Representational coexistence in the God concept: Core knowledge intuitions of God as a person are not revised by Christian theology despite lifelong experience

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Abstract

Previous research has shown that in the minds of young adult religious adherents, acquired theology about the extraordinary characteristics of God (e.g., omniscience) coexists with, rather than replaces, an initial concept of God formed by co-option of the person concept. We tested the hypothesis that representational coexistence holds even after extensive experience with Christian theology, as indexed by age. Christian religious adherents ranging in age from 18 to 87 years were asked to evaluate as true or false statements on which core knowledge intuitions about persons and Christian theology about God were consistent (both true or both false) or inconsistent (true on one and false on the other). Results showed, across adulthood, more theological errors in evaluating inconsistent versus consistent statements. Older adults also exhibited slower response times to inconsistent versus consistent statements. These findings show that despite extensive experience, indeed a lifetime of experience for some participants, the Christian theological God concept does not separate from the initial person concept from which it is formed. In fact, behavioral signatures of representational coexistence were not attenuated by experience. We discuss the broader implications of these findings to the acquisition of evolutionarily new concepts.

Keywords Core knowledge · Person concept · God concept · Religious beliefs · Conceptual change

Introduction

The past few decades of research in cognitive development have revolutionized our most basic theories about the ontology of concepts. In infancy, domain-specialized learning mechanisms scaffold the development of concepts of physical entities and their mechanical properties, animate agents and their patterns of self-propelled motion, intentional agents and their mental states, natural kinds and their properties, numerosities, and others (Baillargeon, Scott, & Bian, 2016; Carey, 2009; Inagaki & Hatano, 2002; Spelke, 1990). The architecture of this reliably developing conceptual repertoire has been designed by natural selection to track fitness-relevant

features of the environments in which humans evolved. A fundamental insight of this view is that our representations of the world are not necessarily veridical—rather, organisms of different species carve the world along lines that were relevant for the survival and reproduction of the ancestors of that species (Tooby, Cosmides, & Barrett, 2005).

Beyond this core conceptual repertoire, however, humans have the capacity to acquire “evolutionarily new” concepts, or concepts that were not targets of natural selection (Sperber & Hirschfeld, 2004, refer to these as concepts that exist within the actual but not proper domain of evolved mechanisms): of subatomic particles, of an infinite universe, of geological and evolutionary processes, and of extraordinary beings.¹ What is the relationship between these concepts and the core

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¹ A debate in the literature concerns whether natural selection shaped our minds to represent concepts of extraordinary beings. Notably, Norenzayan (2013) argues that representations of omniscient and moralizing gods were culturally and perhaps genetically selected to promote cooperation in large groups. A full discussion of this debate is beyond the scope of this article, but we consider the by-product view, most notably advanced by Boyer (2001), more likely. See for example Baumard, Hyafil, Morris, and Boyer (2015) for a cogent critique of Norenzayan (2013).

conceptual repertoire? We address this question by focusing on the case study of the God concept in Christian theology.

The God concept is formed by co-opting the person concept, a reliably developing set of core knowledge intuitions about the physicality, biology, and psychology of persons (Boyer, 2001).² For example, Lane, Wellman, & Evans, (2010) showed that Midwestern U.S. children younger than 5 who explicitly attributed constrained knowledge to persons (e.g., their mom) on verbal response tasks did also to God. That is, initially children conceptualize God's knowledge as that of a person. The God concept is then modified to represent those characteristics that set God apart from ordinary persons. In Lane et al. (2010), children older than 5 differentiated between persons and God, to whom they attributed extraordinary knowledge.³ A question that follows from this is whether the modified God concept, which includes characteristics incompatible with the person concept, replaces the person representations on which it is initially formed (Barret, 1999; Barret & Keil, 1996; Boyer, 2001).

Barlev, Mermelstein, & German, (2017) found evidence that later-acquired Christian theological representations of God do not replace initial person representations of God but rather coexist alongside them. In three studies, young adult Christian religious adherents evaluated as true or false statements in which their formal theology about God and intuitions about persons were consistent or inconsistent. If initial person representations of God are replaced by later-acquired representations, then accuracy and response time should be independent of consistency with intuitions about persons. For example, statements such as "God has beliefs that are true" (true according to both intuition and theology) and "all beliefs God has are false" (false according to both) should be responded to with the same accuracy and time as statements such as "God has beliefs that are false" (false theologically but true intuitively) and "all beliefs God has are true" (true theologically but false intuitively). However, if initial person representations of God coexist with later-acquired representations, then they might interfere with them. Indeed, participants in Barlev et al. (2017) made more theological errors and were slower when evaluating inconsistent compared with consistent statements.

Lane, Wellman, & Evans, (2014) suggest that a full understanding of extraordinary characteristics such as omniscience

develops slowly. In their Experiment 1, participants who varied in age (3-5, 6-12, and 18-21 years) were introduced to an agent (Mr. or Ms. Smart) who "knows everything about everything" and were asked six questions about this agent's mental states (e.g., "Does Mr./Ms. Smart know what you're thinking right now?"). Only 16% of the youngest participants attributed full omniscience to Mr./Ms. Smart ("yes" answers to all 6 questions about the breadth and depth of omniscience, i.e., knowledge of all domains, and all knowledge within a specific domain), whereas 63% (statistically not different from chance performance) and 83% of participants in the middle and older groups, respectively, did so.

Because a full understanding of omniscience, and possibly other extraordinary characteristics, develops slowly, it is possible that the young adult participants in Barlev et al. (2017) had not yet acquired a full understanding of God's omniscience, omnipresence, and incorporeality or had not had enough experience with it for it to fully replace their initial understanding of God. The present study expanded on Barlev et al. (2017) by searching for behavioral signatures of representational coexistence in a sample of Christian religious adherents that varies in theological experience, as indexed by age.

While there are no prior studies of representational coexistence in the God concept of older adults, recent studies of older adults show evidence of coexistence in science concepts. Shtulman and Harrington (2016) presented adult participants varying in age with statements where naïve and scientific theories were consistent (i.e., true according to both, or false according to both) or inconsistent (i.e., true naively but false scientifically, or false naively but true scientifically). Both younger and older adults made more scientific errors and were slower responding to inconsistent statements (e.g., "the earth revolves around the sun" which is scientifically true but intuitively false) compared with consistent statements (e.g., "the moon revolves around the earth," which is both scientifically and intuitively true). In the present study, the full set of science items used by Shtulman and Harrington (2016) are embedded among the religion items for comparison.

The present study was designed to answer two primary questions:

(1) Are initial representations of God as a person replaced by acquired Christian representations of an omniscient, omnipresent, and incorporeal God in participants with extensive maturation and/or theological experience?

(2) If initial representations of God as a person are not replaced (indeed, if they are not replaceable), does maturation and/or theological experience attenuate conflict between them and acquired Christian representations of God?

We additionally wanted to answer two secondary questions concerning individual differences in religious expertise and executive functions. We present these in the [Supplementary Materials](#).

² We use the term "core knowledge intuitions" throughout this manuscript to capture our view that it is the output of such cognitive mechanisms that is responsible for the initial person representation of extraordinary supernatural entities. For brevity, we also use this term to capture representations in the domain of science (see e.g. pp. 6-7), although it is important to note that the status of these representations is less precisely captured by this term. In the domain of science initial core knowledge intuitions are elaborated into what may be thought of as "naïve" scientific beliefs, which develop reliably and early but which are not necessarily directly the output of core knowledge mechanisms.

³ See Heiphetz et al. (2016) for a recent review of children's representation of the psychology of God.

Methods

Participants

Participants were recruited from Christian churches in Southern California. Participants⁴ ($N = 67$; 24 males) ranged in age from 18 to 87 years ($M_{\text{age}} = 46$, $SD_{\text{age}} = 24$); approximately 30% of participants were 18 to 21 years (due to the proximity of some of these churches to a university), approximately 45% were between 22 and 64 years, and approximately 25% were 65 years and older. Sixty percent of participants identified as white, 19% identified as Hispanic or Latino, 15% identified as East Asian, and 6% identified with another ethnicity or background.

Eighty-two percent of participants identified as Roman Catholic, 8% identified as Episcopalian, and the remaining 10% identified with a variety of other mainstream Protestant denominations. The majority of participants (96%) reported growing up with a mainstream Christian religion (with the remainder reporting growing up without a religion but of having been affiliated with their present religion for many—up to 45—years); 76% currently identified with the religion with which they grew up; 82% of participants currently identified as Catholic having also grown up as Catholic. Eighty-five percent of participants identified as moderately or very religious ($M_{\text{religiosity}} = 2.27$, $SD_{\text{religiosity}} = 0.75$; 0 = not at all, 1 = slightly, 2 = moderately, 3 = highly); 90% of participants identified as moderately or very spiritual ($M_{\text{spirituality}} = 2.46$, $SD_{\text{spirituality}} = 0.68$), and the two were strongly correlated ($r(65) = 0.44$, $p < 0.001$).

Design

The dependent variables were the magnitude of interference between consistent and inconsistent statements, calculated for both accuracy and response time, for each of the two domains (religion and science) in a repeated-measures design. Theological experience was indexed by age, which was coded as a between-subjects factor in two separate ways: dichotomized to create a two-level between-subjects age factor (older vs. younger), and tertitized to create a three-level between-subjects age factor (older vs. middle vs. younger). Finally, age was analyzed continuously in linear regressions.

Materials

The religion statements ($n = 48$), pertaining to doctrines about the physical and psychological characteristics of God in

mainstream Christian theology, were from Barlev et al. (2017). Statements were constructed in quartets; each quartet pertained to a particular theological doctrine (e.g., infallibility). In each quartet, there was a pair of *consistent* statements (true according to both intuitions about persons and Christian theology about God, or false according to both) and a pair of *inconsistent* statements (true intuitively but false theologically, or false intuitively but true theologically; Table 1).

The science statements ($n = 200$), pertaining to theories about ten areas of mathematics and science (astronomy, evolution, fractions, genetics, germs, matter, mechanics, physiology, thermodynamics, and waves), were from Shtulman and Harrington (2016) and were similarly constructed (Table 2).

Thus, within each quartet there were two true and two false statements according to religion or science. The four statements within each quartet were further balanced in terms of overall sentence structure, complexity, and length in words. The full list of statements can be found in the [Supplementary Materials](#).

On the Sentence Verification Task, *accuracy interference* was calculated by subtracting the mean accuracy on inconsistent statements from the mean accuracy on consistent statements, and *response time interference* was calculated by subtracting the mean response time on consistent statements from the mean response time on inconsistent statements. Thus, for both accuracy and response time, performance on consistent statements was a baseline with which performance on inconsistent statements was compared; higher accuracy and response time interference scores indicate poorer performance on inconsistent versus consistent statements.

Additionally, participants took a survey that included demographic questions and the following indices of explicit beliefs about God: “Do you believe that God is physical in the same manner humans are physical?” (Yes/No/Unsure), “Do you believe God has feelings and thoughts in the same manner humans have feelings and thoughts?” (Yes/No/Unsure).⁵

Procedure

Participants were tested in semiprivate computer stations in an experimental psychology laboratory (87%) or on laptop computers in a quiet room in their church (13%). A typical study session lasted between 30 and 60 minutes but with up to 120 minutes for the older participants who were generally slower on all parts of the study. Participants received \$20.

The sentence verification task items were presented one-by-one and in a randomized order, and whether the right or left hand was used to respond “true” or “false” was randomized between participants. The instructions to the sentence verification task emphasized accuracy but not response time, and responses were collected via key presses (presented via E-Prime software).

⁴ Nine participants were excluded from this final sample: two for identifying as atheist or agnostic, three for identifying with non-Christian religions, one for identifying as a Christadelphian, which is a Christian denomination with non-mainstream theological doctrines (e.g., nontrinitarianism), one for experimenter failure to record religious affiliation, and two for participant failure to follow instructions on the sentence verification task.

⁵ These questions were added to the experiment after it had started, and data on these questions is therefore missing for 17 participants.

Table 1 Sample statements from the domain of religion

Consistency	Intuition	Theology	Religion statements
<i>Consistent</i>	T	T	God has beliefs that are true.
	F	F	All beliefs God has are false.
<i>Inconsistent</i>	T	F	God has beliefs that are false.
	F	T	All beliefs God has are true.
<i>Consistent</i>	T	T	God can hear what I say out loud.
	F	F	God can't hear what I say out loud.
<i>Inconsistent</i>	T	F	God can't hear what I say to myself.
	F	T	God can hear what I say to myself.
<i>Consistent</i>	T	T	God can be present at my church and at other churches as well.
	F	F	God is never present at my church, nor is He present anywhere else.
<i>Inconsistent</i>	T	F	Sometimes God is at my church, and sometimes He is at other churches.
	F	T	God is at all times both at my church and at other churches.

Consistent statements are true for both intuition and theology. Inconsistent statements are true for one and false for the other. Statements are from Barlev et al. (2017)

Results and Discussion

The analyses presented here use accuracy and response time interference scores. See [Supplementary Materials](#) for pirate plots of consistent and inconsistent items separately. The data used in the analyses presented here were manipulated by removing data points above or below 3 SD from each participants' mean response time, separately on consistent and inconsistent religion and science items; less than 2% of data points were removed in this way. Additionally, to maximize transparency, we present both response time data computed from correct responses only (as in Barlev et al., 2017) and from correct and incorrect responses. Lastly, following the recommendation by Steegen

et al. (2016), we present a multiverse analysis exploring different outlier removal strategies. The overall conclusions of the present study remain the same with all outlier removal strategies explored, including the strategy of not removing outliers at all.

Response interference is evident in older adults

We first tested for response interference in the full sample and then, to evaluate whether response interference exists in older adults, in the sample dichotomized and tertitized by age. The dichotomized sample was comprised of two groups: 18- to 45-year-olds ($n = 34$) and 46- to 87-year-olds ($n = 33$). The tertitized sample was comprised of three groups: 18- to 25-year-olds ($n =$

Table 2 Sample statements from the domain of science

Consistency	Intuition	Science	Science statements
<i>Consistent</i>	T	T	Rocks are composed of matter.
	F	F	Numbers are composed of matter.
<i>Inconsistent</i>	T	F	Fire is composed of matter.
	F	T	Air is composed of matter.
<i>Consistent</i>	T	T	People turn food into energy.
	F	F	Rocks turn food into energy.
<i>Inconsistent</i>	T	F	Plants turn food into energy.
	F	T	Bacteria turn food into energy.
<i>Consistent</i>	T	T	Humans are descended from tree-dwelling creatures.
	F	F	Humans are descended from plants.
<i>Inconsistent</i>	T	F	Humans are descended from chimpanzees.
	F	T	Humans are descended from sea-dwelling creatures.

Consistent statements are true for both intuition and science. Inconsistent statements are true for one and false for the other. Statements are from Shtulman and Harrington (2016)

Table 3 Response accuracy (ACC) and time (RT) interference scores throughout adulthood

		Full sample	Dichotomized		Tertiarized		
			Younger	Older	Younger	Middle	Older
Religion	ACC	7%***	7%***	7%***	7%***	8%***	6%**
	RT ¹	308 ms**	152 ms	469 ms**	196 ms	231 ms	500 ms**
	RT ²	459 ms***	260 ms [†]	663 ms***	287 ms [†]	394 ms [†]	698 ms*
Science	ACC	20%***	20%***	21%***	20%***	19%***	22%**
	RT ¹	1039 ms***	887 ms***	1194 ms***	840 ms***	916 ms***	1366 ms***
	RT ²	866 ms***	740 ms***	993 ms***	704 ms***	819 ms***	1076 ms***

Interference scores are computed as consistent minus inconsistent for response accuracy and inconsistent minus consistent for response time

RT¹ are computed with correct responses. RT² are computed with correct and incorrect responses

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; [†] $p < 0.10$

22), 26- to 60-year-olds ($n = 23$), and 62- to 87-year-olds ($n = 22$). The accuracy and response time differences were analyzed using one-sample t tests. Table 3 presents the results of these analyses. Tables 5 and 6 in the Appendix present a multiverse analysis.

In the full sample, religion and science response interference was evident from both accuracy and response time differences between consistent and inconsistent items. In the dichotomized and tertiarized samples, religion response interference was fully evident in the older group and partially evident in the younger group (dichotomized sample) and in the younger and middle groups (tertiarized sample), where response time differences achieved marginal statistical significance when computed with correct and incorrect responses but did not achieve statistical significance when computed with correct responses only. In both the dichotomized and tertiarized samples, science response interference was fully evident in all groups.

Response interference is invariant with maturation and theological experience

A series of Bayesian linear regressions, computed using JASP 0.8.1.2. (JASP Team, 2017), were used to evaluate the relationship between theological experience and response interference, using age (our index of experience) as a continuous predictor. Because a plausible hypothesis considered in the present analysis is the null, Bayes factors showing support for the null versus the alternative were computed (with priors set to the default in JASP 0.8.1.2., which is $r = 0.354$). The Bayes Factors in support of the null hypothesis that religion and science accuracy interference scores did not vary with age were 3.91 and 3.63 (both moderate evidence in support of the null). The Bayes Factors in support of the null hypothesis that religion and science response time interference scores did not vary with age were 1.39 and 0.67 (which

support neither hypothesis).⁶ See Tables 7 and 8 in the Appendix for a multiverse analysis. The regressions are displayed in Fig. 1.

Additionally, in our sample there were three participants with Master's degrees in Theology and with decades of experience teaching theology, each in a different setting (a religious school, a youth ministry, and a church). We viewed these participants as case studies of particularly high theological expertise. The religion accuracy interference scores of 2 of the 3 were in the predicted direction (4%, 8%, and -4%), and all three had religion response time interference scores in the predicted direction (425 ms, 361 ms, and 607 ms, respectively).

Response interference is invariant with explicit beliefs about God

As noted, a full understanding of God's extraordinary characteristics is difficult to acquire. This may mean that some individuals in our sample explicitly believe that some of God's characteristics are quantitatively but not qualitatively different from those of a person. For instance, they might represent God's mental states not as omniscient ("knows everything about everything") but as extensive ("knows very many things about very many things"); an 85-year-old participant who said that God has feelings and thoughts in the same manner humans have feelings and thoughts commented to the experimenter, "But billions of times more. I can't imagine what He is like." Overall, in our sample 18% of participants reported believing that God is physical in the manner humans are physical (6% were unsure), and 36% reported that God has feelings and thoughts in the same manner humans have feelings and thoughts (14% were unsure).

Thus, is it possible that core knowledge intuitions are replaced only among individuals who explicitly believe that God is qualitatively different from a person? A categorical explicit beliefs composite variable, indexing the extent to which participants explicitly attributed person characteristics to God, was computed as follows: participants providing two "no" answers were coded as explicitly believing in an abstract God; participants providing

⁶ Because the data reported are not normally distributed, Bayesian Kendall's tau coefficients were additionally calculated. The tau tests yielded identical conclusions to those reported using the Bayesian regressions.

Fig. 1 Scatterplots of performance for the sentence verification task with age. Circles represent participant accuracy (% correct) or response time (milliseconds) interference scores. The shaded areas around the regression lines represent the 95% confidence intervals

two “yes” or “unsure” answers were coded as explicitly believing in a person-like God; and participants providing one “no” and one “yes” or “unsure” answers were coded as explicitly believing that God is both abstract and person-like (regarding different characteristics). The representational coexistence hypothesis predicts that we will find evidence of response interference among participants who report explicitly believing in an abstract God. We stacked the cards against this prediction by coding “unsure” along with “yes.” The findings reported below are the same if we code “unsure” with “no.”

One-sample *t* tests showed that religion accuracy interference was significantly different from zero in all three explicit beliefs groups, and that religion response time interference, when computed with correct and incorrect responses, was different from zero in one of the three groups (marginal when

computed with correct responses only) and marginally different in another. Thus, response interference is invariant with explicit beliefs about God. See Table 4 for a summary.

Conclusions

The present study evaluated the hypothesis that intuitions about God as a person coexist with acquired Christian theology about God and are not replaced even with maturation and extensive theological experience. We indexed representational coexistence with performance on a task in which participants were asked to evaluate as true or false statements for which core intuitions about persons and acquired Christian theology about God were consistent (both true or both false) or inconsistent (one true and the other false). If the intuitions on which the initial representations of God are based are replaced by Christian theology, then performance should not differ between consistent and inconsistent statements. However, if these intuitions are not replaced then they may interfere with Christian theology, resulting in worse performance on inconsistent statements.

First, it was found that Christian religious adherents made more theological errors and were slower responding to inconsistent versus consistent statements. Importantly, this response pattern was found among older adults when they were examined separately. Furthermore, this response pattern was found in participants who reported explicitly believing in an abstract God. We

Table 4 Religion sentence verification task accuracy (ACC) and response time (RT) scores given different explicit beliefs about God

	Abstract (<i>n</i> = 23)	Both (<i>n</i> = 17)	Person-like (<i>n</i> = 10)
ACC	9% (9%)***	6% (6%)**	3% (3%)*
RT ¹	276 ms (697 ms) [†]	469 ms (918 ms) [†]	166 ms (1063 ms)
RT ²	512 ms (1260 ms) [†]	587 ms (968 ms)*	185 ms (1064 ms)

RT¹ are computed with correct responses. RT² are computed with correct and incorrect responses

****p* < 0.001; ***p* < 0.01; **p* < 0.05; [†]*p* < 0.10

therefore can conclude that it is not likely that initial representations of God as a person are replaced by Christian theological representations of God as omniscient, omnipresent, and incorporeal, even following extensive theological experience—indeed, a lifetime of experience.

Second, performance on the task was invariant with maturation and theological experience: age did not attenuate conflict between core intuitions about persons and Christian theology about God. The same null findings for age were found for science items. In contrast, Shtulman and Harrington (2016) found that, compared with younger adults, older adults in their study (community members and university professors) made slightly fewer scientific errors but were slightly slower responding to inconsistent versus consistent statements. While this response pattern might be due to the effects of scientific experience, it alternatively might be due to a changing response

strategy wherein among older adults response time is traded off for accuracy (Starns & Ratcliff, 2010).

The findings reported are compatible with the idea that one way in which humans form concepts that were not targets of natural selection is by co-opting and modifying the conceptual output of mechanisms that are part of our evolved core cognitive architecture. In the case of scientific theories, initial theories of the world impede the fluidity with which later-acquired theories are utilized (Shtulman & Valcarcel, 2012), even after much scientific experience has been accumulated (Shtulman & Harrington, 2016; see Shtulman, 2017, for a recent review). The same pattern has been demonstrated here for the case of Christian theology about God. We speculate that coexistence with core knowledge concepts, and consequent interference from those concepts, is a signature property of reasoning about bodies of evolutionarily new knowledge in general.

Appendix

Table 5 Multiverse analysis of response accuracy interference scores

Data processing	Religion						Science					
	Dichotomized			Tertitized			Dichotomized			Tertitized		
	Total	Younger	Older	Youngest	Middle	Oldest	Total	Younger	Older	Youngest	Middle	Oldest
<i>p</i> value												
No-transform												
None	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
± 0.5%	<0.001	<0.001	<0.001	<0.001	<0.001	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
± 2.5%	<0.001	<0.001	<0.001	<0.001	<0.001	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
± 2SD	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
± 3SD	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Log-transform												
None	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
± 0.5%	<0.001	<0.001	<0.001	<0.001	<0.001	.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
± 2.5%	<0.001	<0.001	<0.001	<0.001	<0.001	.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
± 2SD	<0.001	<0.001	<0.001	<0.001	<0.001	.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
± 3SD	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BF ₁₀												
No-transform												
None	>1000	>1000	>1000	312.13	>1000	54.72	>1000	>1000	>1000	>1000	>1000	>1000
± 0.5%	>1000	>1000	686.17	164.69	219.58	11.22	>1000	>1000	>1000	>1000	>1000	>1000
± 2.5%	>1000	>1000	686.17	164.69	219.58	11.22	>1000	>1000	>1000	>1000	>1000	>1000
± 2SD	>1000	>1000	>1000	275.37	701.19	17.18	>1000	>1000	>1000	>1000	>1000	>1000
± 3SD	>1000	>1000	>1000	321.82	842.26	18.56	>1000	>1000	>1000	>1000	>1000	>1000
Log-transform												
None	>1000	>1000	>1000	312.13	>1000	54.72	>1000	>1000	>1000	>1000	>1000	>1000
± 0.5%	>1000	>1000	686.17	164.69	219.58	11.22	>1000	>1000	>1000	>1000	>1000	>1000
± 2.5%	>1000	>1000	686.17	164.69	219.58	11.22	>1000	>1000	>1000	>1000	>1000	>1000
± 2SD	>1000	>1000	>1000	316.85	968.55	21.87	>1000	>1000	>1000	>1000	>1000	>1000
± 3SD	>1000	>1000	>1000	312.13	>1000	59.23	>1000	>1000	>1000	>1000	>1000	>1000

Data were processed with or without log transformation and by removing no outliers or by removing outliers using different cutoffs: ±0.5%, ±2.5%, ±2 SD, or ±3 SD most extreme scores. Bayes Factors reported are likelihood probabilities in favor of the alternative hypothesis

Table 6 Multiverse analysis of response time interference scores

Data processing	Religion		Science																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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	Total			Younger			Older			Youngest			Middle			Oldest			Youngest			Middle			Oldest																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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Data were processed with or without log transformation, and by removing no outliers or by removing outliers using different cutoffs: $\pm 0.5\%$, $\pm 2.5\%$, ± 2 SD, or ± 3 SD most extreme scores. C = Correct responses only. C+I = Correct and incorrect responses. Bayes Factors reported are likelihood probabilities in favor of the alternative hypothesis

Table 7 Multiverse analysis of age predicting response accuracy differences

	Religion <i>p</i> value	Science	Religion BF ₀₁	Science
No-transformation				
None	0.983	0.626	4.00	3.61
± 0.5%	0.687	0.571	3.73	3.48
± 2.5%	0.687	0.644	3.73	3.64
± 2 SD	0.766	0.685	3.85	3.72
± 3 SD	0.820	0.636	3.91	3.63
Log-transformation				
None	0.983	0.626	4.00	3.61
± 0.5%	0.687	0.571	3.73	3.48
± 2.5%	0.687	0.658	3.73	3.67
± 2 SD	0.740	0.632	3.81	3.62
± 3 SD	0.994	0.551	4.00	3.43

Data were processed with or without transformation, and by removing no outliers or by removing outliers using different cutoffs. BF₀₁ are likelihood probabilities in favor of the null hypothesis

Table 8 Multiverse analysis of age predicting response time differences

	Religion		Science		Religion		Science	
	C	C+I	C	C+I	C	C+I	C	C+I
	<i>p</i> value				BF01			
No-transformation								
None	0.236	0.116	0.074	0.333	2.18	1.37	1.00	2.67
± 0.5%	0.081	0.110	0.036	0.146	1.06	1.32	0.58	1.60
± 2.5%	0.081	0.110	0.035	0.100	1.06	1.32	0.58	1.23
± 2 SD	0.330	0.263	0.057	0.169	2.65	2.32	0.82	1.76
± 3 SD	0.119	0.103	0.043	0.099	1.39	2.82	0.67	3.98
None	0.412	0.369	0.839	0.563	2.99	2.82	3.93	3.46
Log-transformation								
± 0.5%	0.219	0.312	0.592	0.793	1.06	2.57	1.72	3.88
± 2.5%	0.219	0.312	0.717	0.794	2.08	2.57	3.78	3.88
± 2 SD	0.351	0.263	0.568	0.169	2.74	3.15	3.47	3.98
± 3 SD	0.417	0.369	0.668	0.913	3.01	2.82	3.69	3.98

Data were processed with or without transformation, and by removing no outliers or by removing outliers using different cutoffs. BF₀₁ are likelihood probabilities in favor of the null hypothesis. C = correct responses only. C+I = correct and incorrect responses

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