Psychology of Religion and Spirituality

Beyond Beliefs: Multidimensional Aspects of Religion and Spirituality in Language

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Religion and spirituality are multidimensional constructs including practices, rituals, and experiences, though they are often treated solely in terms of belief. In this study ($N = 2,389$), we investigate dimensions examined in previous linguistic analysis studies—religious affiliation and experiences of unity—and new dimensions: religious services, prayer, meditation, and religious/spiritual experience. We replicate previous findings related to the linguistic correlates of religious affiliation, in which language categories of *religion*, *social*, and *positive emotion* categories are positively related, while *negative emotion* and *insight* (a marker of analytic thinking) are negatively related. However, we find that other dimensions (practices, prayer, meditation, and experiences) show a different profile of language associations. We also examined dimensions of religion/spirituality across believers and non-believers. We find that among non-believers, associated language points to emotions—such as inspiration and gratitude—rather than mentions of religious doctrine. Taken together, these results reinforce that religion and spirituality are multidimensional constructs with divergent profiles in natural language use.

Keywords: religion, spirituality, beliefs, practices, spiritual experiences

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Religion is notoriously difficult to define—and spirituality even more so. Propositional definitions have been offered in classic texts in the psychology of religion, such as *The Varieties of Religious Experience* (James, 1902) and *The Elementary Forms of Religious Life* (Durkheim, 1912). But some scholars instead opt for a polythetic definition, which enumerates the common components of a particular concept without offering a set of necessary and sufficient conditions (Smith, 1982, p. 166). Similarly, contemporary psychological researchers have argued for treating religion and spirituality as multidimensional constructs in psychological research—to look beyond beliefs to consider practices, rituals, and experiences (Graham & Haidt, 2010).

A multi-dimensional construal of religion/spirituality helps to resolve some apparently paradoxical uses of the terms in contemporary culture. For example, in *Waking Up: Spirituality without Religion* (2014), atheist writer Sam Harris advocates for the value of the originally religious practice of meditation, though without any attendant religious or spiritual beliefs. In *Religion for Atheists: A Non-believer's Guide to the Uses of Religion* (2012), philosopher Alain De Botton describes the social and psychological benefits of participating in religious rituals without religious or spiritual beliefs. In *Living with a Wild God: A Non-Believer's Search for the Truth about Everything* (2014), journalist Barbara Ehrenreich describes her religious/spiritual/mystical experiences, to which she does not attach any religious or spiritual interpretations. As philosopher Rebecca Newberger Goldstein puts it, "Math . . . music . . . starry nights . . . These are secular ways of achieving transcendence, of feeling lifted into a grand perspective. It's a sense of being awed by existence that almost obliterates the self. Religious people think of it as an essentially religious experience but it's not. It's an essentially human experience."

Additionally, a growing number of people in the U.S. now consider themselves "spiritual but not religious," which typically differentiates between personal and institutional forms of belief (Pew Research Center, 2012). Individuals can also nominally believe, largely due to religious cultural traditions, but not engage in any practices or rituals. Lastly, individuals of any belief (or non-belief) system can practice mindfulness meditation (Hölzel et al., 2011) and have experiences of unity (Yaden et al., 2017). Beyond this somewhat superficial example, there is a long-standing and theoretically rich discourse in the psychology of religion on the dimensions of religion and spirituality (Elkins, 2001; Emmons & Paloutzian, 2003; Fetzer Institute/National Institute on Aging

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Working Group, 1999; Frankl, 1959; Hill et al., 2000; James, 1902; Pargament, 1999; Piedmont et al., 2009; Zinnbauer et al., 1997). There have also been relevant discussions of the theoretical and empirical relationship between religion and spirituality (Büssing et al., 2007; Piedmont et al., 2009), as well as attention to differences between believers and non-believers (e.g., Büssing et al., 2007). One insight that emerges from this work is that the meanings of religion and spirituality become clearer when broken down into components.

A number of psychometric scales measure religiosity/spirituality (for reviews, see Hill & Hood, 1999; Hill & Pargament, 2008); however, these scales typically lump various dimensions of religion/spirituality into single measures; often mixing beliefs, practices, and experiences into a total score. Providing some justification for this practice, items tapping various dimensions of religion/spirituality do tend to correlate with one another at high levels, at least in most US contexts (Piedmont et al., 2006). For example, the *Santa Clara Strength of Religious Faith Questionnaire* includes items related to prayer (practice), religious service attendance (ritual), and faith (belief) in a single factor. The Cronbach's alpha for this scale in its initial validation was .95, demonstrating excellent reliability (Plante & Boccaccini, 1997). However, dimensionality often varies across sub-groups—so while prayer and experiences may be highly correlated in believers, they may be relatively orthogonal in non-believers. In certain research contexts, such unidimensional religious/spiritual constructs may be desirable, with the caveat that the multidimensional nature of religion/spirituality tends to be lost.

Large-scale polling organizations such as Gallup, Pew, and the General Social Survey (GSS) have asked a number of single-item questions related to the various dimensions of religion/spirituality. The results of such surveys have demonstrated that human engagement with religion and spirituality is pervasive. For instance, despite declining overall levels of religion in the U.S. and Europe (Pew Research Center, 2012), about 50% of the U.S. believes that religion is "very important" in their lives (Gallup Poll, 2018). When it comes to less institutionally doctrinal, or more "spiritual" kinds of beliefs, prevalence increases almost to ubiquity, as about 89% of the U.S. respondents noted that they believed in "God or a universal spirit" (Gallup Poll, 2018). In another U.S. sample ($N = 1,509$), 41% indicated that the statement: "I have had a profound religious experience or awakening that changed the direction of my life," completely applied to them (Gallup Organization, 2003). Instrumental for our purposes, the General Social Survey (Smith et al., 2019) has administered a number of items that capture dimensions of religion/spirituality.

Religiosity/Spirituality Expressed Through Natural Language

Beyond self-report surveys, aspects of religiosity and spirituality are also measurable in language use. Most previous linguistic analysis studies use Linguistic Inquiry and Word Count (LIWC; Pennebaker et al., 2001, 2015), which provides a number of theoretically defined linguistic categories,[1] such as *religion* ("hell," "soul," "holy"), *positive emotion* ("love," "good," "happy"), and *social processes* ("you," "we," "who"). The relative frequency for each category can then be correlated with outcomes of interest (Kern et al., 2016). Early work compared personal disclosures about difficult topics compared to prayers about those topics, finding more

instances of positive emotion words in prayers (VandeCreek et al., 2002; but see Grossoehme et al., 2010). More recent linguistic analysis studies have used much larger sample sizes, leveraging social media datasets and Natural Language Processing (NLP) to analyze the language (e.g., through topic modeling; Blei et al., 2003). Approaches from NLP complement the dictionary-based approaches to language analyses (such as LIWC) in that through computational means language variables emerge directly from the data (rather than being imposed on it by theory through dictionaries), and that implementations generally rely on open-source analysis code maintained by communities in computer science (e.g., Schwartz et al., 2013, 2017).

Studies on Language of Religious Affiliation

A number of studies have examined how religious beliefs/affiliations are expressed in natural language on social media. For instance, using Twitter, Ritter et al. (2014) found that religious individuals were more likely than nonreligious individuals to use *positive emotion* and *social* words (in addition to words related to *religion*, which is unsurprising) whereas nonreligious individuals used more words related to *insight*, or analytic thinking ("know," "think," "thought"). Using Twitter, Chen and Huang (2019) compared Christians and Buddhists, finding similar results for language expressed by Christians, while finding that language expressed by Buddhists looked more like that expressed by nonreligious people in the Ritter et al. (2014) study. Both of these studies identified religious or nonreligious affiliation using the rough proxy of individuals who "follow" prominent religious or nonreligious figures on Twitter. Yaden et al. (2018) found that this pattern (positive emotion and social words positively related, and insight negatively related, to religious affiliation) replicates on Facebook, basing the analysis on the religious or nonreligious affiliation actually self-reported by participants.

Study on Language of Unity ("Mystical") Experience

There is a long tradition in psychology of qualitatively analyzing religious, spiritual, or mystical experiences (e.g., James, 1902), as well as comparing spontaneously occurring experiences with experiences triggered by psychedelic substances (e.g., Smith, 1964), yet few studies have examined written accounts quantitatively. In one study, Yaden et al. (2016) utilized a corpus of individuals who described in writing any "spiritual and/or religious experience" that they may have had, and then answered a brief measure of "mystical experience" (a sub-scale focused on feelings of unity; Hood & Morris, 1983). In this corpus of personal accounts, experiences of unity were associated with language that was more *inclusive* ("and," "with," "we") as well as with the overlapping set of words in the *cognitive processes* category ("all," "with," and "we") (which also includes the words of the *inclusive* dictionary, as both dictionaries are typically included in LIWC analyses; Tausczik & Pennebaker, 2010). Categories negatively associated with unity experience included *third-person singular* ("he," "she," "his") as well as *religion* ("jesus," "soul," "hell").

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[1] LIWC categories will be in italics throughout this paper.

The Current Study

In this study, we aimed to examine language associated with other aspects of religion/spirituality, beyond belief. We aimed to replicate findings from the religious affiliation studies (Ritter et al., 2014; Yaden et al., 2016) and the unity experience study (Yaden et al., 2016) described above, and then to extend these analyses to additional dimensions of religious/spirituality. We operationalize multiple dimensions of religion/spirituality, drawing on single items that have been included in the GSS, as well as new items adapted from the GSS items, that together capture: religiosity, spirituality, religious service attendance, prayer, meditation, life-changing religious/spiritual experience, and life-changing unity experience. In addition, we explore differences in the natural language between religious versus nonreligious individuals (none/atheist/agnostic) who report practicing meditation or having a life-changing religious/spiritual or unity experience.

Methods

Procedure

The current study compared a set of self-report survey items with natural language use extracted from Facebook status updates. Participants were recruited by Qualtrics. After consenting to participate in the study, respondents completed a Qualtrics-based survey. The end of the survey asked participants to allow access to their status updates on the social media platform Facebook. As the study aimed to consider correlations between the survey responses and natural language, we only included individuals who completed the survey items and allowed access to their social media posts. In addition, participants were only included if they had a minimum of 500 words across their Facebook posts, which previous work determined to be the minimal amount of linguistic information is needed for meaningful language associations (Kern et al., 2016). Participants were also excluded if they failed an attention check. The University of Pennsylvania's Institutional Review Board approved all procedures used in the study.

Participants

The final sample $N = 2,389$ was 52% female, with an average age of 43.5, and drawn entirely from the US. In terms of ethnicity, 68.2% of the sample was White, 12.8% was Black, and 19% were from all other categories. As for religion, 61.8% of the sample were Christian, 23.7% were "None/Atheist/Agnostic" and the rest were from other religious categories (Buddhist, Hindu, Jewish, Mormon, Muslim, and "other").

Measures

The Santa Clara Strength of Religious Faith Questionnaire

The Santa Clara Strength of Religious Faith Questionnaire (SCSORF; Plante & Boccaccini, 1997) is a unidimensional measure of religious faith, which includes 10 items related to multiple aspects of religion, such as beliefs ("My religious faith is extremely important to me"), practices ("I pray daily"), and rituals ("I consider myself active in my faith or church"). Items were answered on a 4-point Likert style scale (1 = *strongly disagree*,

$4 = strongly\ agree$), and then averaged together to create a single composite (α = .99).

Items From the GSS

As summarized in Table 1, the survey included five items that have been used within multiple waves of the GSS: religious identification, spiritual identification, frequency of attending religious services, prayer, and having a life-changing religious or spiritual experience. The table indicates the question asked and the response options, and then compares the percentage of selecting a response option on each item with the latest wave of the GSS compared to the current sample. Compared to the 2018 GSS wave, participants in the current study endorsed items at similar rates.

Items Adapted From the GSS

The survey included two items that were adapted from the GSS. First, in the 1998 GSS wave, one question queried about meditative practices: "Within your religious or spiritual tradition, how often do you meditate?" We believed that the wording of the item was awkward, as people may meditate without a particular religious or spiritual tradition. Therefore, we dropped the first part of this question and asked, "How often do you meditate?" keeping the same response options. Second, studies on mystical experiences involve items related to unity or oneness (e.g., the mysticism sub-scale of the Death Transcendence Scale; Hood & Morris, 1983). To measure this experience, we modified the GSS question on having a life-changing religious or spiritual experience: "Did you ever have an experience of oneness that changed your life?" We retained the same possible answers as the other experience question (yes or no).

Religious Affiliation

We also considered whether differences occurred between religious and nonreligious individuals. As part of the demographic section, participants indicated their religion. We divided users into two groups: (a) "nonreligious," for participants who selected "none," "atheist," or "agnostic" (23.7%), and (b) religious, for participants who indicated being Christian, Muslim, Hindu, Buddhist, or other religions (72.3%).

Satisfaction With Life

In addition to the religion/spirituality scale and items, we included the Satisfaction With Life (SWLS; Diener et al., 1985) as an indicator of participant well-being. Participants indicated their agreement with five items on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*) evaluated their life as a whole (α = .90).

Language Data

Upon consent to allow access to their Facebook posts, our Python-based code base queried Facebook's automatic programming interface (API) and downloaded the participant's text-only status updates from their Facebook profile. The language data was linked with the person's survey responses through anonymous identifiers, and both stored on a secure server approved by the University of Pennsylvania's IRB and data protection guidelines.

Table 1

Items, Response Options, and Comparisons Between the General Social Survey and Current Samples

Item	Response options	GSS respondents	Current study
		% selecting response	
Items from the General Social Survey (GSS)			
To what extent do you consider yourself to be a religious person?	Very religious, moderately religious, slightly religious, not religious	15.8% very religious[a]	13.6% very religious
To what extent do you consider yourself to be a spiritual person?	Very spiritual, moderately spiritual, slightly spiritual, not spiritual	29.8% very spiritual[a]	31.8% very spiritual
How often do you attend religious services?	Never, at least once a year, once a year, several times a year, once a month, two to three times a month, nearly every week, every week, more than once a week	16.7% attend every week[a]	11.1% attend every week
How often do you pray?	Several times a day, once a day, several times a week, less than once a week, never	29.4% pray several times a day[a]	25.2% pray several times a day
Did you ever have a religious or spiritual experience that changed your life?	Yes, no	40.9%[b]	49.0%
Items modified from the GSS			
How often do you meditate?	Several times a day, once a day, several times a week, less than once a week, never	6.6% meditate every day[c]	10.4% meditate every day
Did you ever have an experience of oneness that changed your life?	Yes, no	(not asked)	40.6%

Note. GSS = General Social Survey.
[a] GSS 2018, *N* = 2,348.
[b] GSS 2010, *N* = 2,044.
[c] GSS 1998, *N* = 2,832.

Access occurred once only, such that the linguistic data represented the person's posts up to the point of data collection and not beyond.

Data Analyses

We extracted words and phrases from each participant's language data using two different approaches, a "closed vocabulary" and an "open vocabulary" method (see Kern et al., 2016 for a detailed description of both). The closed-vocabulary method used here, Linguistic Inquiry and Word Count (LIWC; Pennebaker et al., 2015), utilizes researcher-created categories/dictionaries, each of which consists of a list of theoretically related words. Each category is assigned a value consisting of the relative frequency of words from each participant that appear in the word list within that category. For example, if a participant's writing consisted of "I am happy now," the positive emotion category for that participant would be scored with a .25, as "happy," a word in the positive emotion category, constitutes ¼ of the sentence. Category scores were then used to predict the religious/spirituality scales and items, controlling for age and gender and correcting for multiple comparisons using the Benjamini-Hochberg method (Benjamini & Hochberg, 1995). Multiple regression was conducted on standardized (mean centered and normalized) variables. The resulting beta coefficients for categories were rank-ordered per religious/spiritual outcome. These results are presented in terms of previous research findings (Table 3) and provide the top five positive and negative language category correlates for each item (Supplemental Table 1).

As an open-vocabulary approach that does not rely on researcher-defined dictionaries, we used Differential Language Analysis (DLA; Schwartz et al., 2013), which identifies the words and phrases that most strongly correlate with a given outcome variable (phrases are

determined as two to three words that co-occur more often than would be expected by chance, such as "Happy New Year"). Essentially, each word or phrase is entered as an independent variable to predict the outcome (here: the religious/spiritual items), using multiple regression, controlling for age and gender. Normalized weights are presented rank ordered by descending magnitude, and significant associations (after correcting for multiple comparisons using the Benjamini–Hochberg method) are visualized as a word cloud, within which the size of the word indicates the strength of the correlation with the outcome (and color indicates the frequency). We present word clouds for each aspect of religion/spirituality and include figures of these results in the supplemental materials (Supplemental Figure 1).

We then examined linguistic differences between religious and nonreligious individuals. We divided participants according to whether, in the demographics section, they selected that they were none/atheist/agnostic for the "nonreligious" group or any religion (e.g., Christian, Muslim, Hindu, Buddhist) for the "religious" group. We conducted DLA, again controlling for age and gender, and ranked the beta coefficients (Figure 1; see Supplemental Tables 2–5 for tables used to generate the figure). All words in these clouds remain significant ($p < .05$) after controlling for multiple comparisons using the Benjamini-Hochberg method. All analysis was performed using the open source Python package DLATK (Differential Language Analysis ToolKit; Schwartz et al., 2017).

Results

Table 2 summarizes correlations among the items and measures. The unidimensional SCSORF scale was most strongly correlated with religious identification, along with spiritual identification, attending religious services, and engaging in prayer. The SCSORF

Table 2

Correlations Among the Religion/Spirituality Scales and Items

Variable	1	2	3	4	5	6	7	8
1. SCSORF								
2. Religiosity	.67*							
3. Spirituality	.54**	.82**						
4. Religious services	.59**	.49**	.40**					
5. Prayer	.73**	.65**	.57**	.58**				
6. Meditation	.27**	.36**	.43**	.30**	.41**			
7. R/S experience	.45**	.50**	.51**	.34**	.45**	.31**		
8. Unity experience	.30**	.39**	.43**	.23**	.31**	.36**	.60**	
9. Life satisfaction	.12**	.11**	.11**	.19**	.14**	.14**	.05*	.05*

Note. $N = 2,389$. SCSORF = The Santa Clara Strength of Religious Faith Questionnaire; R/S = religious/spiritual.
* $p < .05$. ** $p < .01$.

was less associated with having a life-changing religious/spiritual experience, and much less associated with meditation or having had a life-changing unity experience. Life satisfaction was associated with every aspect of religion/spirituality, though to a small degree.

Turning to linguistic categories related to religious affiliation, we report a summary table of the previous findings in Ritter et al. (2014), Yaden et al. (2016), and from the present study (Table 3). We find that the previously reported linguistic category associations with religious affiliation replicate for SCSORF, religiosity, and religious service attendance. Prayer practice is not associated with the *insight* category and spirituality is associated in the opposite direction. Meditation, religious/spiritual experience, and unity experience show different patterns of associations with these linguistic categories.

For unity experience (also known as "mystical experience"), we report the findings from a previous study (Yaden et al., 2016) and the findings from the present study (Table 4). The previous sample used language from a corpus of individuals describing any variety of "religious or spiritual" experience in writing, while the present sample uses a corpus of language from social media posts. Despite

this different corpus, the inclusive and cognitive processes language categories remained significantly correlated; however, *third person singular* was not related in the present sample and the *religion* category was related in the opposite direction.

While the particular language categories that were used in previous studies are reported here in order to inform the robustness and replicability of these findings, these categories are often not the language categories most strongly associated with each aspect of religiosity/spirituality. The top language categories associated with each aspect of religiosity/spirituality are reported in the supplemental materials (Supplemental Table 1). For open-vocabulary results, the supplemental materials present word clouds for each aspect of religion/spirituality (Supplemental Figure 1), identifying the words and phrases that were most strongly positively and negatively correlated.

Lastly, we analyzed results across religious (i.e., Jewish, Christian, Islamic, or Hindu) and nonreligious individuals (i.e., atheist, agnostic, or "none") in Figure 1. We include linguistic correlates for aspects of religion/spirituality which can be dissociated with belief (i.e., aspects of religion/spirituality that non-believers can engage with).

Table 3

Religious Affiliation: Previous and Present Study Results

LIWC category	Representative words	Ritter et al. (2014): religious affiliation d	Yaden et al. (2016): religious affiliation β	Present study: SCSORF β	Present study: religiosity β	Present study: religious services β	Present study: spirituality β	Present study: prayer practice β	Present study: meditation practice β	Present study: R/S experience β	Present study: unity experience β
Religion	Hell, soul, holy	.29**	.28**	.31**	.32**	.32**	.26**	.37**	.17**	.30**	.21**
Pos emo	Love, happy	.36**	.28**	.14**	.13**	.10**	.05*	.13**	*−.01*	*.05*	*.03*
Social	You, we, who	.42**	.19**	.16**	.17**	.13**	.10**	.17**	*.04*	.09**	.10**
Neg emo	Bad, hate, miss	−.22**	−.32**	−.15**	−.16**	−.18**	−.07**	−.11**	*−.02*	*−.05*	*.00*
Insight	Know, think	−.28**	−.08*	−.07**	−.09**	−.06**	*.08**	*.01*	*.08**	*.08**	*.09**

Note. The top table shows that the religious affiliation/belief and religious service attendance items from the "present" study show the same pattern of results as the Ritter et al. (2014) study and the Yaden et al. (2016) study. The bottom table shows that spiritual affiliation, practices (prayer, meditation), and experiences (religious/spiritual, unity) follow a different pattern of linguistic result. Results *differing* from the pattern of results in previous studies for religious affiliation are italizied. Pos emo = positive emotion; Neg emo = negative emotion.
* $p < .05$. ** $p < .01$.

Figure 1

Language Most Associated With Each Outcome Variable in Religious and Nonreligious Individuals

Note. The size of the word indicates correlation strength and the color of the word indexes frequency from grey to darker green. Beta weights are given as a range for each word or phrase appearing in a given word cloud. All linguistic features are significantly correlated after controlling age and gender and correcting for multiple comparisons. See the online article for the color version of this figure.

Table 4
Unity Experience: Previous and Present Study Results

LIWC category	Representative words	Yaden et al. (2016): unity experience r	Present study: unity experience β
Inclusive	And, with, we	.20**	.048*
Cognitive processes	All, always, ever	.11**	.063**
Third person singular	He, she, her	−.13**	−.003
Religion	Religion, soul, christ	−.20**	.195**

Note. Results differing from the previous pattern of results for religious affiliation are italicized. LIWC2007 was used for this analysis in order to compare the present study with the previous study categories.
* $p < .05$.   ** $p < .01$.

Discussion

Religion/spirituality is often conceptualized and measured in a unidimensional manner with an emphasis on belief, yet this is at odds with instances in which individuals selectively engage with or experience aspects of religion/spirituality in ways that may not involve belief. A number of historical (e.g., James, 1902) and contemporary (e.g., Graham & Haidt, 2010) theorists make the case for multidimensionality. The current study examined multiple dimensions of religion/spirituality, especially as they appear in language behavior. Findings suggest that patterns of previous linguistic findings regarding religious affiliation extend to a religious faith scale, religious service attendance, and prayer measures—but do *not* extend to spirituality, the practice of meditation, and religious/spiritual or unity experiences.

Specifically, as in previous studies (Ritter et al., 2014; Yaden et al., 2018), religious affiliation, religious service attendance, and a religious faith scale all showed positive correlations with the categories of *religion*, *social*, and *positive emotion* as well as negative correlations with *negative emotion* and *insight*. However, spirituality, prayer, meditation, and experiences (religious/spiritual and unity) showed different linguistic patterns, with mostly nonsignificant associations with *positive emotion* and with reversed correlations with the *insight* category. These results raise the possibility that different aspects of religion/spirituality relate to emotion and analytic thinking styles in different ways.

As in a previous study (Yaden et al., 2016), experiences of unity were associated with the *inclusive* category as well as *cognitive processes*. These language categories are related to social connectedness, as they feature plural first-person pronouns such as "we" and "us." This finding suggests that unity experiences may be related to more social connectedness. However, while the previous study reported a negative correlation with the *religion* category, in the present study we found a positive correlation, and we found no association with *third person singular*. These differences may be due to the different corpora used, as the prior study focused on a non-social-media corpus of people specifically reporting their experiences, which may have amplified the distinction between two different kinds of experiences—those featuring the presence of God ("numinous experience" in the scholarly literature) from experiences emphasizing unity ("mystical experience"; for further discussion, see Proudfoot, 1976).

We show a different pattern of language use across religious and nonreligious individuals for spiritual affiliation, meditation, as well as life-changing religious/spiritual experiences and experiences of unity. While the language associated with these dimensions among religious individuals looks broadly similar to language associated with religious affiliation ("god," "pray," "church"), the language use among nonreligious individuals emphasizes words such as "inspiration," "growth," "inspiration," and "be grateful." These findings provide some insight into candidate cognitive processes underpinning these aspects of religion/spirituality, as non-believers tend to refer to personal emotions rather than to supernatural entities or doctrines. While these psychological processes may underlie the experience of believers and non-believers alike, reference to them among non-believers can be observed unobstructed by references to the content of religious beliefs.

Limitations and Future Directions

This study was limited in several ways. We used self-report measures as our outcomes of interest, though future studies might use behavioral measures where applicable (e.g., religious service attendance documented through GPS, or the use of meditation timer apps). Participants were recruited through an online survey platform, Qualtrics, which involves paying participants a small amount for their participation. While data from online panel sources has been demonstrated to be reliable (Buhrmester et al., 2011), future studies might gather samples through other means and in other cultures. Because our sample was drawn from the U.S., it is largely white and Christian. Future research should replicate these findings in other populations and care should be taken when attempting to generalize these findings.

Our language data was gathered from posts on a social media platform. Language behavior on social media has been shown to be consistent with one's offline traits (Kern et al., 2014), yet future studies might gather language data from other sources. Indeed, our findings related to unity experiences may have been strongly impacted by corpus type.

Additionally, all of the items tapping dimensions of religion/spirituality were displayed together on the self-report survey. This may have provided an item context that produced an affirmative response tendency for all items, even those not necessarily related to religious affiliation. Future studies might embed these items across different item contexts to determine whether more orthogonal relationships between items result.

Conclusion

While religion/spirituality are often conceptualized and measured solely in terms of beliefs, there are conceptual and empirical reasons to consider them as multi-dimensional constructs. In this study, we show that while the linguistic correlates of religious affiliation replicate in this sample and extend to a multidimensional measure of faith, religious service attendance, and prayer—they do not extend to spirituality, meditation, religious/spiritual experience, or to unity experience. We also show that unity experiences are associated with inclusive language, as has been found in a previous study, providing some evidence that those who have experienced unity experiences use more language related to social connection. Additionally, religious believers and non-believers may interact

with the various non-belief-related dimensions of religion and spirituality differently. Among religious believers, language associated with spirituality, meditation, religious/spiritual experience, and unity experience involves explicitly religious concepts. Among non-believers, on the other hand, they are associated with positive emotions—such as inspiration and gratitude. Taken together, these findings underscore the importance of looking beyond beliefs to other dimensions of behavior and experience when considering and measuring religion and spirituality in general, and, in particular, in language.

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