

UC Merced

Proceedings of the Annual Meeting of the Cognitive Science Society

Title

“Think” and “believe” across cultures: A shared folk distinction between two cognitive attitudes in the US, Ghana, Thailand, China, and Vanuatu

Permalink

<https://escholarship.org/uc/item/0pz7d2c8>

Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 42(0)

Authors

Leeuwen, Neil Van

Weisman, Kara

Luhrmann, Tanya M.

Publication Date

2020

Peer reviewed

“Think” and “believe” across cultures: A shared folk distinction between two cognitive attitudes in the US, Ghana, Thailand, China, and Vanuatu

Neil Van Leeuwen (nvan@gsu.edu)

Department of Philosophy, Neuroscience Institute, Georgia State University,
25 Park Place, Suite 1600, Atlanta, GA 30303, USA

Kara Weisman (kweisman@stanford.edu)

Departments of Anthropology and Psychology, Stanford University,
450 Jane Stanford Way, Building 50, Stanford, CA 94305, USA

Tanya M. Luhrmann (luhrmann@stanford.edu)

Department of Anthropology, Stanford University,
450 Jane Stanford Way, Building 50, Stanford, CA 94305, USA

Abstract

Do people hold different kinds of beliefs about gods and spirits than they do about the everyday world? Many say no: that to the faithful, gods and spirits are real in the same way that tables and chairs are real. Yet experimental studies have found that speakers of American English tacitly distinguish between two cognitive attitudes—one for factual beliefs and one for religious credences—through their differential use of the words “think” and “believe” (Heiphetz, Landers, and Van Leeuwen, 2018). In three large-scale studies—conducted in five strikingly different linguistic and cultural-religious contexts (from west to east: the US, Ghana, Thailand, China, and Vanuatu)—we demonstrate that such linguistic differentiation of factual belief and religious credence is cross-culturally robust. This lends support to the hypothesis that human theory of mind includes nuanced distinctions among different varieties of “belief.”

Keywords: attitude reports; religious credence; factual belief; theory of mind; social cognition; psycholinguistics; comparative anthropology

Introduction

One form of human cognitive flexibility is the ability to relate to any given idea in a range of different ways. One might *think* that it’s raining, *wonder whether* it’s raining, *want* it to be raining, *imagine* it’s raining, *hate* that it’s raining, etc. These different ways of processing ideas are called “attitudes.” Among the attitudes, those that posit how the world is or might be are called “cognitive attitudes” (Shah and Velleman, 2005).

Neurotypical humans track and communicate a range of different cognitive attitudes, as is evidenced by the existence of distinct attitude verbs in every known language (Goddard, 2010; Wierzbicka, 2007). Indeed, as social creatures, it benefits us to be able to keep track of and communicate such differences in attitudes to our fellow humans: Different attitudes are linked to different emotions and behaviors (e.g., being in a good vs. bad mood on a rainy day; carrying vs. not carrying an umbrella), and thus provide key insights into why people do what they do and what they are likely to do next.

This insight is at the core of the extensive body of work on “theory of mind.”

Some differences in attitude type are stark, such as *knowing* that *p* versus *pretending* that *p*, so it is no surprise that most humans—even children—can be aware of and articulate such differences (e.g., Weisberg, 2013).

Recent theoretical work highlights differences in cognitive attitude types that may appear more subtle. In particular, among the suite of attitudes that many other researchers lump together under the term “belief,” Van Leeuwen (2014, 2017) argues for a distinction between (1) *factual beliefs*, which guide people’s behaviors across any practical setting, provide general background information for use in inferences, and are sensitive to evidence; and (2) *religious credences*, which share none of these features, and instead are understood to have a normative orientation (i.e., it is regarded as good to have one’s actions guided by one’s religious credences), lend themselves to free elaboration rather than rational inference, and are sensitive to special authority (e.g., the word of a church leader) rather than evidence. From this perspective, factual beliefs and religious credences are distinct ways of processing ideas, with different etiologies, different updating mechanisms, and different characteristic effects on thought, emotion, and behavior. In this sense, the distinction between factual belief and religious credence is of critical importance to scholars of epistemology, belief revision, and religion.

Do ordinary humans track this distinction? Religious credence and factual belief may be common and distinct ways of processing information without its being the case that ordinary people differentiate between these two varieties of “belief” in their representations of others’ mental states.

To address this question, a recent series of studies by Heiphetz et al. (2018) examined ordinary people’s use of attitude verbs to communicate about mental states—on the idea that, if speakers systematically use distinct words in ways that line up with differences in attitude types, then that is evidence that they are representing those differences, at least at an implicit level. These studies offered ample evidence that speakers of American English use the verbs

“think” and “believe” with different frequencies in third-person mental state attribution, depending on whether they are attributing a religious attitude or a more mundane factual attitude about how the world is.

First, probing the Corpus of Contemporary American English, Heiphetz et al. documented that, across spoken, fiction, magazine, newspaper, and academic sub-corpora, the phrase “believe that” has a range of religious collocates (e.g., “miracles” and “Allah”), while “think that” has none.

Behavioral studies provided converging evidence for this finding. In these studies, participants were more likely to use the word “believe(s)” to complete sentences that had religious content (e.g., *Zane _____ that Jesus turned water into wine*) than sentences with more matter-of-fact content (e.g., *Nick _____ that cassiterite is the chief source of tin*). (Note that, in both cases, the ascribed contents described states of the world, rather than judgments of what is good or bad.) This difference held up across different response paradigms (forced choice vs. free response) and across different types of matter of fact context (well-known facts, esoteric facts, and personal life facts, such as *Sharon _____ that she will meet her mother at the store today*). Differential use of “thinks” vs. “believes” was evident even when the propositional content of a sentence was held constant, and only the broader context of the proposition was manipulated. For example, participants were more likely to use “believe” to complete the sentence *she _____ that aspirin is not a cure* in the context of a religious vignette about the Church of Christ Scientist than in the context of a person who finds aspirin ineffective.

Heiphetz et al. (2018) did not claim that the *only* uses of “think” and “believe” are for factual belief versus religious credence; they granted that other uses, such as acknowledging uncertainty, are also common. But such other uses were unable to account for the pattern of differential usage in these studies.

The fact that, in Heiphetz et al.’s (2018) work, ordinary people reliably used the words “think” vs. “believe” to distinguish between factual beliefs and religious credences is particularly striking in light of the fact that scholars themselves frequently assume that the distinction between how people relate to “matters of fact” vs. “matters of religion” is rarefied, esoteric, or an artifact of a scholarly kind of Western secularism. Throughout the anthropological literature, for example, there are concerns that religious belief is a Western, Christian idea that simply does not apply to people elsewhere (Asad, 1993). As the anthropologist Christina Toren wrote (2007: 307-7): “We [anthropologists] may characterise as *belief* what our informants *know* and, in so doing, misrepresent them. If I am to correctly represent my Fijian informants, for example, I should say that they *know* the ancestors inhabit the places that were theirs.” The implication of such anthropological writings appears to be that the folk distinction between factual belief and religious credence surfaced by Heiphetz et al. (2018) simply does not appear in non-Western, non-Christian contexts.

With this in mind, we set out to test the hypothesis that similar linguistic patterns of differentiation to what Heiphetz et al. (2018) observed among ordinary people speaking American English would emerge in diverse linguistic, cultural, and religious settings, and to explore the extent to which this distinction did or did not vary across samples in these settings. These studies were preregistered at [AsPredicted.org \(#5427: \[aspredicted.org/p6iy3.pdf\]\(https://aspredicted.org/p6iy3.pdf\)\)](https://aspredicted.org/#5427:aspredicted.org/p6iy3.pdf); analysis code is available at github.com/kgweisman/think_believe.

Field sites

These studies were part of a large collaborative project (the Mind and Spirit Project; Luhrmann et al., 2020) which focused on how people’s understanding of the mind relates to their experience of spiritual and supernatural presence. This project took place in five countries—from west to east: the US, Ghana, Thailand, China, and Vanuatu—chosen to include diverse cultural models of the mind and religious practices.

In the US, the current studies were conducted in English and focused on the words *think* and *believe* (following Heiphetz et al., 2018). In other countries, hypothesized counterparts to the English words “think” and “believe” were chosen after close consultation with anthropologists on the project who had local expertise, and with other native speakers. In Ghana, studies were conducted in Fante (an Akan dialect) and focused on the words *dwen* and *gye dzi*. In Thailand, studies were conducted in Thai and focused on the words *คิด* (*khid*) and *เชื่อ* (*cheu*). In China, studies were conducted in Mandarin and focused on the words *认为* (*rènwéi*) and *相信* (*xiāngxìn*). In Vanuatu, studies were conducted in Bislama (an English-based creole) and focused on the words *ting* and *bilif*. All study materials were back-translated in order to ensure semantic fidelity.

In the US, Thailand, China, and Vanuatu, studies were conducted via pen-and-paper surveys distributed on college campuses in urban areas (the San Francisco Bay Area, Chiangmai, Shanghai, and Port Vila). In Ghana, studies were administered orally to adults from the general population living in rural areas of the Central Region. This allowed us to include speakers of Fante (a language that is primarily spoken rather than written), with limited exposure to English (which is the language of instruction in Ghana and predominant on college campuses).

Study 1: Forced choice

Study 1 provided an initial test of the hypothesis that people use the words “believe” vs. “think” (or their counterparts in other languages) to mark a distinction between religious credence vs. factual belief. Methods closely followed Heiphetz et al. (2018), Study 2, in which English-speaking US adults were found to be more likely to choose “believe” (rather than “think”) to complete a sentence with religious content, whereas they were more likely to choose “think” to complete with more matter-of-fact content.

Methods

Participants The final sample included 344 participants (US: $n=76$; Ghana: $n=48$; Thailand: $n=75$; China: $n=48$; Vanuatu: $n=97$). An additional 33 adults were excluded from the sample because they failed an attention check ($n=4$) or because they completed Study 1 after completing one of the other studies included in this paper, which could have affected their responses to this study ($n=29$).

Materials and procedure Participants were presented with 25 attitude reports of the form “[Character] [thinks / believes] that X” and were asked to select one of the two options to fill in the blank. In rural Ghana, a research assistant read each item out loud and asked for a verbal response. In all other sites, participants completed a pen-and-paper survey, circling either “think” or “believe” for each item. Items were presented in one of two counterbalanced orders. Responses of “think” were coded as 0, and responses of “believe” as 1.

Ten of these attitude reports were “religious”: The complement phrase included either Christian content ($n=5$; e.g., *Jesus Christ died for human sins*) or Buddhist content ($n=5$; e.g., *the Buddha found spiritual truth while meditating*).

The remaining 15 attitude reports were “matter-of-fact”: The complement phrase included either a well-known fact ($n=5$; e.g., *Brazil is in South America*), an esoteric fact ($n=5$; e.g., *an octopus has three hearts*), or a personal life fact ($n=5$; e.g., *her dad is cooking noodles for dinner*).

We emphasize that both religious and matter-of-fact attitude reports contained statements about states of the world; none of them described value judgments (e.g., *it is important to pray, it is wrong to eat meat*).

Analyses All results reported here are from mixed effects logistic regressions with maximal random effects structures (subject to model convergence), fitted using the “lme4” and “lmerTest” packages for R. Categorical variables were effect-coded, and β estimates were standardized by dividing by 2 standard deviations (via the “sjstats” package for R).

For all studies, the primary analysis predicted responses of “believe” (or its counterparts in other languages) using attitude report type (2 levels: religious, matter-of-fact), field site (5 levels: US, Ghana, Thailand, China, Vanuatu), and an interaction between them as fixed effects, with both variables effect-coded to yield comparisons to the grand mean. Secondary analyses examined differences in responses of “believe” across attitude report types within each field site considered alone. A third analysis predicted responses of “believe” using attitude report sub-type, field site, and an interaction between them as fixed effects; in these models, attitude report sub-type was coded with the following orthogonal contrasts: (a) religious vs. matter-of-fact attitude reports; (b) religious attitude reports with content from the more locally salient religion (Christianity for participants in the US, Ghana, and Vanuatu; Buddhism for participants in Thailand and China) vs. the religion that was less salient in

that setting; (c) attitude reports featuring well-known vs. esoteric and personal life facts; and (d) attitude reports featuring esoteric vs. personal life facts.

Results and Discussion

As hypothesized, participants were generally more likely to select “believe” for religious items than for matter-of-fact items ($\beta=0.39$, $p<0.001$), even while statistically controlling for differences in the overall rates of selecting “believe” (or its counterparts) across field sites.

The distinction between religious and matter-of-fact attitude reports was more pronounced among participants in the US ($\beta=0.06$, $p=0.005$) and Thailand ($\beta=0.09$, $p<0.001$), and less pronounced in Ghana ($\beta=-0.13$, $p<0.001$); it did not differ from the grand mean in China ($\beta=-0.01$, $p=0.585$) or Vanuatu ($\beta=0.01$, $p=0.744$). Nonetheless, secondary analyses confirmed that this difference was significant in each field site considered alone (US: $\beta=0.48$, $p<0.001$; Ghana: $\beta=0.20$, $p=0.010$; Thailand: $\beta=0.52$, $p<0.001$; China: $\beta=0.37$, $p<0.001$; Vanuatu: $\beta=0.40$, $p<0.001$). See Figure 1.

An additional analysis revealed that participants were more likely to circle “believe” for religious attitude reports featuring content from the more locally salient religion ($\beta=0.06$, $p<0.001$); interestingly, this difference was particularly pronounced in the two most devoutly religious samples (Ghana: $\beta=0.04$, $p=0.026$; Vanuatu: $\beta=0.06$, $p=0.004$) and attenuated in the least religious sample (China: $\beta=-0.04$, $p<0.001$). Participants were also more likely to select “believe” for attitude reports featuring well-known vs. esoteric and personal life facts ($\beta=0.14$, $p<0.001$). Participants did not reliably distinguish between esoteric and personal life facts in their use of “believe” ($\beta=0.05$, $p=0.051$).

We consider the US results to be a clear replication of Heiphetz et al. (2018), Study 2.

The results from other field sites are, to our knowledge, the first experimental evidence that awareness of the distinction between religious credence and factual belief is expressed in the language use of ordinary people speaking languages other than English, or in cultural-religious contexts other than the US. At the same time, this study hints at the possibility that this distinction may be more pronounced in some languages or contexts than in others.

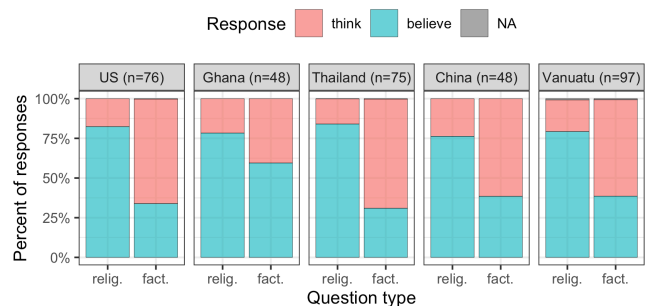


Figure 1: Study 1 results. Participants in all field sites were more likely to select “believe” to complete religious (as compared to matter-of-fact) attitude reports.

Study 2: Free response

Study 2 explored the same question by asking participants to complete sentences using a word or phrase of their own free choice. Methods closely followed Heiphetz et al. (2018), Study 3, in which English-speaking US adults were more likely to generate phrases including the word “believe” to complete religious vs. matter-of-fact attitude reports.

Methods

Participants The final sample included 388 participants total (US: $n=71$; Ghana: $n=46$; Thailand: $n=98$; China: $n=100$; Vanuatu: $n=73$). An additional 70 adults were excluded from the sample because they failed an attention check ($n=31$) or because they completed Study 2 after completing one of the other studies included in this paper, which could have affected their responses to this study ($n=39$).

Materials and procedure Methods were identical to Study 1, except that participants were asked to write in (or speak aloud) a word or phrase of their own free choice to complete each attitude report. Responses were translated as needed and then lemmatized using the “textstem” package for R; this provided an automatic categorization of responses without human coding. All responses including the stem “believe” (or its counterparts) were considered usages of “believe”—including, e.g., “does not believe” and “firmly believes”—and so on for “think” and other word stems.

Results and Discussion

As hypothesized, participants were generally more likely to write in “believe” for religious attitude reports than for matter-of-fact attitude reports ($\beta=0.35$, $p<0.001$), even while

statistically controlling for differences in the overall usage of “believe” (or its counterparts) across field sites.

As in Study 1, this difference was more pronounced among participants in the US ($\beta=0.11$, $p<0.001$) and less pronounced among participants in Ghana ($\beta=-0.11$, $p<0.001$). In Study 2, this difference was also more pronounced in China ($\beta=0.04$, $p=0.001$) and less pronounced in Vanuatu ($\beta=-0.04$, $p=0.002$); the difference did not vary from the grand mean among participants in Thailand ($\beta=0.01$, $p=0.541$).

Again, however, despite this variability across sites, the key difference in rates of “believe” responses between religious vs. matter-of-fact attitude reports was significant in each field site (US: $\beta=0.46$, $p<0.001$; Ghana: $\beta=0.20$, $p<0.001$; Thailand: $\beta=0.37$, $p<0.001$; China: $\beta=0.44$, $p<0.001$; Vanuatu: $\beta=0.26$, $p<0.001$). See Figure 2.

Echoing Study 1, an additional analysis revealed that participants were more likely to write in “believe” for religious attitude reports featuring content from the more locally salient vs. less locally salient religion ($\beta=0.02$, $p=0.022$). Again, this difference was attenuated in the least religious sample (China: $\beta=-0.09$, $p<0.001$), and exaggerated in one of the most religious samples (Vanuatu: $\beta=0.06$, $p<0.001$; but not in Ghana: $\beta=0.01$, $p=0.408$). In this study, participants did not distinguish between different sub-types of facts in their use of “believe” (well-known vs. esoteric and personal life facts: $\beta=0.01$, $p=0.198$; esoteric vs. personal life facts: $\beta=0.02$, $p=0.231$).

We consider the US results to be a clear replication of Heiphetz et al. (2018), Study 3.

Again, however, of greater interest is the fact that the distinction between religious and matter-of-fact attitude reports was robustly evident even among participants speaking languages other than English in cultural-religious contexts other than the US—and even in a free response paradigm, which surfaced fairly striking differences in the range of responses favored in each site (see Figure 2).

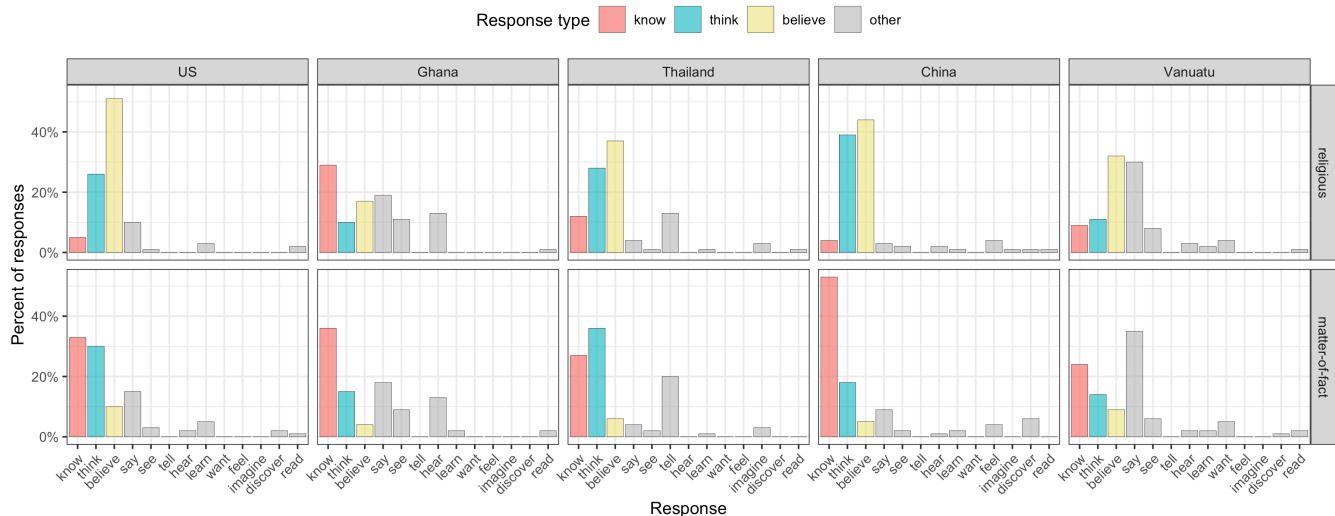


Figure 2: Study 2 results. Participants in all field sites were more likely to generate responses containing the stem “believe” (or its equivalent in other languages) to complete religious vs. matter-of-fact sentences. This plot presents 13 response stems that include the 6 most common responses in each field site, ordered by prevalence (collapsing across belief report types).

These data also lend further credence to the possibility raised in Study 1 that this distinction may be more pronounced in some linguistic and cultural contexts. In particular, in both Studies 1 and 2 the difference in rates of “believe” responses between religious vs. matter-of-fact attitude reports was smaller among participants in Ghana than among participants in other sites. Study 2 begins to shed light on this difference across samples, by surfacing the fact that Ghanaian participants were far more likely to generate the word *nyim* (English translation: “know”) over either “think” or “believe.” Participants in other sites also generated “know” (or its counterparts in other languages) quite often; indeed, “know” was the most frequent word stem generated in Study 2, and was particularly frequent for fact-based attitude reports (see Figure 2). But participants in the Ghanaian sample were the only group to prefer “know” (Fante: *nyim*) over “think” and “believe” for *both* types of attitude reports. We return to these observations in the General Discussion.

Study 3: Forced choice, controlled content

Study 3 provided a final, more closely-controlled test of the overarching hypothesis, by matching the literal content of the complement phrase but manipulating the surrounding context to be more “religious” or more “factual.” Methods closely followed Heiphetz et al. (2018), Study 3, in which English-speaking US adults were found to be more likely to choose “believe” (rather than “think”) to complete sentences when they were presented in a religious vs. matter-of-fact context.

Methods

Participants The final sample included 328 participants (US: $n=57$; Ghana: $n=70$; Thailand: $n=72$; China: $n=49$; Vanuatu: $n=80$). An additional 65 adults were excluded from the sample because they failed an attention check ($n=16$) or because they completed Study 3 after completing one of the other studies included in this paper, which could have affected their responses to this study ($n=49$).

Materials and procedure Methods were identical to Study 1, except that, rather than each attitude report varying in the content of the complement phrase, five key attitude reports were each presented in two contexts: a brief vignette with either “religious” or “factual” content. For example, the item “[Character] now [thinks / believes] that there is alien life on earth” was presented twice: once in a religious context (*Jeff is a member of the church of Scientology. He has practiced that religion for many years. He always reads the church’s sacred texts. Today he read in his holy book that powerful alien beings from outer space long ago came to live on earth. Jeff now [believes / thinks] that there is alien life on earth.*) and once in a closely-matched factual context (*Max is a member of the research organization called NASA. He has studied astronomy for many years. He always reads NASA’s research reports. Today he read in a research report that a rock from outer space crashed on earth, carrying alien bacteria. Max now [thinks / believes] that there is alien life*

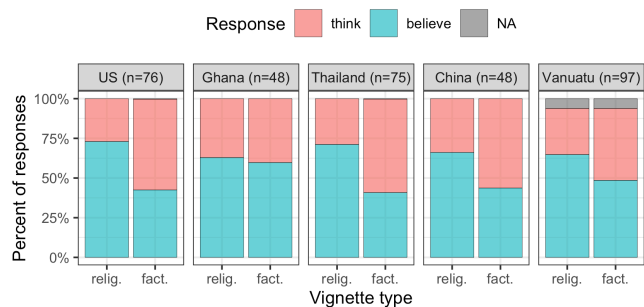


Figure 3: Study 3 results. Participants in the US, Thailand, China, and Vanuatu—but not Ghana—were more likely to select “believe” to complete an attitude report when it was embedded in a religious (vs. factual) vignette.

on earth.) The 10 vignettes were presented in one of two counterbalanced orders. The “religious” vignettes included diverse religious traditions, and the “factual” vignettes were scientific, historical, or commonsensical in nature.

Results and Discussion

As hypothesized, participants were generally more likely to select “believe” when a given attitude report was embedded in a religious vignette than when the same item was embedded in a factual vignette ($\beta=0.21$, $p=0.010$), even while statistically controlling for differences in the overall rates of selecting “believe” across field sites.

Echoing Studies 1-2, the distinction between religious and scientific vignettes was more pronounced in the US ($\beta=0.07$, $p=0.004$) and Thailand ($\beta=0.05$, $p=0.002$) and less pronounced in Ghana ($\beta=-0.09$, $p<0.001$); it did not differ from the grand mean among participants in China ($\beta=0.01$, $p=0.602$) or Vanuatu ($\beta=-0.02$, $p=0.161$).

Again, however, secondary analyses confirmed that this difference was significant in four of the five sites considered alone (US: $\beta=0.31$, $p<0.001$; Thailand: $\beta=0.30$, $p=0.009$; China: $\beta=0.23$, $p=0.039$; Vanuatu: $\beta=0.08$, $p=0.050$). The exception to this rule was that participants in Ghana were no more or less likely to circle “believe” for religious vs. scientific vignettes ($\beta=0.02$, $p=0.748$). See Figure 3.

We consider the US results to be a clear replication of Heiphetz et al. (2018), Study 4.

In addition, Study 3 offers a third piece of converging evidence that the distinction between religious credence and factual belief is robustly evident among participants speaking languages other than English in cultural-religious contexts other than the US.

At the same time, this study revealed the most dramatic difference across field sites, with participants in Ghana treating religious and factual vignettes similarly while participants in other sites differentially preferred “believe” in religious vignettes. This echoes the results of Studies 1-2, in which the difference between religious vs. matter-of-fact attitude reports was smaller among Ghanaian participants than in any other sample.

General Discussion

Our studies show that people speaking diverse languages and in diverse cultural contexts distinguish between religious and matter-of-fact cognitive attitudes in their use of epistemic verbs. *Believe* (American English), *gye dzi* (Fante), เชื่อ (Thai), 相信 (Mandarin Chinese), and *bilif* (Bislama) were each used preferentially in attitude reports of a religious nature. In our view, the most parsimonious explanation of our results is that a folk distinction between religious credence vs. factual belief exists in many cultural contexts; ordinary people can keep track of that difference; and speakers use epistemic verbs differently in whatever their native language is in order to keep track of that difference in their nuanced attitude reports.

This is not to say that the only use of “believe” and its counterparts in other languages is for reporting religious credences; indeed, there is a great deal of flexibility to the purposes to which epistemic verbs can be put. But it is clear that if a religious credence attitude is to be reported, people’s default is to use a word like “believe” to express it.

The studies we conducted rule out several alternate explanations of this differentiating pattern of word choice.

If the choice of “believe” merely marked a sense that the subject of the sentence was uncertain as to whether the attributed content is true, then we should have seen a greater incidence of “believe” for content that is less well known—i.e., “esoteric facts” and perhaps “personal life facts”—than for well-known facts. We did not observe this in the current studies—in fact, sentences about well-known facts generally elicited more uses of “believe” than other matter-of-fact sentences in Studies 1-2. This shows that use of “believe” to indicate hedging cannot explain the pattern of difference that emerges in our data (see also Heiphetz et al., 2018).

Likewise, if the word “believe” reflected only something religious about the content of the reported attitude (rather than the attitude itself), then we shouldn’t have seen the striking differences that we saw in most field sites in Study 3, in which propositional complements (e.g., *that there is alien life on earth*) were matched exactly and only the broader context of the vignette varied.

If the choice of “believe” indicated that the *participant* objected to the content of the attributed attitude, then we should have found an effect of religion on word choice, with people using “believe” more for religions that are not their own. No such pattern emerged—in fact, in Studies 1-2 participants were more likely to use “believe” in sentences with content from the religion that was more salient in their local context (Christianity in the US, Ghana, and Vanuatu; Buddhism in Thailand and China), and this pattern was particularly pronounced in the most devoutly religious samples (in Ghana and Vanuatu).

Finally, if the differentiation between factual belief and religious credence were unique to WEIRD cultural contexts (Henrich et al. 2010), we would not have seen the striking similarities across cultures that we did.

In fact, the results of these studies were strikingly similar across all of our field sites, with one exception: The distinction in participants’ use of “believe” between religious

vs. matter-of-fact attitude reports was clearly present, but significantly attenuated, among Ghanaian participants in Studies 1-2—and attenuated to the point of absence in the Ghanaian sample in Study 3. Ongoing studies will assess the possible roles of methodological differences (verbal vs. written task administration) and differences in education and socio-economic status in these findings. Based on the ethnographic observations of others on our broader project team, however, we speculate that it may be more common in the Ghanaian cultural-religious context to regard supernatural ideas in a more matter-of-fact way (Dulin, 2020; Dzokoto, 2020). That is, it may be more common in Ghana than in the other sites for people to hold factual beliefs about religious contents—a possibility that Van Leeuwen (2014) discusses at a theoretical level, but which has yet to be documented empirically. If it is true that attitude and content vary independently, there is nothing in principle impossible about having factual beliefs with religious contents, and it may vary from culture to culture to what extent such a mental state is and is regarded as normal. This aligns with the uniquely strong preference of Ghanaian participants in Study 2 to use a verb (*nyim*) that is semantically similar to the American English “know” to report both religious and matter-of-fact cognitive attitudes (see Figure 2). Strikingly, the apparent differences between Ghana and other sites cannot be explained by the lack of Christianity, as some anthropologists might suggest—the great majority of our Ghanaian participants were devoutly Christian.

Although the strength of the distinction in participants’ use of “believe” between religious vs. matter-of-fact attitude reports varied across field sites, the ability to represent the difference between factual belief and religious credence was robustly evident across these five diverse linguistic, cultural, and religious settings. Since these two attitudes are likely to have different effects on cognition, emotion, and behavior, marking such a distinction may be an important, and widely shared, component of theory of mind. Factual beliefs are used across settings to enable people to figure out how to achieve their goals; whereas religious credences, though more limited in use to sacred times and places, are used in guiding symbolic actions that are expressive of sacred values (Atran and Axelrod, 2008). It is thus of great practical importance for people to be able to keep track of that difference and communicate it to others in language.

Finally, it is worth returning to the broader issue with which we started. We noted at the outset that the ability to have different attitudes toward any given idea is an important form of human cognitive flexibility, and that one subtype of that flexibility is the ability to have distinct attitudes of factual belief and religious credence, and to convey this distinction in language. We presented it as an open question whether this more particular form of cognitive flexibility is limited to scholars, Westerners, Christians, or some other rarefied group, or whether it can be found in diverse cultural-religious contexts. The studies here support the conclusion that such cognitive flexibility is broadly shared across diverse linguistic, cultural, and religious contexts.

Acknowledgements

Thanks to the research teams and participants in each field site, especially to the team leaders in each site: Joshua Brahinsky and Nikki Ross-Zehnder (US), John Dulin and Vivian Dzokoto (Ghana), Felicity Aulino (Thailand), Emily Ng (China), and Rachel Smith (Vanuatu). Thanks to Dan Weiskopf for insight into the hypotheses tested here, and Larisa Heiphetz for help with study design and pre-registration. This material is based upon work supported by the John Templeton Foundation under Grant No. 55427. KW was also supported by the National Science Foundation Graduate Research Fellowship Program under Grant No. DGE-114747, and by a William R. & Sara Hart Kimball Stanford Graduate Fellowship.

References

- Asad, T. (1993). *Genealogies of religion: Discipline and reasons of power in Christianity and Islam*. Baltimore, MD: Johns Hopkins University Press.
- Atran, S. & Axelrod, R. (2008). Reframing sacred values. *Negotiation Journal*, 24, 221-246.
- Dulin, J. (2020). Vulnerable minds, bodily thoughts, and sensory spirits: Local theory of mind and spiritual experience in Ghana. *Journal of the Royal Anthropological Institute*, 26 (S1), 61-76.
- Dzokoto, V.A. (2020). *Adwenhoasem*: An Akan theory of mind. *Journal of the Royal Anthropological Institute*, 26 (S1), 77-94.
- Goddard, C. (2010). Universals and variation in the lexicon of mental state concepts. In Malt & Wolff (Eds.), *Words and the Mind: How Words Capture Human Experience* (pp. 72–92). New York, NY: Oxford University Press.
- Heiphetz, L., Landers, C. & Van Leeuwen, N. (2018). Does think mean the same thing as believe? Linguistic insights into religious cognition. *Psychology of Religion and Spirituality*.
- Henrich, J. Heine, S.J. & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences*, 33, 61-83.
- Luhmann, T.M. (2018). The faith frame: Or, belief is easy, faith is hard. *Contemporary Pragmatism*, 15, 302-318.
- Luhmann, T.M. (Ed.) (2020). Mind and spirit: A comparative theory [Special issue]. *Journal of the Royal Anthropological Institute*, 26 (S1), 1-166.
- Shah, N. & Velleman, J.D. (2005). Doxastic deliberation. *Philosophical Review*, 114, 497-534.
- Weisberg, D.S. (2013). Distinguishing imagination from reality. In Taylor (Ed.), *Oxford Handbook of the Development of Imagination* (pp. 75–93). New York, NY: Oxford University Press.
- Toren, C. (2007). How do we know what is true? The case of mana in Fiji. In Astuti, Parry, & Stafford (Eds.) *Questions of Anthropology*. New York, NY: Berg.
- Van Leeuwen, N. (2014). Religious credence is not factual belief. *Cognition*, 133, 698-715.
- Van Leeuwen, N. (2017). Two paradigms for religious representation: The physicist and the playground (a reply to Levy). *Cognition*, 164, 206-211.
- Wierzbicka, A. (2007). Is “remember” a universal human concept? “Memory” and culture. In Amberber (Ed.), *The Language of Memory in Cross-linguistic Perspective* (pp. 13–39). Amsterdam, the Netherlands: John Benjamins.