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The relation between different types of religiosity and analytic cognitive style

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ABSTRACT

Analytic cognitive style (ACS) has usually been found to be negatively correlated with religiosity. Several recent studies, however, challenged this finding claiming, for example, that the presumed association is an artifact of the order of presentation of the ACS and religiosity measures or that ACS might be differently related to different types of religiosity. Furthermore, almost all data in this field of research come from Western Christian samples. We, therefore, investigated whether ACS is related to four types of religiosity (intrinsic, extrinsic, quest, and general religious belief) and whether this relation stems from an order effect in three different studies with four different non-western samples (total $n = 1329$). The results reveal that there is no order effect and that ACS is negatively correlated to intrinsic/extrinsic religiosity and general religious belief, corroborating initial findings. Additionally, we found a positive correlation between ACS and quest religiosity. The results point to the importance of distinguishing different types of religiosity in religiosity-cognitive style studies.

The dual-process model of the mind originally proposed to account for thinking dispositions in reasoning and problem solving, is currently being evaluated as a plausible explanation of beliefs and attitudes in a much broader domain (see Pennycook, Fugelsang, & Koehler, 2015). Dual-process theories generally argue that our minds operate on the basis of two types of processes. Type 1 processes are mostly those that are intuitive, automatic and low-effort while Type 2 processes are mostly analytic, controlled and requiring high effort (Evans & Stanovich, 2013). These thinking styles have been shown to be associated with acceptance of evolutionary theory (Gervais, 2015), understanding the nature of science (Shtulman & McCallum, 2014), less moral sensitivity (Pennycook, Cheyne, Barr, Koehler, & Fugelsang, 2014; Royzman, Landy, & Goodwin, 2014), and less conservative political attitudes (Iyer, Koleva, Graham, Ditto, & Haidt, 2012; Saribay & Yilmaz, 2017; Yilmaz & Saribay, 2016, 2017a, 2017b).

A large literature indicates that the tendency to think analytically (as measured by the Cognitive Reflection Test; CRT) is also negatively related to religious belief (Gervais & Norenzayan, 2012; Pennycook, Cheyne, Seli, Koehler, & Fugelsang, 2012; Shenhav, Rand, & Greene, 2012). However, a recent study argued that the CRT-religious belief relationship originates from a kind of order effect (Finley, Tang, & Schmeichel, 2015). That is, it is only found when analytic thinking is measured first. In other words, it is argued that CRT primes analytic thinking, which in turn leads to a decrease in religious belief when it is measured before the religiosity measure; however, there is, in fact, no relationship between trait religiosity and trait analytic thinking ability (Finley et al., 2015).[1] Pennycook, Ross, Koehler, and Fugelsang (2016) further tested this order effect argument and have shown a modest significant relation with American university students by measuring religious beliefs and analytical thinking in separate sessions. At the same time, they showed that atheists and agnostics were more reflective/analytic than religious believers.

In addition to these correlational findings, a number of studies found that activating analytic thinking experimentally has the effect of reducing religious belief (Gervais & Norenzayan, 2012; Shenhav et al., 2012; Yilmaz, Karadöller, & Sofuoglu, 2016), though there are other studies that failed to find an effect (Sanchez, Sundermeier, Gray, & Calin-Jageman, 2017) and another study that found the opposite effect (Yonker, Edman, Cresswell, & Barrett, 2016). Sanchez et al. (2017) could not replicate the original findings of Gervais and Norenzayan (2012, Study 2) in a high-powered study. Yonker et al. (2016) found in separate studies that the activation of analytical thinking either increased or did not influence intrinsic religiosity. There was also no effect of the analytic thinking manipulation on other measures of religiosity (i.e., another religious belief scale, and belief in supernatural agents).

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[1] Religiosity was initially taken as a fixed character trait in the previous literature, but then it was seen that it can be manipulated and changed (see Shariff, Cohen, & Norenzayan, 2008). The same applies for ACS.

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Intrinsic religiosity is not seen as a general religious belief in the literature but as a sign of religious motivation (Hathaway & Pargament, 1990). Yonker et al. (2016) argue that there should not be a negative relationship between intrinsic religiosity and analytical thinking in contrast to the findings of Gervais and Norenzayan (2012) since intrinsic religiosity is positively associated with self-control (McCullough & Willoughby, 2009), which is necessary to suppress intuitions and to think in a high effort mode. Accordingly, Yonker et al. (2016) expected that intrinsic religiosity will be positively related to analytic cognitive style. Thus, they suggest that individual differences in religiosity are important and there might be different relationships between different religiosity measures and the tendency to think analytically. However, it is not clear in this work whether the methods used to prime analytical thinking actually worked. Likewise, some analytical thinking tasks were solved in the experimental group but no parallel manipulation was given to the neutral group. In any case, a number of methods used to activate analytic thinking seem ineffective. For example, of the three manipulation methods used by Gervais and Norenzayan (2012), visual priming was found to be ineffective by Sanchez et al. (2017) and Deppe et al. (2015). While the scrambled sentence task worked in Yilmaz et al. (2016) on religious belief, replicating Gervais and Norenzayan's (2012) findings, the same method did not work in another study investigating morality (Yilmaz & Bahçekapılı, 2015a, Study 1 science priming; Study 3 analytic thinking priming). Similarly, while Shenhav et al. (2012) showed that a reflective or intuitive mindset had an effect on religious beliefs, the priming method did not work in a study conducted on Turkish university students (Yilmaz & Saribay, 2016, Study 3A). In any case, the fact that there is no neutral group in the Shenhav et al.'s (2012) study makes it impossible to conclude whether it is the intuitive mindset that is increasing religious belief or the reflective mindset that is decreasing it. Likewise, Gervais and Norenzayan's (2012) difficult-to-read font was not replicated in a high-powered study (Meyer et al., 2015), or in a work done on Turkish university students (Yilmaz & Saribay, 2016, Study 3B). There is, therefore, a general problem in the literature on priming analytical thinking. Thus, a correlational demonstration of a relation between analytic thinking and religiosity might provide a more secure rationale for future experimental studies (see also Pennycook, Tranel, Warner, & Asp, 2017 for a similar argument).

Moreover, almost all the data on the relation of analytical thought and religiosity come from American or online MTurk participants (see for a meta-analysis Pennycook et al., 2016). Therefore, whether analytical thinking is related to religious belief in non-western samples, whether this relationship is due to an order effect as Finley et al. (2015) claimed, and whether this relationship will differ according to different religiosity types (intrinsic, extrinsic, quest, general religious belief) are not clear.

Therefore, in the present study, we first examined whether religious belief would show a differential relationship with analytic thinking by giving CRT before and after the religiosity measure in two separate samples (Study 1). In Study 2, we examined the possibility of a positive relationship with intrinsic religiosity as Yonker et al. alleged, and examined the separate relationship of intrinsic, extrinsic, and quest religiosity with CRT. In Study 3, we replicated the findings of Study 2 by measuring intrinsic religiosity with a different measure.

1. Study 1

1.1. Sample 1

1.1.1. Methods

A total of 217 participants took part in the study (Mean age = 27.31, *SD* = 9.41, 170 women). Eighteen identified themselves as atheists, 32 as believing in God without being affiliated with an organized religion, 179 as Muslim and three did not respond.

Since the sample was selected from an adult population outside college, the age range is relatively large. Participants were contacted by a group of research assistants randomly on the streets of Istanbul. The participants were given paper and pencil forms, and they completed the forms at their own pace, and then returned them to the researcher in a maximum of 1 h on the street.

Participants first solved the CRT questions. CRT (Frederick, 2005) is a measurement tool commonly used in the literature to measure analytic cognitive style, an independent construct from general cognitive ability (Frederick, 2005; Pennycook et al., 2012; Saribay & Yilmaz, 2017; Toplak, West, & Stanovich, 2011). The test consists of three questions that measure analytical or intuitive thinking styles. Each question has a correct (analytic) and an intuitive (incorrect) answer. For example, the correct answer to the question "A bat and a ball cost $ 1.10 in total. The bat costs $ 1.00 more than the ball. How much does the ball cost?" is 5 cents. It requires suppressing an automatic and intuitive answer (10 cents). The correct responses given to the three questions were summed and a CRT total score was generated.

They then filled in the Turkish version of the Intuitive Religious Belief Scale (IRS) (Yilmaz et al., 2016) developed by Gervais and Norenzayan (2012). This scale is a general religious belief measure and is a 5-point (1 = strongly disagree, 5 = strongly agree) Likert-type measure (sample items: "I believe in God"; "When I am in trouble, I find myself wanting to ask God for help"). They then responded to a demographic form that included a one-item religiosity question (1-not at all religious to 7-highly religious) and a one-item political orientation question (1-left wing to 7-right wing), since it is known that political orientation is related to both religiosity and analytic thinking tendency (see Saribay & Yilmaz, 2017). A single item religiosity measure has also its use in psychological research (e.g., Piazza & Sousa, 2014; Yilmaz & Bahçekapili, 2015a) for a more direct measure of religiosity, and it has predictive value. We also asked perceived socio-economic status (SES) of the participants by asking them their current SES on a 5-point scale (1 = low SES, 5 = high SES).

1.1.2. Results and discussion

The results revealed that CRT was negatively correlated with IRS ($r = -0.147$, $p = 0.031$), religiosity ($r = -0.180$, $p = 0.007$), and political orientation ($r = -0.155$, $p = 0.022$). However, when we conducted a hierarchical regression analysis and controlled for gender (0 = male, 1 = female), age (in years), SES (1 = low, 5 = high), and political orientation (1 = left, 7 = right) in step 1, CRT did not significantly predict neither IRS ($\beta = -0.060$, $p = 0.388$), nor religiosity ($\beta = -0.065$, $p = 0.302$), in step 2. Thus, the results might suggest that although there is a significant relation, the results are not robust. However, it must be noted that it is not conceptually clear whether these demographic variables should be treated as artifacts, or possible reasons which account for the certain amount of variance on the outcome variables (see also Yilmaz & Saribay, 2017b footnote 2). In other words, although it is a general approach to examine the effect of the independent variable by eliminating the variances accounted by the demographic variables associated with the dependent variable in the general psychology literature, this approach may be problematic in a theoretical sense. More specifically, the demographic variables, whose variances are eliminated, are generally seen as methodological artifacts. However, they actually explain a certain variance on the dependent variable and should be considered as one of the possible causes of the change on the dependent variable. Thus, the disappearance of the effect after controlling participants' demographics should not mean that there is not, in fact, a relationship. Thus, Yonker et al.'s (2016) findings must be evaluated with this caution since they controlled for all demographics in all the analyses, and found no significant effect of the analytic thinking manipulation.

In another sample, we investigated the same relation by exposing participants to the religious belief measure before CRT.