

"Think" and "Believe" Across Cultures: Religious & Factual Epistemic Verbs (#5427)

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Author(s)

Neil Van Leeuwen (Georgia State University) - nvan@gsu.edu

Larisa Heiphetz (Columbia University) - lah2201@columbia.edu

Tanya Luhrmann (Stanford University) - luhrmann@stanford.edu

1) Have any data been collected for this study already?

It's complicated. We have already collected some data but explain in Question 8 why readers may consider this a valid pre-registration nevertheless.

2) What's the main question being asked or hypothesis being tested in this study?

The question is whether several different languages exhibit a difference in word usage that parallels the difference between "think" and "believe" in American English. Data collected for an earlier study (Heiphetz, Landers, & Van Leeuwen, in preparation) strongly suggest that speakers of American English are more likely to use the verb "believe" to report religious cognitive attitudes and "think" to report more mundane, matter-of-fact cognitive attitudes.

Our overarching hypothesis for the present study is that other languages will contain a similar distinction in word usage. That is, other languages will have an epistemic verb that is more likely to be used for religious attitude reports (similar to English "believe") and a different epistemic verb that is more likely to be used for matter-of-fact attitude reports (similar to English "think").

For this study, we are examining five languages in five regions of interest: (i) Mandarin in China; (ii) Thai in Thailand; (iii) Bislama (an English-based creole language) on the Melanesian Island of Vanuatu; (iv) Fante in Ghana; and (v) American English in the Bay Area, California.

We thus have five more specific sub-hypotheses. For each of the first four languages / regions of interest, we hypothesize that a set of words or phrases exists whose usage parallels the difference between usage of "think" and "believe" in American English, with one word or phrase (the "think" analogue) being used for more matter-of-fact attitude reports and the other (the "believe" analogue) being more likely to be used for religious attitude reports. That gives us our first four sub-hypotheses: that Mandarin, Thai, Bislama and Fante speakers will each use two different words in a manner parallel to the use of "think" and "believe" in an American English setting as identified by Heiphetz, Landers, and Van Leeuwen. Our fifth sub-hypothesis is that the Bay Area portion of the study will replicate the results of the earlier study of Heiphetz, Landers, and Van Leeuwen.

3) Describe the key dependent variable(s) specifying how they will be measured.

The key dependent variable in each study is what epistemic verb participants use to fill in various blanks. For example, one sentence (e.g., "Julian [believes / thinks] that angels deliver messages from God") in a forced-choice condition will be completed by circling the verb that the participant finds most appropriate. Participants will write in their own choice of verb in the free-response condition. Thus, the dependent variable will be measured by what items participants circle or what verbs they write in.

In Ghana, the same surveys as are being done elsewhere will be administered orally, and responses will be collected by the researcher.

There are three surveys that have been translated into the several different languages. In all languages other than English, specific words or phrases have been chosen in advance as translations for "think" or "believe," and choice (or not) of these specific translations is the dependent variable for the surveys in the other languages.

Survey 1: a forced-choice sentence completion task, where the forced choice options are forms of "think" or "believe" (or their respective translations in the target language).

Survey 2: a free-response sentence completion task with all the same sentence contexts as Survey 1, where participants can choose whatever verb they want to fill in the blank.

Survey 3: a different forced-choice completion task, where participants must choose forms of "think" or "believe" (or their respective translations in the target language) to complete an attitude report that comes at the end of a short vignette.

4) How many and which conditions will participants be assigned to?

Participants at each of five sites will be assigned to complete one of three surveys (see list of countries in response to question #2 and description of each survey in response to question #3). Each survey has an A and B version with different question orders. All surveys will be done by paper and pen, except for the Fante surveys in Ghana, where a researcher will collect answers by oral interview, since Fante is not generally a written language.

5) Specify exactly which analyses you will conduct to examine the main question/hypothesis.

Survey 1: We will conduct a 5 (Site: China vs. Thailand vs. Vanuatu vs. Ghana vs. United States) x 2 (Statement Type: religion vs. fact) mixed ANOVA with repeated measures on the second factor and the proportion of trials on which participants completed sentences using a form the word "believe" (or its

respective translation) as the dependent measure. To look for finer-grained differences between different religious and factual statements, we will also conduct a 5 (Site: China vs. Thailand vs. Vanuatu vs. Ghana vs. United States) x 5 (Statement Type: Buddhist religious statements vs. Christian religious statements vs. life facts vs. well-known facts vs. esoteric facts) mixed ANOVA with repeated measures on the second factor and the proportion of trials on which participants completed sentences using a form of the word “believe” (or its respective translation) as the dependent measure. In all cases where omnibus ANOVAs are significant, we will conduct pairwise analyses comparing each statement type with each other statement type and each site with each other site.

Survey 2: Responses will be coded in two ways. First, participants will receive a 1 if they use a form of the word “believe” (or its respective translation) and a 0 if they use any other word or phrase, including “think” (or its translation) as well as any non-target words (know, learn, say, etc., or non-target words in other languages). These data will be analyzed as described above for Survey 1. Second, participants will receive a 1 if they used any word or phrase other than a form of “think” or “believe” (or their translations in other languages), and they will receive a 0 if they use any form of “think” or “believe” (or their translations in other languages). These data will also be analyzed as described above for Survey 1.

Survey 3: We will conduct a 5 (Site: China vs. Thailand vs. Vanuatu vs. Ghana vs. United States) x 2 (Vignette Type: religion vs. fact) mixed ANOVA with repeated measures on the second factor and the proportion of trials on which participants completed sentences using a form the word “believe” (or its translation) as the dependent measure. If this omnibus ANOVA is significant, we will conduct pairwise analyses comparing each statement type with each other statement type and each site with each other site.

6) Any secondary analyses?

In each survey, we will conduct analysis to determine whether responses vary according to demographic factors such as religion. The demographic questionnaire asks participants whether they are part of any religious group, and we will conduct ANOVAs with participant religious group as an independent variable and proportion of “believe” (or its translation) responses (and, in Survey 2, proportion of non-target word responses) as the dependent variable to determine whether responses differ across religious groups. The religious groupings will be determined based on the number of participants who claim particular religious categories. We will seek to create approximately equal groups by, for example, combining minority religions into one category or comparing people who identify with a religious group vs. people who don’t identify with a religious group, depending on the number of participants who identify with any given group. The demographic questionnaire also contains several continuous measures of religiosity. We will correlate responses to these measures with the dependent measures described in the previous question.

7) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.

Each survey (1, 2, or 3) will have approximately 50 participants in each region of interest. No participant will do more than one survey. Thus, there will be approximately 150 participants in each region of interest. Given that there are five regions, that makes for approximately 750 participants altogether. It is possible that experimenters will not be able to recruit this many participants in all regions; for example, participants in some countries may be particularly hesitant to participate in psychological research. If this is the case, recruitment will continue until resources are depleted (e.g., experimenters have tested everyone in a given region who is willing to participate).

The target sample size was determined by consulting recommendations for psychologists (e.g., Lakens & Evers, 2014; Simmons, Nelson, & Simonsohn, 2013).

8) Anything else you would like to pre-register? (e.g., data exclusions, variables collected for exploratory purposes, unusual analyses planned?)

At the end of each survey, participants are asked to indicate one question they answered without turning back to the rest of the survey. This will serve as an attention check. Data from participants who do not correctly answer this question will be excluded from analyses.

We put “It’s complicated” on Question 1 for the following reason. Although none of the paper-and-pen interviews have been collected in four regions of interest, as of today (September 8, 2017), we have conducted the majority of our planned 150 face-to-face interviews in Ghana. We started those face-to-face interviews earlier than the other pen-and-paper surveys for logistical reasons. Still, this should be considered a valid pre-registration, because (i) the analyses selected here were largely determined by a previous study (Heiphetz, Landers, and Van Leeuwen, in preparation), (ii) data from the Ghana interviews are still in the hands of research assistants and have not yet been cleaned or looked at by the main researchers, and (iii) the vast majority of data have yet to be collected.