It's the heart that matters: The relationships among cognitive mentalizing ability, emotional empathy, and religiosity

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ABSTRACT

Mentalizing ability, i.e., an ability to attribute mental states to other beings, has been regarded as a chief cognitive predisposition that allows people to believe in supernatural beings. However, research on mentalizing ability and religiosity is inconsistent and tainted with methodological vagueness. Most notably, the terms "mentalizing" and "empathy" have often been used interchangeably, which can mask important distinctions between cognitive and emotional foundations of religious belief. To shed light on the role of these two constructs for religiosity, we conducted two studies ($N = 314$ and $N = 236$) examining the relationships among cognitive mentalizing ability, emotional empathy, and religiosity. Results showed that measures precisely assessing mentalizing were either unrelated or negatively related to religiosity. Moreover, we found that the link between mentalizing and belief was strongly influenced by the cognitive style of belief. On the other hand, emotional empathy was robustly and positively associated with religiosity. Finally, we also established that a popular tool commonly used as a measure of mentalizing is related to religiosity due to its emotional components, closely connected with empathy. Altogether, these results cast further doubt on the relationship between mentalizing and belief, but they also point to the significance of empathy as a socio-emotional correlate of religiosity.

1. Introduction

Recent years have seen a rapid growth of research situating religious belief in the broader context of human cognition. Various investigations highlight that humans' cognitive architecture both enables and constrains the way we perceive and think about religion and spirituality (e.g., Willard & Norenzayan, 2013).

One seminal line of studies in this area has revolved around the association between religiosity and the capacity to attribute mental states to other beings – also known as mentalizing (e.g., Frith & Frith, 2005), theory of mind (e.g., Happé, 1994), mind-reading (e.g., Realo et al., 2003) or mind perception (e.g., Gervais, 2013). This capacity, which we will refer to as mentalizing, is commonly recognized as a major developmental achievement that allows people to function in complex social situations (Flavell, 1999). Interestingly, the capacity to perceive minds is not limited to human targets. Although supernatural entities such as gods, spirits, or ghosts are believed to possess certain miraculous attributes, they are also oftentimes conceived of as having human-like thoughts, intentions or feelings (Guthrie, 1993). Because of this characteristic, it has been argued that the same cognitive skills required to reason about mental states of other people are also

necessary in order to reason about, and therefore believe, in God(s) (Gervais, 2013).

This theoretical claim has initially received some empirical support. For instance, Norenzayan, Gervais, and Trzesniewski (2012) reported that mentalizing deficits mediated the inverse relationship between autistic traits and intuitive belief in God. Moreover, some indirect evidence for the link between mind-reading and religiosity was also provided using neuroimaging techniques. In two independent investigations, researchers demonstrated that the brain structures involved in thinking about God (Kapogiannis et al., 2009) and prayer (Schjoedt, Stødkilde-Jørgensen, Geertz, & Roepstorff, 2009) were identical with those previously identified as important for mentalizing and social cognition.

However, despite these early promising results, there is now a growing body of research that failed to demonstrate a significant relationship between mentalizing ability and religious belief (e.g., Lindeman, Svedholm-Häkkinen, & Lipsanen, 2015; Maij et al., 2017; Reddish, Tok, & Kundt, 2016; Vonk & Pitzen, 2017). We think that such inconsistency in findings could arise, at least partially, from methodological shortcomings of the previous work. To support this claim, we will start by discussing difficulties with the way mentalizing has been

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operationalized and measured in the context of research on religion. Next, we will advocate the clear differentiation between *cognitive* mentalizing ability and *emotional* empathy (i.e., a phenomenon of sharing someone else's feelings), pointing to the importance of such a distinction for our understanding of the psychological foundation of religious belief. Finally, we will present the results of two independent studies that investigate the complex relationships among mentalizing, empathy, and religiosity.

1.1. Difficulties with operationalization and measurement of mentalizing ability

Mentalizing has been so far operationalized in two different ways: as an actual performance in tasks that require inferences about mental states of other people, or as a self-reported mentalizing disposition. In the case of actual mentalizing abilities, previously mentioned research by Norenzayan et al. (2012) showed that the widely used performance-based measure of mentalizing ability, the Reading the Mind in the Eyes Test (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001) was positively related to belief in God. However, other investigations found that this measure does not significantly predict belief in God (e.g., Jack, Friedman, Boyatzis, & Taylor, 2016; Lindeman et al., 2015; Maij et al., 2017). These conflicting findings have led some researchers to question the relevance of the Reading the Mind in the Eyes Test for the research on religion (Vonk & Pitzen, 2017). It has been suggested that since this task assesses a very basic, low-level mentalizing and relies thoroughly on visual cues (inferring mental states from pictures of human eyes), it might not be particularly useful in explaining religious belief and that more advanced mentalizing skills should be measured instead (Vonk & Pitzen, 2017). Somehow contrary to the previous reasoning, however, Vonk and Pitzen (2017) argue that more advanced mentalizing abilities would be negatively associated with religious belief since they allow to better differentiate between real and imagined minds. We presume that one way to resolve this apparent contradiction might be to take into account the style with which one holds their religious beliefs and not only the degree of belief. For instance, it may be important to distinguish between literal and symbolic style of belief, since prior work demonstrates that theory of mind is positively related to symbolic skills (e.g., Lillard & Kavanaugh, 2014), and negatively to over-literal understanding (Happé, 1994). Therefore, while high mentalizing skills could facilitate symbolic religious belief, it might also hinder more literal forms of belief.

Apart from performance-based measures, researchers have also frequently used self-reports of mentalizing, and, in particular, a popular measure originating from research on autism called "Empathy Quotient" (Baron-Cohen & Wheelwright, 2004). In this case, however, findings regarding religious belief are, once again, rather inconsistent. In some investigations, Empathy Quotient was positively associated with religious belief (e.g., Lindeman & Lipsanen, 2016; Norenzayan et al., 2012), while others reported no significant relationship between the two variables (e.g., Banerjee & Bloom, 2014; Maij et al., 2017). We think that at least part of this inconsistency could be associated with this particular measure of mentalizing. There are a number of reasons why the administration of Empathy Quotient in the context of religion might be problematic. First, there is no agreement in the literature as to what is being actually measured by this scale. Some researchers argue that it captures "mentalizing tendencies" (Willard & Norenzayan, 2013), while others suggest that it is "sensitive to people's accuracy in deciphering others' mental states" (Banerjee & Bloom, 2014, p. 288). Moreover, the original intention for creating this scale was to include both cognitive and affective components (Baron-Cohen & Wheelwright, 2004), and some independent analyses demonstrated that the scale might be, in fact, composed of three correlated but separate factors, namely: cognitive empathy, social skills and emotional reactivity (Muncer & Ling, 2006).

We would argue that while such a complex measure may serve its purpose in studies on the autism spectrum, it does not help answer the questions regarding the relationship between mentalizing and religious belief. A multifaceted measure makes it difficult to know which components contribute to the association between mentalizing and religious belief. Moreover, Empathy Quotient also includes emotional components, which, we claim, should not be recognized as measuring mentalizing at all but as emotional empathy. We argue below that separating cognitive mentalizing from emotional empathy is critical in order to precisely understand the factors associated with religious belief.

1.2. Distinguishing mentalizing ability from empathy

Researchers tend to use the terms "mentalizing" and "empathy" interchangeably (e.g., Lindeman et al., 2015) or suggest that empathy could be used to detect mentalizing ability (e.g., Maij et al., 2017; Norenzayan et al., 2012). We argue, however, that confusing the two terms is not only problematic given consideration to the prevailing theoretical accounts and recent empirical findings, but also hinders the researchers from describing and understanding how these two psychological phenomena are related to religious belief.

Although mentalizing and empathy have both been conceptualized in various ways, most researchers tend to agree that the term "empathy" describes the *affective* process of sharing someone else's emotions (e.g., Hoffman, 2000; Singer & Lamm, 2009)[1], whereas mentalizing refers to the *cognitive* phenomenon of reasoning about the thoughts and feelings of other people (e.g., Frith & Frith, 2005; Wellman, 1992). Therefore, mentalizing and emotional empathy are conceptually and empirically separable. While both are involved in various social situations (e.g., Hooker, Verosky, Germine, Knight, & D'Esposito, 2008; Preckel, Kanske, & Singer, 2018), they do not always co-occur. For instance, on the one hand, research demonstrates that perceiving others' minds may emerge from self-interested motivation when the social context is competitive (e.g., Epley, Caruso, & Bazerman, 2006). On the other hand, more primary forms of empathy, such as emotional contagion, do not require any reasoning to be activated (cf. Davis, 1994).

The dissociation between mentalizing and empathy is also demonstrated by research on autism and psychopathy. The former condition is associated with severe mind-reading impairment, often referred to as "mindblindness" (Baron-Cohen, 1997), but does not necessarily imply deficits in empathy (Bird et al., 2010). Psychopaths, on the other hand, manifest a lack of emotional empathy (Blair, 2008; Łowicki & Zajenkowski, 2017), while typically showing no signs of deterioration in the cognitive mentalizing ability (Richell et al., 2003). Finally, recent neuroscientific evidence convincingly shows that mentalizing ability and empathy result from activation of different neural networks (Preckel et al., 2018). All these findings call for a clear distinction between mentalizing ability and empathy, which has not been systematically applied to the research on the psychology of religion.

1.3. The role of empathic concern for religious belief

Furthermore, two emotional outcomes of empathy should be also differentiated. The experience of empathy (i.e., resonating with or sharing someone's else emotional state) can produce other-oriented feelings of compassion and sympathy, referred to as empathic concern (Davis, 1983), or simply compassion (e.g., Preckel et al., 2018). Alternatively, empathic arousal may also result in so-called personal distress (or empathic distress), which is an aversive, self-focused experience of uneasiness or anxiety when faced with suffering of others (e.g., Davis, 1983). Differences between these two types of empathy-related responding have been extensively investigated in personality and social psychology (e.g., Eisenberg & Eggum, 2009).

This precise differentiation is important for the field of religion, as there is now growing evidence that only one particular type of emotional empathy, empathic concern, is significantly related to religious

belief (e.g., Hardy, Walker, Rackham, & Olsen, 2012; Łowicki & Zajenkowski, 2019; Watson, Hood Jr, Morris, & Hall, 1984). It has been previously suggested that this link might be rooted in other-focused perspective that is common to both compassionate feelings and religiosity or spirituality (see Łowicki & Zajenkowski, 2019). Moreover, it is possible that religion with its communal rituals may facilitate an emotional exchange between people or may provide a favorable environment for acting upon one's personal empathic dispositions (Markstrom, Huey, Stiles, & Krause, 2010).

Crucially, a recent investigation that directly compared mentalizing measures to empathic concern found that the latter is a more robust and substantive correlate of religious belief (Jack et al., 2016). In a series of eight studies, when controlling for empathic concern, researchers have consistently found no significant relationships between belief and performance-based or self-reported mentalizing ability. These results, again, speak in favor of distinguishing different dimensions within a broad domain of social cognition.

Although the investigation by Jack et al. (2016) made a significant contribution to the knowledge on cognitive and emotional correlates of belief, some of its important limitations should be recognized as well. First, in all eight studies, only a single item was used to measure belief in God (i.e., "Do you believe in the existence of either God or a universal spirit?"). One major drawback of this approach is that it does not take into account the variability of belief. Taking into consideration some of the latest findings on mentalizing ability and different aspects of religiosity (see Vonk & Pitzen, 2017), we argue that it is necessary to replicate Jack and colleagues' studies using more sophisticated measures of religious belief. Moreover, while Jack et al. (2016) included the Empathy Quotient measure in their research and demonstrated that it did not predict belief in God over and above empathic concern, given the fact that EQ is a multifaceted construct, it is important to examine whether its association with religious belief exists due to its cognitive or emotional components (or both).

1.4. Current research and hypotheses

The current research had three primary purposes:

1) To test the existence of a relationship between mentalizing ability and religiosity and to possibly explain previous inconsistent findings by including more sophisticated measures of variables of interest.
2) To both replicate and extend some recent findings pointing to the positive relationship between empathic concern and religiosity.
3) To compare the contribution of Empathy Quotient with measures of mentalizing ability and empathic concern in explaining religiosity. Because this measure includes items that can be associated with both mentalizing and emotional empathy (Muncer & Ling, 2006), we decided to conduct more focused analyses to test its association with religiosity when controlling for other measures of cognitive mentalizing ability and emotional empathy. These analyses will shed light on whether Empathy Quotient is related to religiosity because of its cognitive or emotional components.

1.4.1. Hypotheses

We generated three empirical hypotheses for the current research. First, based on the original reasoning that mentalizing is necessary in order to form mental representation and to believe in supernatural beings (see Gervais, 2013), we hypothesized that mentalizing ability would be positively associated with religiosity (H1). Next, taking into consideration certain similarities between empathic concern and religiosity/spirituality as well as recent empirical findings, we expected that this empathic outcome would be positively associated with religiosity (H2). Finally, although mentalizing ability and empathic concern are jointly involved in various social interactions, the latest studies have demonstrated that empathic concern is a stronger and more robust correlate of religiosity than mentalizing, therefore we hypothesized that

any association between mentalizing and religiosity would be attenuated once empathic concern is controlled for (H3).

These hypotheses were tested in two studies. Study 1 examined the relationships among mentalizing ability, empathic concern, and religiosity. Study 2 served as a direct replication of Study 1, but also extended the previous study by including new and more sophisticated measures of these constructs.

2. Study 1

In Study 1, the associations among performance-based mentalizing ability, empathic concern, and general religiosity were examined in a sample of Polish university students.

2.1. Method

2.1.1. Participants

The sample consisted of 314 Polish students (175 females, 138 males, 1 n/a) attending various universities across Poland. This sample size was sufficient to detect a medium-sized effect ($r = 0.20$) with a power of 0.80 and two-tailed $\alpha = 0.05$ (see Gignac & Szodorai, 2016). Participants were recruited via online advertisements posted on social media. The study was advertised as research on social attitudes and emotionality. Upon providing informed consent, participants were invited to fill out an online survey. Participation was voluntary and participants were not compensated in any form.

The mean age of the sample was 22.77 ($SD = 3.47$; range from 18 to 60). On average, participants have completed 15.83 years of education ($SD = 2.26$, range from 11 to 28). Participants' religious affiliations were: Roman Catholics (67.2%), Buddhists (3.2%), Orthodox (2.9%), Protestants (1.3%), other Christians (2.2%), other religions (1.9%), not identified with any religion/denomination (21.3%).

2.1.2. Measures

2.1.2.1. Mentalizing ability. The actual performance in social-perceptual mentalizing ability was assessed using the Reading the Mind in the Eyes Test developed by Baron-Cohen et al. (2001). Participants were presented with a series of thirty-six photographs depicting eyes. The task was to infer the correct mental state expressed in the eyes by choosing one out of four options for each photograph. Scores were calculated using the sum of all the correct responses.

2.1.2.2. Emotional empathy. The subscale *empathic concern* from the Interpersonal Reactivity Index by Davis (1983) was administered to measure emotional empathy. This aspect of empathy is defined as a tendency to experience other-oriented feelings of compassion and sympathy for less fortunate others. The subscale comprises seven items rated on a 5-point Likert-type scale (from 1 = "strongly disagree" to 5 = "strongly agree"). An example item is: *I often have tender, concerned feelings for people less fortunate than me.* The scale items were summed to compute an overall score in empathic concern.

2.1.2.3. Religiosity. The short version of the Centrality of Religiosity Scale (CRS) by Huber and Huber (2012) was used as a measure of general religiosity. The scale consists of five items evaluating the subjective importance of religiosity across five dimensions: intellectual (i.e., *How often do you think about religious issues*?), ideological (i.e., *To what extent do you believe that God or something divine exists*?), experiential (i.e., *How often do you experience situations in which you have the feeling that God or something divine intervenes in your life*?), public practice (i.e., *How often do you take part in religious services*?), and private practice (i.e., *How often do you pray*?). Following the guidelines by Huber and Huber (2012), we computed the mean scores of all items in the scale, which yielded values within the range of 1.00 to 5.00.

Table 1
Descriptive statistics, reliability coefficients and correlations matrix for all variables in Study 1.

	M	SD	α	2.	3.
1. Reading the Mind in the Eyes Test	25.69	3.72	0.54	−0.02	0.02
2. Empathic concern	23.70	4.51	0.71		**0.23****
3. Religiosity - Centrality of Religiosity Scale	2.99	1.08	0.88		–

Note Significant correlations are bolded.
** *p* < .01.

2.2. Results and discussion

The descriptive statistics, reliability coefficients and bivariate correlations between all variables are presented in Table 1.

First, zero-order bivariate correlation analyses revealed that performance on the Reading the Mind in the Eyes Test was not significantly related to religiosity; thus, hypothesis 1 was not supported. Empathic concern, on the other hand, was positively and moderately correlated with religiosity ($r = 0.23$, $p < .001$ (two-tailed), 95% CI [0.122 to 0.332]), supporting hypothesis 2.

Next, we conducted a 3-step linear regression analysis to test how empathic concern and mentalizing ability jointly predict religiosity. In the first step we entered gender (dummy coded, female = 0, male = 1) and age as predictors, which failed to produce a significant model ($\Delta R^2 = 0.002$; ΔF (2, 310) = 0.295, $p = .745$). Entering the Reading the Mind in the Eyes Test score in the second step did not significantly improve the model ($\Delta R^2 = 0.000$; ΔF (1, 309) = 0.082, $p = .775$). Finally, including empathic concern in the third step resulted in a significant improvement of the model ($\Delta R^2 = 0.052$; ΔF (1, 308) = 17.063, $p < .001$) yielding a small effect size (Cohen's $f^2 = 0.058$). Notably, empathic concern was the only significant predictor of religiosity in the final model ($\beta = 0.24$, $p < .001$, 95% CI [0.124 to 0.350]). The values of beta coefficients for nonsignificant predictors in the final model ranged from 0.03 to 0.05 ($p > .36$). These findings did not support hypothesis 3 since the inclusion of empathic concern did not significantly attenuate the relationship between mentalizing ability and religiosity. It needs to be noted, however, that this relationship was not significant in the first step, therefore hypothesis 3 could not have been supported.

3. Study 2

In Study 1 we found that general religiosity was positively related to emotional empathy but unrelated to mentalizing ability. Study 2 was intended to both replicate and develop these findings in a number of ways. First, in Study 1 cognitive mentalizing was measured using one performance-based task. In Study 2 we administered an additional performance-based measure of mentalizing ability, which assessed more advanced mentalizing skills. We also administered a self-report measure of mentalizing ability. Second, in addition to measuring general religiosity, we also administered the Post-Critical Belief Scale which disentangles between the degree of belief (exclusion vs. inclusion of transcendence) and the style of belief (symbolic vs. literal interpretation of religion). Since mentalizing ability and empathy have been previously associated with more symbolic ways of thinking (Duriez, 2004; Lillard & Kavanaugh, 2014), we predicted that examining the style of belief might be helpful in explaining the inconsistency in previous findings. Fourth, given that previous research has sometimes used a popular measure of empathy (i.e., "Empathy Quotient") to assess mentalizing ability, we also included this measure to compare its predictive power with that of other cognitive and emotional measures.

Additionally, in Study 2, we also performed a commonality analysis, which is a statistical technique within multiple regression that serves to decompose the overall R^2 explained in a given model into the percent of variance associated uniquely with each predictor and the portion of variance explained by a common effect of two or more predictors (Nimon, 2010). Commonality analysis provides more information than beta weights alone and can be used to not only determine the relative importance of all independent variables but also reveal the intricate interplay between them. In our research, the analysis of common and shared variance will help delineate the contribution of Empathy Quotient in comparison with cognitive mentalizing measures and empathic concern in explaining religious belief.

3.1. Method

3.1.1. Participants

A total of 236 adult participants (145 females, 88 males, 3 n/a) were recruited from the community in Warsaw, Poland. This sample size was sufficient to detect a medium-sized effect ($r = 0.20$) with a power of 0.80 and two-tailed α = 0.05 (see Gignac & Szodorai, 2016). The study described here was part of a larger investigation on cognitive and socioemotional correlates of religiosity. Parts of this dataset were used elsewhere; however, none the results presented here had been previously reported. All the materials and data from both current studies are available online via the Open Science Framework platform (https://osf.io/d6y8x/?view_only=764c6b25844a4f38836ec6d46ec9513f).

All participants were recruited individually through an online advertisement and were invited to fill out a series of online questionnaires. The study was advertised as a research study on social attitudes and emotionality. All participants provided informed consent. For their participation, they received monetary compensation in the amount of 40 PLN (approx. 10 USD).

The mean age was 32.06 ($SD = 10.54$, range from 19 to 66). On average, participants have completed 15.93 years of education ($SD = 2.96$, range from 6 to 30). In terms of religious affiliation, the sample was predominantly Roman Catholic (64.8%), with a small proportion of Protestants (2.1%), Orthodox (1.3%), other Christians (2.1%), Buddhists (1.2%) and adherents of other religions (1.2%). Finally, 22.5% declared no affiliation with any denomination or religion.

3.1.2. Measures
3.1.2.1. Mentalizing ability. To assess the actual performance in the social-perceptual mentalizing ability we used the Reading the Mind in the Eyes Test (see the description for Study 1).

Additionally, we included another performance-based measure of mentalizing ability, i.e., the Faux Pas Recognition Test (Stone, Baron-Cohen, & Knight, 1998). This test is typically regarded as a measure of *advanced* social-cognitive mentalizing skills (Stone et al., 1998). It consists of 20 short vignettes describing various social interactions. For each story, participants need to determine if someone said something inappropriate and identify a person who made a faux pas. This task requires the ability to make inferences about the mental states of the characters depicted. In the current study, 10 vignettes (five containing a faux pas, and five being control stories) were selected from the original version of the Faux Pas Recognition Test. Participants received one point for each successful faux pas detection and one point for proper identification of the source of inappropriateness. As recommended by Stone et al. (1998), we computed the overall score as a sum of all responses divided by the number of correctly answered control questions for each story. This way we obtained a faux pas detection ratio with a range of scores from 0.00 to 1.00.

Finally, in order to capture the self-reported mentalizing abilities, the Mind-Reading Belief Scale (Realo et al., 2003) was administered. This self-reported questionnaire examines how participants themselves assess their own skills related to reading mental states of other people. Participants rated eight items on a 5-point Likert scale (from 1 = "strongly disagree" to 5 = "strongly agree"). Example items: *Usually, I know beforehand what my conversation partner is going to say; I*

do not think I am good at knowing human nature/judging people (reverse-coded).

3.1.2.2. Empathy.
To assess empathy we used the same measure of *empathic concern* as described in Study 1.

Additionally, in Study 2, we also included the Empathy Quotient - Short by Wakabayashi et al. (2006) which assesses the general level of self-declared empathy. According to the authors of the original scale (Baron-Cohen & Wheelwright, 2004), Empathy Quotient intentionally blends cognitive and emotional components of empathy into one broad measure of dispositional empathy. The short version of the scale contains 22 items with four response options: "strongly agree," "slightly agree," "slightly disagree," "strongly disagree." Participants received 2 points for a strong endorsement of a given statement, 1 point for a moderate endorsement, and 0 points for a slight or strong disagreement. Six items were reversely scored. The overall score is the sum of all items included in the scale.

3.1.2.3. Religiosity.
In addition to the Centrality of Religiosity Scale (see description in Study 1), the Post-Critical Belief Scale by Duriez, Appel, and Hutsebaut (2003) was also administered. The measure is based on the idea of Wulff (1991) that all the possible approaches to religion may be represented using a two-dimensional space, with one dimension being inclusion vs. exclusion of transcendence, and the other being a literal vs. symbolic interpretation of religious contents. When the two dimensions are combined, four specific religious positions can be distinguished, i.e., orthodoxy (e.g., *Only the major religious traditions guarantee access to God*), external critique (e.g., *A scientific understanding of human life and the world makes a religious understanding obsolete*), second naiveté (e.g., *The Bible is a guide, full of signs in the search for God, and not a historical account*), and relativism (e.g., *There is no absolute meaning in life, only direction-giving, which is different for each one of us*). The whole scale comprises 33 items rated on a 7-point response scale (from 1 = "strongly disagree" to 7 = "strongly agree"). Since in this investigation we were mainly interested in comparing religious the degree of belief per se with the style of belief, we focused our analyses on the scores of the two dimensions: exclusion vs. inclusion and literal vs. symbolic. Scores were computed using the method previously described by Shen, Yelderman, Haggard, and Rowatt (2013):

Exclusion vs. inclusion = (orthodoxy + second naiveté – external critique – relativism)

Literal vs. symbolic = (relativism + second naiveté – orthodoxy – external critique).

A higher score on exclusion vs. inclusion means a stronger inclusion of transcendence, whereas a higher score on literal vs. symbolic dimension means a more symbolic interpretation of religious contents.

3.2. Results and discussion

3.2.1. Descriptive statistics
The descriptive statistics along with reliability estimates for all measures are presented in Table 2.

Table 2
Descriptive statistics and reliability coefficients for all measures in Study 2.

Measure	M	SD	α
Reading the Mind in the Eyes Test	23.70	4.78	0.70
Faux Pas Recognition Test	0.82	0.17	0.71
Mind-Reading Belief Scale	25.95	4.88	0.77
Empathic concern	24.99	3.99	0.66
Empathy Quotient – Short	21.64	7.46	0.86
Religiosity – Centrality of Religiosity Scale	2.92	1.16	0.90
Post-Critical Belief Scale – exclusion vs. inclusion	−0.47	3.75	–
Post-Critical Belief Scale – literal vs. symbolic	2.42	2.00	–

3.2.2. Associations between mentalizing ability, empathy, and religiosity
First, we computed bivariate correlations among measures of mentalizing ability, empathy, and religiosity (see Table 3).

Little evidence was found for an association between performance-based measures of mentalizing ability and religiosity. Similarly to Study 1, the Reading the Mind in the Eyes Test score was not significantly related to religiosity. Regarding the Post-Critical Belief Scale, results showed that the Reading the Mind in the Eyes Test was weakly and negatively associated with the dimension of inclusion of transcendence ($r = -0.13$, $p = .044$ (two-tailed), 95% CI [-0.253 to -0.002]) but positively related to the dimension of symbolic interpretation of religious contents ($r = 0.19$, $p = .003$ (two-tailed), 95% CI [0.064 to 0.310]). Faux Pas Detection ratio was not significantly related to general religiosity or any dimension of the Post-Critical Belief Scale.

A different pattern of results was observed for self-reported mentalizing skills. The Mind-Reading Belief Scale score was positively associated with general religiosity ($r = 0.20$, $p = .002$ (two-tailed), 95% CI [0.074 to 0.320]) but unrelated to either exclusion vs. inclusion or literal vs. symbolic approach. Overall, thus, we conclude that hypothesis 1 stating that mentalizing ability would be positively related to religiosity was only partially supported with regard to self-reported mentalizing skills.

On the other hand, hypothesis 2 concerning a positive relationship between empathic concern and general religiosity was, similarly to Study 1, strongly supported. The observed association between the two variables was positive and large in size ($r = 0.34$, $p < .001$, (two-tailed), 95% CI [0.222 to 0.448]). Moreover, empathic concern was also positively correlated with both dimensions of the Post-Critical Belief Scale: exclusion vs. inclusion of transcendence ($r = 0.28$, $p < .001$ (two-tailed), 95% CI [0.158 to 0.394]) and literal vs. symbolic interpretation of religion ($r = 0.13$, $p = .041$ (two-tailed), 95% CI [0.002 to 0.253]).

Another measure of empathy, Empathy Quotient, also had a significant association with religiosity, which was positive and moderate in size ($r = 0.24$, $p < .001$ (two-tailed), 95% CI [0.116 to 0.357]). Empathy Quotient was also significantly and positively related to exclusion vs. inclusion ($r = 0.14$, $p = .033$ (two-tailed), 95% CI [0.013 to 0.263]).[2]

Subsequently, in order to investigate the incremental validity of both mentalizing and empathy measures in the prediction of religiosity, a series of three hierarchical regression analyses were conducted for each of the measures related to religiosity: general religiosity, inclusion-exclusion of transcendence, and literal-symbolic approach to religiosity.

First, we built a model predicting general religiosity. In the first step, we entered two demographic predictors: gender (dummy coded, female = 0, male =1) and age, which did not produce a significant model ($\Delta R^2 = 0.006$; ΔF (2, 230) = 0.718, $p = .489$). In the second step, all mentalizing measures were included (i.e., Reading the Mind in the Eyes Test, Faux Pas Recognition Test, and Mind-Reading Belief Scale), yielding a significant improvement of the model ($\Delta R^2 = 0.062$; ΔF (3, 227) = 5.018, $p = .002$). In this step the Mind-Reading Belief Scale was a significant positive predictor ($\beta = 0.21$, $p = .001$, 95% CI [0.084 to 0.340]), and the Reading the Mind in the Eyes Test score was a significant negative predictor ($\beta = -0.16$, $p = .027$, 95% CI [-0.297 to -0.018]) of general religiosity. Finally, we entered both empathy measures (i.e., empathic concern and Empathy Quotient) as predictors in the final step significantly improved the model ($\Delta R^2 = 0.088$; ΔF (2, 225) = 11.717, $p < .001$). In this step the Reading the Mind in the Eyes Test score was a significant negative predictor ($\beta = -0.17$, $p = .014$, 95% CI [-0.303 to -0.034]), and empathic concern was a significant positive predictor of general religiosity ($\beta = 0.31$, $p < .001$, 95% CI [0.167 to 0.449]).

This pattern of results brings no support for hypothesis 3. Contrary to our expectations, the inclusion of empathic concern did not attenuate the relationship between mentalizing ability (i.e., Reading the Mind in the Eyes Test) and religiosity.

Table 3
Correlation matrix for selected variables in Study 2.

	2.	3.	4.	5.	6.	7.	8.
1. Reading the Mind in the Eyes Test	**0.36****	0.10	**0.15***	**0.16***	−0.08	**−0.13***	**0.19****
2. Faux Pas Recognition Test		0.06	**0.18****	0.10	0.04	−0.05	0.09
3. Mind-Reading Belief Scale			**0.19****	**0.56****	**0.20****	0.09	0.03
4. Empathic concern				**0.46****	**0.34****	**0.28****	**0.13***
5. Empathy Quotient – Short					**0.24****	**0.14***	0.12
6. Religiosity – Centrality of Religiosity Scale						**0.85****	**0.35****
7. Post-Critical Belief Scale – Exclusion vs. inclusion							**0.26****
8. Post-Critical Belief Scale – Literal vs. symbolic							–

Note Significant correlations are bolded.
* $p < .05$.
** $p < .01$.

Next, an analogous regression analysis was conducted to predict exclusion vs. inclusion of transcendence. Gender and age entered in the first step did not produce a significant model ($\Delta R^2 = 0.004$; ΔF (2, 230) = 0.477, $p = .621$). In the next step we added three measures of mentalizing ability, which did not significantly improve the model ($\Delta R^2 = 0.029$; ΔF (3, 227) = 2.305, $p = .078$). Finally, empathic concern and Empathy Quotient were entered, yielding a significant improvement of the model ($\Delta R^2 = 0.075$; ΔF (2, 225) = 9.426, $p < .001$). In this final model there were two significant predictors: the Reading the Mind in the Eyes Test a negative predictor ($\beta = -0.17$, $p = .020$, 95% CI [−0.304 to −0.027]) and empathic concern a positive predictor ($\beta = 0.29$, p < .001, 95% CI [0.147 to 0.437]).

The last hierarchical regression model was built to predict literal vs. symbolic interpretation of religious contents with demographics, mentalizing ability and empathy. Entering gender and age as predictors in the first step provided a significant model ($\Delta R^2 = 0.036$; ΔF (2, 230) = 4.255, $p = .015$). Age was a significant negative predictor of literal vs. symbolic dimension ($\beta = -0.19$, $p = .004$, 95% CI [−0.320 to −0.063]). The inclusion of mentalizing measures in the second step did not significantly improve the model ($\Delta R^2 = 0.029$; ΔF (3, 227) = 2.322, $p = .076$). Age remained significant negative predictor ($\beta = -0.16$, $p = .019$, 95% CI [−0.286 to −0.026]) and the Reading the Mind in the Eyes Test was a positive predictor ($\beta = 0.17$, p = .020, 95% CI [0.027 to 0.308]). Finally, entering empathic concern and Empathy Quotient in the third step also did not yield a significant improvement of the model ($\Delta R^2 = 0.024$; ΔF (2, 225) = 3.022, $p = .051$). The two significant predictors in the final model were age ($\beta = -0.16$, $p = .016$, 95% CI [−0.289 to −0.031]) and the Reading the Mind in the Eyes Test ($\beta = 0.16$, $p = .027$, 95% CI [0.018 to 0.297]).

3.2.3. Relationship between the Reading the Mind in the Eyes Test and religious belief vs. religious cognitive style

Because the Reading the Mind in the Eyes Test score was differently related to the degree of religious belief and style of religious belief, we decided to test the contribution of both religious dimensions to the prediction of mentalizing ability. We built a regression model with the Reading the Mind in the Eyes Test score as a dependent variable and both dimensions of the Post-Critical Belief Scale as predictors (see Table 4). Additionally, we also performed a commonality analysis using the script developed by Nimon (2010) to precisely determine the unique and common effects of each predictor in the model.

The regression model proved statistically significant ($\Delta R^2 = 0.072$; ΔF (2, 233) = 9.002, $p < .001$). Literal vs. symbolic dimension was a significant positive predictor ($\beta = 0.242$, $p < .001$, 95% CI [0.113 to 0.371]), and exclusion vs. inclusion dimension was a significant negative predictor ($\beta = -0.195$, $p = .003$, 95% CI [−0.323 to −0.066]) of the Reading the Mind in the Eyes Test score. Out of the variance in religiosity explained by this regression model, as much as 50% is attributable to the literal vs. symbolic dimension and 23.61% to exclusion vs. inclusion.

These results suggest that although religious cognitive style (i.e., literal vs. symbolic dimension) explained more variance in mentalizing ability, the degree of belief (i.e., exclusion vs. inclusion dimension) was also significantly and, in this case, negatively associated with the Reading the Mind in the Eyes Test score. Moreover, since the common effect for both predictors is a negative number and the overall percent of variance explained by unique and common effects is lower than 100%, we may conclude that there exists a mutual suppression of both religious dimensions.

3.2.4. Relationship between empathic concern and religious belief vs. religious cognitive style

Since some researchers suggested that empathic concern might be only related to religious cognitive style and not religious belief per se, we conducted a similar regression analysis as in the case of the Reading the Mind in the Eyes Test. In this model, empathic concern was entered as the dependent variable and the two dimensions of the Post-Critical Belief Scale as predictors (see Table 5).

The analysis revealed that the tested model was statistically significant ($\Delta R^2 = 0.082$; ΔF (2, 233) = 10.347, $p < .001$). The only significant predictor of empathic concern was exclusion vs. inclusion dimension ($\beta = 0.262$, $p < .001$, 95% CI [0.133 to 0.390]). Moreover, we found that while Exclusion vs. inclusion had a relatively large unique contribution, the unique effect of literal vs. symbolic dimension was very small. Exclusion vs. inclusion contributed to as much as 95.12% of all the variance explained in empathic concern.

These findings indicate that empathic concern is primarily associated with religious belief, whereas the religious cognitive style is not a significant predictor and has only a marginal contribution to the prediction of empathic concern.

Table 4
Linear regression and commonality analysis for the model predicting the Reading the Mind in the Eyes Test score with literal vs. symbolic style and exclusion vs. inclusion of transcendence.

Predictor	R	R^2	R^2_{adj}	β	p	Unique	Common	Total	% of R^2
	0.268	0.072	0.064						
Literal vs. symbolic				0.242	0.000	0.055	−0.018	0.036	50%
Exclusion vs. inclusion				−0.195	0.003	0.035	−0.018	0.017	23.61%

Table 5
Linear regression and commonality analysis for the model predicting empathic concern with literal vs. symbolic style and exclusion vs. inclusion of transcendence.

Predictor	R	R^2	R^2_{adj}	β	p	Unique	Common	Total	% of R^2
	0.286	0.082	0.074						
Literal vs. symbolic				0.064	0.324	0.004	0.014	0.018	21.95%
Exclusion vs. inclusion				0.262	0.000	0.064	0.014	0.078	95.12%

3.2.5. Delineating the relationship between "Empathy Quotient" and religiosity

The Empathy Quotient questionnaire has sometimes been used as a measure of mentalizing ability and sometimes as a measure of empathy given that it includes both cognitive and affective components. We therefore aimed at testing whether when controlling for the cognitive components of the tool, its positive association with religiosity would still be present. We also tested whether when controlling for the emotional component of the measure, its positive association with religiosity would disappear. To statistically control for different components of Empathy Quotient, we built two alternative regression models predicting general religiosity. In the first model, we compared the predictive power of Empathy Quotient with measures of cognitive mentalizing ability (i.e., Reading the Mind in the Eyes Test, Faux Pas Recognition Test, and Mind-Reading Belief Scale), whereas in the second model Empathy Quotient was entered as a predictor along with the measure of emotional empathy (i.e., empathic concern).

The results of these analyses indicated that once the cognitive aspect of Empathy Quotient (mentalizing measures) was partialled out, the measure was still significantly associated with general religiosity. However, when the emotional aspect of the scale (empathic concern) was controlled for, then Empathy Quotient was no longer significantly related to religiosity. The detailed analyses comparing the contribution of Empathy Quotient with mentalizing measures and empathic concern can be found in Supplementary Material.

4. General discussion

The present investigation examined the associations between cognitive mentalizing ability, emotional empathy, and religiosity in two independent samples of Polish adults. Previous research findings on the role of mentalizing for religious belief have been inconsistent. We attempted to contribute to this area of research by addressing some methodological shortcomings of the prior work. Specifically, we advocated, and consistently applied, the theoretical differentiation between mentalizing ability and emotional empathy; a distinction that had not been fully adopted in the research on religion before. Moreover, we extended the scope of empirical measures to be able to better understand the complex connection between our variables of interest. Finally, we also carefully examined the contribution of one particular measure, i.e. Empathy Quotient, to explain certain concerns that arose regarding its internal structure and its significance for religious belief.

4.1. Mentalizing ability and religiosity

The evidence from this research is consistent with previous reports that casted doubt on the relationship between mentalizing ability and religiosity (e.g., Jack et al., 2016; Maij et al., 2017; Vonk & Pitzen, 2017). With respect to zero-order correlations across both current studies only one mentalizing measure, i.e., self-reported Mind-Reading Belief Scale was significantly and positively related to general religiosity. Both performance-based measures, i.e., the Reading the Mind in the Eyes Test and more advanced Faux Pas Recognition Test, were not found to correlate with religiosity. These results suggest that the relationship between mentalizing and religiosity, if any, concerns the way religious people subjectively assess their own mentalizing skills. This finding, however, must be interpreted with caution because

previous research showed that beliefs regarding one's mentalizing abilities are typically unrelated to the actual competence (Realo et al., 2003) and that they could merely be a function of narcissism (Ames & Kammrath, 2004). This pattern of findings would, therefore, be in line with other research showing a positive relationship between religiosity and self-enhancement (e.g., Sedikides & Gebauer, 2010).

A slightly different pattern of results was observed when all mentalizing and empathy measures were taken into account jointly. In this case, the Mind-Reading Belief Scale was no longer significantly related to religiosity, however the Reading the Mind in the Eyes Test became a significant and negative predictor of religiosity. Further insight into the role of this measure for religiosity was provided using the Post-Critical Belief Scale which separates religious belief per se from religious cognitive style. Specifically, we found evidence that while the Reading the Mind in the Eyes Test is negatively related to the belief in transcendence, it is also positively related to symbolic processing of religious contents. This finding may partly explain the inconsistency observed in the previous research on mentalizing ability and religion. Namely, we presume that the possibility to detect a relationship between the Reading the Mind in the Eyes Test and belief in God may, partly, depend on the style of belief that religious believers in the particular study hold.

When we only look at the belief in transcendence, we could observe that, generally, the more skillful the person is in mentalizing ability, the less likely he or she is to believe. In this sense, our findings support the idea presented by Vonk and Pitzen (2017) who suggested that high mentalizing ability might actually prove a hindrance to religious belief. Now, when we also take into consideration the religious cognitive style of believers, the picture becomes more complicated. Specifically, if a sample happens to be mostly literal in belief, then, the possibility of observing a negative relationship with the Reading the Mind in the Eyes Test is relatively high. However, if the proportion of symbolic believers in the given sample is more pronounced, this negative association may decrease or even become positive due to the strong positive link been mentalizing and symbolic thinking. Importantly, the proportion of literal vs. symbolic believers may vary significantly across different investigations conducted in different cultural contexts. For instance, believers in Canada are generally less literal in belief than their counterparts in Ghana (Hunsberger, Owusu, & Duck, 1999). In light of these results, we recommend that any future research on mentalizing and religion should not only consider the strength or certainty of belief but also the way religious meanings are represented.

4.2. Empathic concern and religiosity

Unlike mentalizing ability, empathic concern was consistently and positively associated with general religiosity in both studies. This robust, moderate-sized result suggests that more religious individuals tend to experience more of other-oriented feelings of compassion when faced with suffering or distress of other people. With regard to this finding, it is worth noting that religious teachings of various traditions often explicitly oppose excessive selfishness and promote helping or cooperation (Batson, 1983). The Parable of Good Samaritan in Christianity, Buddhist teachings on warm-heartedness, or Zakat (i.e., almsgiving) obliged in Islam are just a few examples of such an attitude. It is possible that what lies at the heart of all these prescriptions is an increased disposition for compassionate feelings. In this view, religion

would serve as a culturally validated system of beliefs and practices which accords with an individual's emotional tendencies (cf. Pizarro & Salovey, 2002). On the other hand, being a member of a religious group might also create new opportunities to experience empathic concern more frequently, e.g., during communal rituals (Xygalatas et al., 2013) or through engagement in volunteering (Markstrom et al., 2010).

With regard to our discussion on the distinction between the degree of belief per se and the style of belief, it is worth noting that empathic concern was positively associated with both the inclusion of transcendence and symbolic religious style. However, when both dimensions were analyzed together only the belief per se remained a significant predictor of empathic concern suggesting that this emotional disposition is, indeed, associated with having stronger belief in transcendence, and not only with a way of processing of religious contents. Interestingly, this finding seems to contradict the previous research by Duriez (2004) who found that various dimensions of empathy, including empathic concern, were solely related to religious cognitive style and not the belief itself. The exact reasons for this discrepancy are unknown, however, we presume that it might be connected with certain cultural differences between the two investigations. Duriez (2004) examined a sample of Flemish-speaking Belgian university students and did not report any information about the religious affiliation of his participants. Therefore, it is possible that the proportion of particular religious denominations (as well as religiously unaffiliated) in that study was markedly different than the structure of our samples, which could result in dissimilar associations between empathic concern and religious style. Nevertheless, given these two conflicting findings, we advise that this particular result should be independently verified in future studies.

4.3. The contribution of Empathy Quotient

Another important contribution of this research is that it carefully delineated the contribution of Empathy Quotient. Although previous investigations have used this tool as a measure of mentalizing tendencies, we argued that because it includes both affective and cognitive components (see Muncer & Ling, 2006), it cannot be reasonably interpreted as a (pure) measure of mentalizing.

We found that Empathy Quotient contributed significantly to the prediction of religiosity when cognitive mentalizing measures were controlled for, however, it was not a significant predictor of religiosity when empathic concern was partialled out. Altogether these results suggest that the association between Empathy Quotient and religiosity might be mainly driven by its emotional components and not the cognitive ones, which are supposed to capture mentalizing tendencies. As a result, prior findings on religious belief and mentalizing measured with Empathy Quotient (e.g., Lindeman & Lipsanen, 2016; Willard & Norenzayan, 2013) should be interpreted very cautiously as they might, in fact, point the role of *emotional* aspects of empathy and not *cognitive* mentalizing. This conclusion is, obviously, tentative and requires further confirmation, however, we believe that it sheds new light on the previous results.

4.4. Limitations

A number of caveats needs to be noted regarding the present research. First, the findings from both studies are limited by the use of cross-sectional design. Therefore, we could not test any causal relationships between mentalizing, empathy and religiosity. If our understanding of the cognitive and emotional foundation of religious belief is to be moved forward, more experimental research needs to be carried out. Moreover, in both studies, we recruited mostly young participants (the mean age was 22.77 and 32.06, respectively). Since the level of religiosity might fluctuate over the life course and might increase with age (Bengtson, Silverstein, Putney, & Harris, 2015), it would be necessary to replicate these findings with older samples.

Finally, the cultural context of our studies needs to be taken into consideration. Both current samples comprised Polish participants only, with a vast majority of Roman Catholics, which is the most prevalent religious denomination in Poland. From one perspective, this choice of samples may be regarded as an advantage because it provides evidence going beyond the previously-explored populations originating mostly from the United States, Canada or Western Europe. However, on the other hand, due to the exact same reasons, the generalizability of our findings might be limited only to believers of similar cultural and religious backgrounds.

4.5. Conclusion

Notwithstanding certain limitations, the present research made several noteworthy contributions to the current knowledge on cognitive and emotional correlates of religiosity. We found that the cognitive mentalizing ability is either unrelated or negatively related to general religiosity and we established that this might be due to its different correlations with regard to religious belief per se and religious style. Next, we confirmed that the other-oriented emotional outcome of empathy, i.e., empathic concern is consistently and positively associated with general religiosity and the belief in transcendence. Finally, we also established that the popular tool previously used as a measure of cognitive mentalizing, Empathy Quotient, might relate to religiosity due to its emotional components, closely connected with empathic concern.

Footnotes

1. We do recognize that some researchers postulate the existence of so-called "cognitive empathy" (e.g., Shamay-Tsoory, Aharon-Peretz, & Perry, 2009). Typically, however, the cognitive aspect (or component) of empathy refers to the way this state is being induced (e.g., through perspective-taking or imagination) rather than the nature of the phenomenon itself (see Davis, 1994). Importantly, the majority of contemporary accounts are unanimous in recognizing that the result of empathic arousal (whether it is evoked via cognitive or emotional mode) is an *affective* state of sharing or resonating with someone else's emotions. A more comprehensive discussion on empathy and related constructs is beyond the scope of this paper but interested readers may consult the work by Preckel et al. (2018).

2. Please note that we also repeated all the above-mentioned analyses controlling for social desirability bias (SD). Results showed that controlling for SD had a marginal impact on the relationships between the examined variables - most of the results remained unchanged in terms of both direction and statistical significance. Due to the space limit we only report these additional analyses in Supplementary Material.

CRediT authorship contribution statement

Paweł Łowicki: Conceptualization, Methodology, Investigation, Formal analysis, Writing - original draft, Writing - review & editing, Funding acquisition.**Marcin Zajenkowski:**Conceptualization, Supervision, Writing - review & editing.**Patty Van Cappellen:**Conceptualization, Writing - review & editing.

Declaration of competing interest

The authors declare that there is no conflict of interest for this paper.

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Ethical statement

The studies were approved by the research ethics committee of the first author's university.

Appendix A. Supplementary material

Supplementary analyses for this article can be found online at https://doi.org/10.1016/j.paid.2020.109976.

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