. *Cognitive Science*, *40*, 121-144. doi:10.1111/cogs.12232.

Heller, D. I. (1986). *The children's god.* Chicago: University of Chicago Press.

Johnson, K. A., Li, Y. J., Cohen, A. B., & Okun, M. A. (2013). Friends in high places: The influence of authoritarian and benevolent God-concepts on social attitudes and behaviors. *Psychology of Religion and Spirituality*, *5*, 15-22. doi:10.1037/a0030138.

Johnson, M. K., Rowatt, W. C., & LaBouff, J. (2010). Priming Christian religious concepts increases racial prejudice. *Social Psychological and Personality Science*, 1, 119-126.

Johnson, K. A., Okun, M. A., Cohen, A. B., Sharp, C. A., & Hook, J. N. (2018). Development and validation of the five-factor LAMBI measure of God representations. Advance online publication. doi: http://dx.doi.org/10.1037/rel0000207.

Jong, J. (2013). Implicit measures in the experimental psychology of religion. In G. Dawes & J. Maclaurin (Ed.), *A new science of religion* (pp. 65-78). New York, NY: Routledge.

Kearns, J. N., & Fincham, F. D. (2004). A prototype analysis of forgiveness. *Personality and Social Psychology Bulletin*, *30*, 838-855.

Kintsch, W. (1988). The role of knowledge in discourse comprehension: A construction-integration model. *Psychological Review*, *95*, 163-182.

Kintsch, W. (1998). *Comprehension: A paradigm for cognition.* New York, NY: Cambridge University Press.

Lambert, N. M., Fincham, F. D., & Graham, S. M. (2011). Understanding the layperson's perception of prayer: A prototype analysis of prayer. *Psychology of Religion and Spirituality*, *3*, 55-65. doi:10.1037/a0021596.

Lambert, N. L., Graham, S., & Fincham, F. D. (2009). A prototype analysis of gratitude: Varieties of gratitude experiences. *Personality and Social Psychology Bulletin*, *35*, 1193-1207.

Lindeman, M., Pysiainen, I., & Saariluoma, P. (2002). Representing God. *Papers on Social Representations*, *11*, 1.1-1.13.

Mullatti, L. (1995). Families in India: Beliefs and realities. *Journal of Comparative Family Studies*, *26*, 11-25.

McIntosh, D. N. (1995). Religion-as-schema, with implications for the relation between religion and coping. *The International Journal for the Psychology of Religion*, *5*(1), 1-16.

Rosch, E. (1975). Cognitive representations of semantic categories. *Journal of Experimental Psychology: General*, *104*, 192-233.

Rosenberg, S., & Jones, R. (1972). A method for investigating and representing a person's implicit theory of personality: Theodore Drieser's view of people. *Journal of Personality and Social Psychology*, *22*, 372-386.

Rosenberg, S., & Sedlak, A. (1972). Structural representations of perceived personality trait relationships. In A. K. Romney, R. N. Shepard, & S. Nerlove (Eds.), *Multidimensional scaling: Theory and application in the behavioral sciences* (Vol. 2, pp. 133-162). New York: Seminar.

Shtulman, A., & Lindeman, M. (2016). Attributes of God: Conceptual foundations of a foundational belief. *Cognitive Science*, *40*, 635-670. http://dx.doi.org/10.1111/cogs.12253.

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. doi:10.1177/1088868314568811.

Shariff, A., & Norenzayan, A. (2011). Mean gods make good people: Different views of God predict cheating behavior. *International Journal for Psychology of Religion*, *21*, 85-96. doi:10.1080/10508619.2011.556990.

Shariff, A. F., Willard, A. K., Andersen, T., & Norenzayan, A. (2016). Religious priming: A meta-analysis with a focus on prosociality. *Personality and Social Psychology Review*, *20*, 27-48. doi:10.1177/1088868314568811.

Sharpe, D. (2015). Your Chi-Square Test is statistically significant: Now what? *Practical Assessment, Research & Evaluation*, *20*(8), 1-10.

Solomon, S. (1999). Death and the evolution of human social motives. *Psychological Inquiry, 10*(3), 244-247.

Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. *Cognitive Science, 12*, 257-285.

Sweller, J. (1989). Cognitive technology: Some procedures for facilitating learning and problem solving in mathematics and science. *Journal of Educational Psychology, 81*(4), 457-466.

Sweller, J. (1993). Some cognitive processes and their consequences for the organization and presentation of information. *Australian Journal of Psychology, 45*, 1-8.

Taylor, S. E., & Crocker, J. (1981). Schematic bases of social information processing. In E. T. Higgins, C. P. Herman, & M. P. Zanna (Eds.), *Social cognition: The Ontario Symposium* (pp. 89-134). Hillsdale, NJ: Lawrence Erlbaum.

Xygalatas, D. (2016). Cognitive science of religion. In D. A. Leeming (Ed.), *Encyclopedia of Psychology and Religion* (pp. 1-5). Heidelberg: Springer-Verlag. doi:10.1007/978-3-642-27771-9_9261-4.

Zahl, B. P., & Gibson, N. J. S. (2012). God representations, attachment to God, and satisfaction with life: A comparison of doctrinal and experiential representations of God in Christian young adults. *International Journal for the Psychology of Religion, 22*, 216-230. http://dx.doi.org/10.1080/10508619.2012.670027.