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Atheism Is Not the Absence of Religion: Development of the Monotheist and Atheist Belief Scales and Associations With Death Anxiety and Analytic Thinking

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Many previous studies have assumed that atheism is the absence of religious belief or lies at one end of a spectrum of religiosity. In the philosophical literature, however, atheism is a positive belief system. This article describes two online studies that tested whether atheism and religion are separate, negatively correlated belief systems. In Study 1 ($N = 488$, 206 male, $M = 31.7$ years, a convenience sample recruited via Twitter), we designed a scale (the Monotheist and Atheist Beliefs Scale [MABS]) to measure religious and atheistic beliefs and used exploratory factor analysis to identify its structure. In Study 2 ($N = 638$, U.K. population, representative sample, 296 male, $M = 45.0$ years, recruited by the survey company Qualtrics), we tested the structure of the MABS with confirmatory factor analysis (CFA) and studied its associations with analytic thinking (using the Cognitive Reflection Test [CRT]) and death anxiety in analyses in which religiosity was treated as unidimensional and in which religiosity and atheism were treated as separate. Data from both studies supported a two-factor model. In contrast to previous studies showing that atheists are superior at analytic thinking, we found that the CRT scores were negatively associated with religious belief but had no relationship with atheistic belief. In contrast to previous studies showing a curvilinear relationship between death anxiety and religiosity, we observed that death anxiety was linearly associated with religious belief but was not associated with atheistic belief. The MABS is a useful instrument for future research.

Keywords: religiosity, atheism, death anxiety, analytic thinking

Despite the commercial success of a number of popular books advocating atheism, for example, by the British evolutionary biologist Dawkins (2006) and the American philosopher Harris (2004), psychological research on the topic is sparse. A 2014 survey of the scholarly literature found only 100 papers on the psychology of atheism published across the disciplines of psychology, sociology, religious studies, and political science between 2001 and 2012, of which only 42 were empirical (Brewster et al., 2014). A search of Google Scholar from 2015 through the end of 2019 using the search term "psychology of atheism" produced 95 hits, but, of them, only 15 were empirical studies. For example, Bradley and colleagues investigated American atheists' justifications for their beliefs, finding that many justifications were nonintellectual. Some atheists reported bad personal experiences with religion, finding the idea that there is no God emotionally satisfying or believing that religions had a damaging impact on society (Bradley et al., 2018). The authors also found that a substantial subgroup of atheists had a clear conception of a relational God toward which they felt negative emotions, such as anger (Bradley et al., 2017).

In an investigation of the cognitive factors that may predispose individuals to atheism, Pennycook et al. (2016) reported a meta-analysis of 35 studies examining the relationship between religious beliefs and analytic thinking, usually defined in terms of the subjects' performance on some variant of Frederick's (2005) Cognitive Reflection Task. They concluded that "atheists and agnostics are more reflective than religious believers" (Pennycook et al., 2016, p. 1). Other psychological constructs appear to have more complex relationships with atheistic beliefs. For example, a recent meta-analysis found a high heterogeneity in the literature on death anxiety and religious belief, with some evidence of an inverted-U relationship when religiosity was considered as existing on a continuum with atheism so that people very high or low on religious belief show low levels of anxiety (Jong et al., 2018). This finding has been interpreted as being consistent with studies showing that belief in supernatural agents is associated with low levels of death anxiety in people who identify as religious but with high levels of death anxiety in those who identify as atheist (Jong et al., 2013).

An important conceptual issue that has clouded interpretation of the limited studies in the field is the treatment of atheism as a category defined in opposition to religious belief. Indeed, in much of the relevant literature, atheism is described as "nonbelief" or at least as being at the opposite end of a spectrum from religion, with agnosticism between the two extremes. This approach fails to

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recognize that atheism can be positive belief system as is evident in both the philosophical literature (e.g., Gray, 2018) and in the forceful arguments of atheism's modern advocates, such as Dawkins and Harris. This failure to acknowledge that both atheistic beliefs and religious beliefs may be held more or less strongly—so that, for example, it is possible to be neither religious nor an atheist or to hold some nuanced combination of the two types of belief—makes the interpretation of empirical studies of atheism problematic. For example, in the meta-analysis conducted by Pennycook et al. (2016), every study defined atheism either as a category in opposition to religion or in terms of low scores on a religiosity measure. It is therefore not possible to determine whether higher levels of analytic thinking are associated with the absence of religious belief or a positive set of atheistic beliefs or both, making the authors' conclusion that atheists are more reflective than religious believers uncertain or at least a possible oversimplification. Arguably, the same issue characterizes studies that use nonreligious people as controls in the hope of understanding the role of psychological factors in religiosity. For example, a sizeable body of research literature apparently supports the claim that religious belief is negatively associated with intelligence (Zuckerman et al., 2013) and/or that intelligence is positively associated with atheism (Lynn et al., 2009), but, in the absence of appropriate independent measures of religious and atheistic belief, it is impossible to tell which of these propositions is correct.

Purposes of the Present Studies

The present studies aimed to test the hypothesis that atheism is a positive belief system independent of religion and to develop a suitable questionnaire instrument (the Monotheist and Atheist Beliefs Scale [MABS]) that will be useful to researchers in the field. In two studies, we used exploratory and confirmatory factor analysis (CFA) to compare models in which atheistic and religious beliefs were considered as belonging to a single dimension as well as models in which they were considered independent but negatively correlated constructs, predicting that the latter would better fit the data. In the second study, we also studied independent associations between the two belief systems and analytic thinking and death anxiety to explore whether there are specific associations with each belief system and to contrast the findings with those obtained when treating belief as existing on a unidimensional religious belief–atheism scale.

Study 1

In Study 1, we piloted items for a scale designed to measure religious and atheistic beliefs and used exploratory factor analysis to identify the structure of the scale. We hypothesized that religious (monotheistic) beliefs and atheistic beliefs would form negatively correlated but separate factors.

Participants

The participants were recruited via a series of tweets from the senior author's Twitter account (20k+ followers) and were not intended to be representative of the U.K. population. They were told that the purpose of the survey was to pilot a questionnaire about religious and atheistic beliefs and were invited to follow a link to an online survey hosted by the survey company Qualtrics and to provide feedback via Twitter if they wished to. Of the 488 respondents, 206 were male aged 20–82 years (M = 31.83 years, SD = 12.13), and 282 were female aged 20–78 years (M = 31.61 years, SD = 12.26); 80.8% had received a university education. When asked about their religious identity ("Religious conviction: How would you classify your religious belief now?" with answers chosen from a drop-down menu), 90 (18.4%) identified as Christian, 4 (0.8%) as Muslim, 2 (0.4%) as Jewish, 6 (1.2%) as Buddhist, 32 (6.5%) as other religion, 87 (17.8%) as agnostic, and 267 (54.5%) as atheist. Ethical approval was obtained from the University of Liverpool Ethics Committee.

Measure

Monotheist and Atheist Beliefs Scale

We focused on beliefs, defined as propositions about the world (Bentall, 2018). Hence, we excluded items that concerned practice (e.g., religious worship) or identity (e.g., the sense of belonging to a religion or to a society of atheists) or that had an explicit affective content. Twelve items reflecting religious beliefs were created, some by adapting items from the Duke University Religion Index (Koenig & Büssing, 2010) and Huber and Huber's (2012) Centrality of Religiosity Scale. These included, for example, "God has revealed his plan to us in holy books" and "Sometimes, it is possible for human beings to feel the presence of God." Given the extraordinary variety of religious beliefs worldwide, it was not possible to sample beliefs relating to all religious belief systems, so all the items were designed with the monotheistic and, especially, Abrahamic religions in mind. Eight atheism items were constructed to match the monotheistic belief items in form, informed by the relevant literature on atheism, including Dawkins (2006), Harris (2004), and Gray (2018). The items covered a broad range of beliefs associated with atheism, including negative beliefs about religion (e.g., "Praying to God is a waste of time" and "Moral judgment should be based on respect for humanity rather than religious doctrine"), as well as those endorsing a nonreligious ontology (e.g., "There is nothing in the universe that cannot be explained by scientific laws") and human progress (e.g., "Despite wars and crises, history reveals that human progress is inevitable over the long term"). The full item set is shown in Table 1. The responses were on a 5-point scale: 1 = *strongly disagree*, 5 = *strongly agree*.

Analysis

Exploratory factor analysis was conducted on SPSS version 25 using oblimin rotation (because the religious belief and atheistic scales were expected to be negatively correlated). As recommended by Reise et al. (2000), we used maximum likelihood to extract the factors. The scale scores were compared across self-defined groups in terms of religious identity (religious, agnostic, atheist).

Results

Exploratory Factor Analysis

The factor extraction revealed two factors with eigenvalues of greater than 1 (the Kaiser criterion), with the first factor (eigenvalue = 11.01) accounting for 52.67% of the variance and

Table 1
Pattern Matrix From Study 1 for a Two-Factor Solution of Religiosity and Atheism Items (extraction Method: Maximum Likelihood; Rotation: Oblimin)

Item	Factor loading	
	1	2
Factor 1: Religion (monotheism) items		
1. The soul is immortal	.918	.160
2. A higher power really exists	.951	.095
5. God has revealed his plan to us in holy books	.675	−.200
6. We can communicate directly to God by praying	.864	−.113
7. Sometimes, it is possible for human beings to feel the presence of God	.538	−.329
8. God or a divine power exists	.942	.034
13. God or something divine sometimes interferes in the affairs of human beings	.763	−.129
15. God sometimes reveals his will directly to human beings	.804	−.140
16. There is an afterlife (immortality of the soul, resurrection of the dead, or reincarnation)	.945	.136
18. God is aware of everything we do	.904	−.018
19. God hears the prayers of human beings	.912	−.043
20. Our fate in the life hereafter is determined by our deeds on Earth	.670	.045
Factor 2: Atheism items		
3. Religious beliefs will ultimately be replaced by scientific theories	−.097	.504
4. The idea of God is a delusion	−.408	.395
9. Belief in gods has been the source of great misery to humankind	−.055	.533
10. Moral judgment should be based on respect for humanity rather than religious doctrine	−.335	.385
11. Despite wars and crises, history reveals that human progress is inevitable over the long term	.075	.266
12. There is nothing in the universe that cannot be explained by scientific laws	−.314	.373
14. Praying to God is a waste of time	−.456	.426
17. It is wrong to indoctrinate children into a religion	−.190	.496

the second factor (eigenvalue = 1.63) accounting for a further 4.61%. A third factor had an eigenvalue of exactly 1.00 but, after inspection of the scree plot, we selected a two-factor solution. Tabachnick and Fidell (2001) recommend reporting the pattern matrix when interpreting factors because it represents the unique contribution of the factors to the variance explained by the indicators, controlling for other factors in the model; this is shown in Table 1. Nearly all the items had high loadings on either the first factor (religious beliefs) or the second factor (atheistic beliefs). Many had *lower* negative loadings on the other factor although some of the atheism items are exceptions, notably items 4, "The idea of God is a delusion," and 14, "Praying to God is a waste of time." One item, 11, "Despite wars and crises, history reveals that human progress is inevitable over the long term" (chosen in the light of Gray's account of atheism and, on reflection, not explicitly endorsing either a religious or atheistic worldview) had low loadings on both factors. The factor scores were negatively correlated: $r = -.50$. When the religious belief and atheism scales were used to generate simple subscales, $\alpha = .96$ for religious beliefs (arguably suggesting some redundancy between the items) and $\alpha = .79$ for atheistic beliefs, and the negative correlation between the two scales was $r = -.69$.

Comparisons by Religious Identity

To validate the scores, we used one-way ANCOVA with religious identity (religious, agnostic, atheist; nonmonotheistic religious identity and "other religious conviction" excluded) and sex as fixed factors and age as a covariate. There was a significant difference for religious belief, $F(2, 442) = 534.71$, $p < .001$, $\eta_p^2 = .71$. Planned contrasts revealed that all three groups differed significantly from one another, with the scores for agnostics ($M = 26.28$, $SD = 7.25$) falling between those of monotheists ($M = 43.22$, $SD = 9.04$) and atheists ($M = 18.80$, $SD = 5.18$), $p < .001$ for each contrast. There was no effect for age but a marginal affect for sex, $F(1, 442) = 3.87$, $p = .05$, $\eta_p^2 = .01$, with females ($M = 25.73$, $SD = 13.16$) scoring higher than males ($M = 21.58$, $SD = 11.29$). For atheism, a main effect for religious identity was also found, $F(2, 442) = 136.05$, $p < .001$, $\eta_p^2 = .74$, and agnostics ($M = 27.03$, $SD = 4.50$) again fell between monotheists ($M = 20.99$, $SD = 4.64$) and atheists ($M = 30.40$, $SD = 4.80$), both contrasts $p < .001$, but there was no effect for age or sex.

Discussion

This was a pilot investigation, and the sample was clearly not representative of the U.K. population, especially in terms of education and religious identity in the 2011 census of England and Wales, 59% of the population identified as Christian, 5% as Muslim, and 24% as having no religion (Office for National Statistics, 2013). As expected, two factors emerged. Also as expected, these were negatively correlated, which was perhaps inevitable given that some of the atheism items expressed hostility to religious ideas (e.g., "It is wrong to indoctrinate children into a religion"). The total scores clearly discriminated between self-identified monotheists, agnostics, and atheists, with agnostics falling midway between monotheists and atheists. On the whole, the items loaded strongly on one factor although the atheism items also tended to load negatively on the religious factor, which is perhaps not surprising given that a negative attitude toward religion is an important element of atheism. One item (11) loaded poorly on both factors: "Despite wars and crises, history reveals that human progress is inevitable over the long term." This item was included in light of Gray's (2018) account of humanist varieties of atheism, but in retrospect, given its lack of

explicit religious or atheistic content, its poor performance is not surprising. Given these promising but not conclusive findings, it was decided to assess a slightly modified version of the MABS on a sample that was much more representative of the U.K. population. We also explored associations between religious and atheistic beliefs and two psychological constructs previously associated with them in studies in which atheism was treated as the absence of religious belief: death anxiety and analytic thinking. To explore the implications of relinquishing this assumption, we carried out analyses in which the two belief systems were treated as separate but negatively correlated as well as analyses in which we scored the participants on a unidimensional religious versus atheistic beliefs scale.

Study 2

Participants

The participants were recruited by Qualtrics and were stratified by sex, age, and household income to be approximately representative of the U.K. population. A total of 722 U.K. residents attempted the survey, but the final sample was 638 after the removal of incomplete surveys and those completed implausibly quickly (predefined following pilot work by the survey company as <15 min). Two hundred and ninety-six participants (46.4%) were male aged 18–80 years (M = 46.60 years, SD = 15.83), and 342 (53.6%) were female aged 18–77 years (M = 43.77 years, SD = 16.16). Five hundred and fifty-four (86.8%) identified as white British, with the rest belonging to a range of ethnic minority groups, and 245 (38.4%) had received a university education. Responses to the question about self-reported religious identity (using the same method as in Study 1) yielded 325 (50.9%) Christian, 16 (2.5%) Muslim, 10 (1.6%) Jewish, 8 (1.3%) Hindu, 5 (0.8%) Buddhist, 4 (0.6%) Sikh, 46 (7.2%) other religions, 69 (10.8%) agnostic, and 155 (24.3%) atheist. This represents a percentage of Christians lower than that recorded in the 2011 census (Office for National Statistics, 2013) although not dramatically so, probably because the question was asked differently in this survey than in the census. Ethical approval was obtained from the University Ethics Committee.

Measure

Monotheism and Atheism Beliefs Scale

An 18-item scale was derived from the scale used in Study 1 by excluding two items: "God or a divine power exists" (because of content similarity to another item), and "Despite wars and crises, history reveals that human progress is inevitable over the long term" (because the factor loadings in Study 1 were small on both factors). Responses were made on a 5-point scale: 1 = *strongly disagree*, 5 = *strongly agree*. The α coefficient was .96 for the monotheism subscale and .83 for atheism.

The Death Anxiety Inventory

The Death Anxiety Inventory (Tomás-Sábado et al., 2005) is a 17-item scale with four subscales (Externally Generated Death Anxiety, Death Acceptance, Death Finality, and Thoughts about Death). Responses are rated on 5-point scales: 1 = *totally disagree*, 5 = *totally agree*). The reliability of the total scale (α = .95) and the Externally Generated Death Anxiety (α = .80), Death Acceptance (α = .88), Death Finality (α = .89), and Thoughts about Death (α = .83) subscales were all high. However, given the high intercorrelations between the subscales (r = .67–.89), we used the total scale score.

The Cognitive Reflection Test

The three-item CRT (Frederick, 2005) was designed to assess the ability to reflect before answering questions designed to hint at a wrong answer. We expanded the scale to include an additional four items from Toplak et al. (2014) and three items from Thompson and Oppenheimer (2016), presented in a four-option multiple-choice format as recommended by Sirota and Juanchich (2018). The items were presented in random order, and 45 s were allowed for each answer, after which the questionnaire automatically moved to the next item. The α coefficient for the 597 participants who completed all 10 items was (α = .70). Forty-one participants failed to complete all the test items.

Analysis Plan

First, CFAs were conducted to compare two models: (1) a model in which all religiosity and atheism items loaded on a single religiosity/atheism factor and (2) a model in which religiosity and atheism were separate but correlated latent variables. Confirmatory factor models were conducted in Mplus 7.0 (Muthen & Muthen, 2013) with robust maximum likelihood estimation (MLR; Yuan & Bentler, 2000). The following recommendations (Hu & Bentler, 1998, 1999) were followed to assess model fit: nonsignificant chi square (χ^2), comparative fit index (CFI; Bentler, 1990) and Tucker–Lewis Index (TLI; Tucker & Lewis, 1973) values above .95 reflected an excellent fit while values for those two indices above .90 reflected an acceptable fit; a root mean square error of approximation (RMSEA; Steiger, 1990) with 90% confidence intervals having values of .06 or less reflected an excellent fit while values of less than .08 reflected an acceptable fit. The standardized root mean square residual (SRMR; Chen, 2007) was also used, with values of .06 or less indicating an excellent fit and values of less than .08 indicating an acceptable fit. The Bayesian information criterion (BIC; Schwarz, 1978) was used to evaluate and compare the models, with the smallest value indicating the best fitting model. In relation to the BIC, Raftery (1996) suggests that a 2–6 point difference offers evidence of model superiority, a 6–10 point difference indicates strong evidence of model superiority and a difference of greater than 10 points indicates very strong evidence of model superiority. Second, we calculated the total scores for both the religious belief and atheistic belief items as well as for a unidimensional scale in which atheism was assumed to be the opposite of religion; the latter scale was constructed by reverse-scoring the atheism items. We then used regression to fit the linear and quadratic relationships between the three scales—religious belief, atheistic belief, and the unidimensional scale—and the two psychological constructs of interest (analytic thinking and death anxiety). In previous studies in which religious and atheistic beliefs were considered in a unidimensional framework, atheism has been associated with high scores on analytic thinking (Pennycook et al., 2016), and a curvilinear relationship has been reported between religiosity and

death anxiety (Jong et al., 2018). In six analyses comparing the two models for each type of belief measure (independent variable: unidimensional, religious belief, or atheistic belief) and each type of psychological construct (dependent variable: death anxiety or analytic thinking), we considered the proportion of variance accounted for as well as the BIC interpreted as in our CFA. As linear models are more parsimonious than quadratic models, we assumed that they were preferable unless there was strong evidence of a better fit for the quadratic model. Finally, we used analysis of covariance to examine the relationship between religious identity (defined as in Study 1) and our religious belief and atheistic belief scales as well as with analytic thinking and death anxiety.

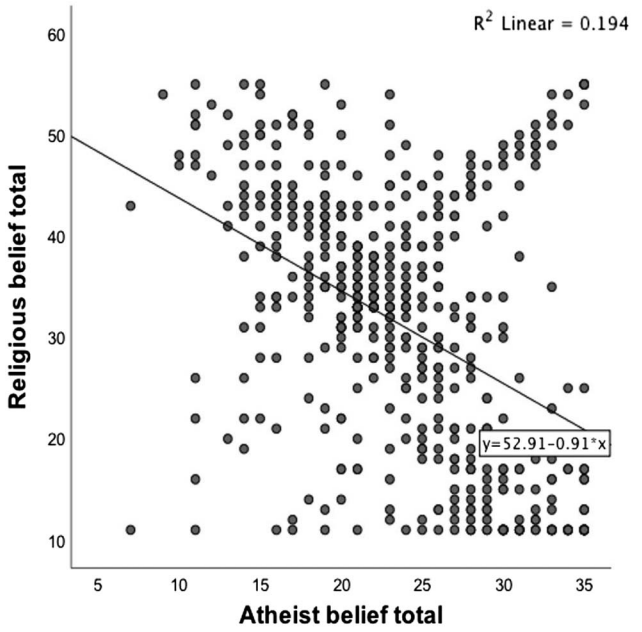
Results

Several features are worth noting in the scattergram showing the relationship between religious belief scores and atheistic belief scores, shown in Figure 1. First, the majority of the participants fell in a band ranging from high religious belief to high atheistic belief, marked by the regression line. Second, very few participants had low scores on both scales. Third, there seems to be a group of individuals who defy the negative association between the two belief systems and score highly on both.

Confirmatory Factor Analysis

The model fit indices for the CFA models, shown in Table 2, show that the two-factor model provided an acceptable fit while the fit statistics for the one-factor model indicated a poor fit. The two-factor model's lower BIC compared to the one-factor model also provides strong evidence of the superiority of the former. The standardized factor loadings for the religiosity and atheism latent variables were all positive and statistically significant, ranging .55–.94, and the correlation between the latent variables was $r = -.46$, $p < .001$. The composite reliability (CR; Raykov, 1997) was high for religiosity (CR = .96) and atheism (CR = .83).

Figure 1
Scattergram Showing the Relationship Between Religious Belief and Atheistic Belief Scores in Study 2



Linear and Quadratic Associations Between Belief Scales and Psychological Constructs

Although our CFA clearly supported the superiority of a two-scale model (religious and atheistic belief) over a single, unidimensional model, a unidimensional scale based on totaling the item scores had an acceptable reliability ($\alpha = .94$). This was to be expected given the correlation between the scales ($r = -.46$, $p < .001$) and considering that α scores tend to increase with increased scale length (Streiner, 2003).

Table 3 shows the associations between the three types of scale score (religious belief, atheistic belief, and the unidimensional scale) and death anxiety and analytic thinking (CRT). When the CRT was regressed on the unidimensional scale, the BIC offered strong evidence of the superiority of the quadratic model and a corresponding increase in the amount of variance accounted for. There was only weak evidence of the superiority of the quadratic model when the CRT scores were regressed on religious beliefs, however, and, in the case of atheistic beliefs, the linear model had a superior BIC score, but neither model predicted a significant amount of the variance in analytic reasoning. Hence, it is reasonable to conclude that the relationship between unidimensional religiosity and analytic reasoning is curvilinear, but, when the two belief systems are considered separately, there is a significant, negative, and linear association with religious belief but no association with atheistic belief. When death anxiety was regressed on the unidimensional belief scale, the BIC difference and the increase in variance that was accounted for offered strong evidence that the quadratic model was superior. When the two belief systems were considered separately, however, a different picture emerged. In the case of religious belief, the quadratic model was not superior to the linear model, and there was a positive association with death anxiety, but, in the case of atheistic beliefs, neither model accounted for a significant amount of the variance.

Comparisons by Religious Identity

Religious identity was defined as in Study 1, and the total scores for the three identity groups are shown in Figure 2. Three-factor ANCOVA (religious identity, sex, and university educated vs. not) with age as a covariate revealed a main effect for religious identity, $F(2, 561) = 195.73$, $p < .001$, $\eta_p^2 = .41$. All three groups differed significantly from one another, $p < .001$ for each comparison (see Figure 2). The effect for graduate status was not significant, but there was a significant effect for age, $F(1, 561) = 25.65$, $p < .001$, $\eta_p^2 = .04$, reflecting the tendency of older people to be less religious. There was no significant effect for sex. A similar analysis of the atheistic belief scores revealed a significant main effect for religious identity, $F(2, 561) = 71.66$, $p < .001$, $\eta_p^2 = .20$, with all three groups differing significantly from one another, $p < .001$ (also see Figure 2). There were also main effects for sex, $F(1, 561) = 10.79$, $p < .001$, $\eta_p^2 = .02$, which accounted for higher mean scores in males ($M = 24.71$, $SD = 6.44$) than females ($M = 22.85$, $SD = 5.55$), and for university education, $F(1, 561) = 5.70$, $p = .02$, $\eta_p^2 = .01$, which was accounted for

Table 2
Religiosity and Atheism Fit Indices for a One-Factor Model and for a Correlated Two-Factor Model, Study 2

Model	χ^2 (*df*) *p*	RMSEA	CFI	TLI	SRMR	BIC
1-Factor model	1187.41 (135) < .001	.111	.812	.787	.105	31,132
2-Factor model	612.70 (134) < .001	.072	.915	.903	.062	30,287

Note. RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker–Lewis Index; SRMR = standardized root mean square residual; BIC = Bayesian information criterion.

higher scores among graduates ($M = 24.53$, $SD = 6.20$) compared to nongraduates ($M = 23.24$, $SD = 5.92$), but there was no association between atheistic beliefs and age.

General Discussion

This article examines the utility of considering religious and atheistic beliefs as separate, albeit negatively correlated belief systems and introduces a new questionnaire measure that discriminates between the two, which may be useful to researchers. Some of the findings, particularly those in which the scores on the two measures were compared according to religious identity, may be considered to support a unidimensional account, with agnostics scoring midway on both scales. These differences support the validity of our measure, but, interestingly, inspecting the scattergram from Study 2 (Figure 1) reveals a more nuanced picture. The absence of people with low religious and atheistic beliefs—those who, in the literature, have been referred to as "apathists" (Rauch, 2003)—is striking. Of equal interest, substantial numbers scored highly on *both* religious and atheistic beliefs, a possibility that would not have been revealed by the use of a simple, unidimensional scale. In future research, these individuals merit special investigation. If, as some researchers have argued, atheism arises from the suppression of a natural human tendency to attribute intentionality to events (Norenzayan & Gervais, 2013), then it is possible that these individuals are particularly taxed by the struggle, which may have implications for their psychological health. Alternatively, it is possible that they possess the considerable intellectual complexity required to accommodate both belief systems.

The data on death anxiety also point to the usefulness of treating religious and atheistic beliefs separately. A unidimensional measure revealed a curvilinear relationship, with low death anxiety in highly religious and highly atheistic individuals as reported in previous studies (Jong et al., 2018), but the analyses in which the two belief systems were treated separately suggest that this may be a misleading picture created by the superposition of both belief systems in a single scale. When treated separately, death anxiety was positively and linearly associated with religious belief, but there was no association with atheistic beliefs.

The positive association with religious belief is not hard to understand and is supported by studies finding that priming death anxiety increases the strength of religious belief in those who are

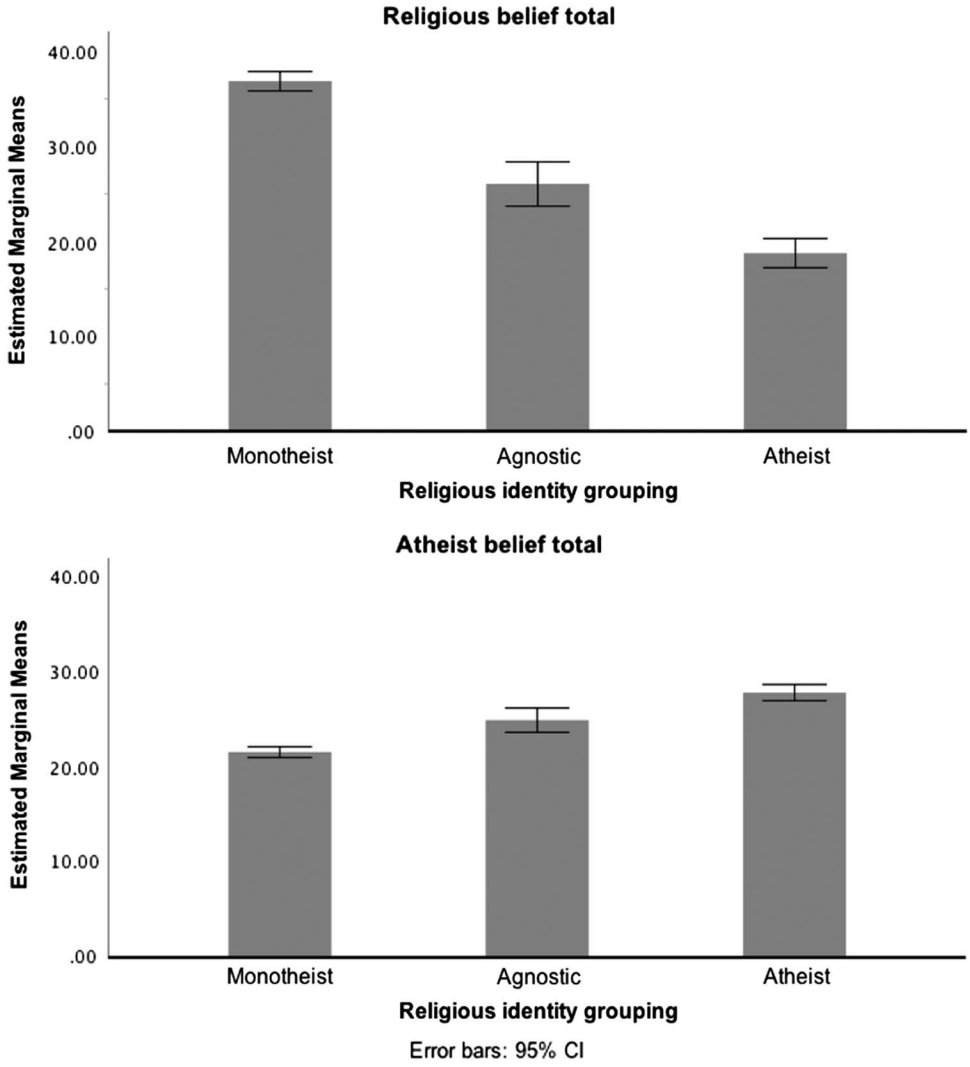
Table 3
Regression Models From Study 2 for the Linear and Quadratic Relationships Between Predictor Measures of Belief (Unidimensional Religious Belief Scale, Religious Belief Scale, and Atheistic Belief Scale) and Death Anxiety and Analytic Thinking (CRT Scores)

Model and components	*B* linear (*SE*)	*B* quad (*SE*)	*R*-squared	BIC
	Analytic thinking (CRT scores)			
Unidimensional religious belief scale				
Linear	−.042 (.006)**		.08**	2,687
Linear and quadratic	−.036 (.006)**	.001 (.000)**	.11**	2,674
Religious beliefs (total)				
Linear	−.057 (.008)**		.09**	2,682
Linear and quadratic	−.054 (.007)**	.002 (.001)**	.11**	2,675
Atheistic belief (total)				
Linear	.058 (.016)**		.02	2,725
Linear and quadratic	.058 (.016)**	.003 (.002)	.03	2,730
	Death anxiety			
Unidimensional religious belief scale				
Linear	.337 (.039)**		.12**	5,269
Linear and quadratic	.273 (.037)**	−.014 (.002)**	.19**	5,222
Religious beliefs (total)				
Linear	.540 (.050)**		.18**	5,222
Linear and quadratic	.529 (.052)**	−.008 (.004)	.19**	5,223
Atheistic belief (total)				
Linear	−.103 (.122)		.00	5,348
Linear and quadratic	−.102 (.121)	−.040 (.017)*	.01	5,346

Note. Lowr BIC scores indicate a better model fit, and a BIC difference of 10 is interpreted as strong evidence of model superiority (Raftery, 1996). CRT = Cognitive Reflection Test; BIC = Bayesian information criterion; SE = standard error.
* $p < .05$. ** p .01.

Figure 2

Religious and Atheistic Belief Scores by Religious Identity Group in Study 2



already religious (Willer, 2009), but the lack of association with atheism observed in this study merits consideration in further research. The literature on terror management theory suggests that anxiety about death leads to system justification, that is, a stronger belief in whatever system of understanding seems to give meaning to the self and the world (Solomon et al., 2015). Hence, it might be expected that, despite the lack of association seen in this study, provoking anxiety about death will lead to increased atheism in those who, for other reasons, are inclined to atheistic beliefs. At least one study has shown this effect, although only for explicit atheistic beliefs, whereas, for implicit beliefs (measured as associations between supernatural concepts and the concepts *real* or *imaginary*), all the participants showed more evidence of belief in supernatural entities (Jong et al., 2012). The relationship between analytic thinking and belief again points to the utility of considering the two belief systems separately. When considered independently, religious belief was negatively associated with analytic thinking as reported in previous studies (Pennycook et al., 2016). However, when the belief systems are considered separately, religious belief is again negatively associated with analytic thinking whereas atheistic beliefs bear no relationship at all with analytic thinking. Together with the previous findings on death anxiety mentioned earlier, these findings seem consistent with a model in which active suppression is required to relinquish religious belief (Norenzayan & Gervais, 2013) but separate factors (perhaps cultural or intellectual) are required to develop an active atheistic belief system.

Some limitations of these studies are important. Study 1 was highly unrepresentative of the U.K. general population although Study 2 was not. Given the importance of cultural factors in the development of belief systems, generalization to other places and nations cannot be assured, and it would be useful to replicate these studies in a cross-cultural context. Our religiosity scale is focused on monotheistic belief systems, so it is possible that our findings will not generalize to, for example, Hindu societies. Nonetheless, it will be important in future studies to evaluate

our scales in societies in which Christian beliefs and practices are more prevalent than in the U.K. (e.g., the United States, the Republic of Ireland, or Poland) and to establish whether the same factor structure can be replicated in predominantly Muslim countries. Finally, as already noted, the studies were cross-sectional; therefore, causal relationships between death anxiety and analytic thinking and religious and atheistic beliefs cannot be assumed on the basis of these data alone. A major strength of the research is that it has yielded useful measures that can be employed in future studies of religious and atheistic beliefs, and we hope that other researchers will feel free to employ them.

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