



Analytic Thinking, Religion, and Prejudice: An Experimental Test of the Dual-Process Model of Mind

Onurcan Yilmaz, Dilay Z. Karadöller & Gamze Sofuoglu

To cite this article: Onurcan Yilmaz, Dilay Z. Karadöller & Gamze Sofuoglu (2016) Analytic Thinking, Religion, and Prejudice: An Experimental Test of the Dual-Process Model of Mind, The International Journal for the Psychology of Religion, 26:4, 360-369, DOI: 10.1080/10508619.2016.1151117

To link to this article: <http://dx.doi.org/10.1080/10508619.2016.1151117>



Accepted author version posted online: 11 Feb 2016.
Published online: 11 Feb 2016.



Submit your article to this journal [↗](#)



Article views: 200



View related articles [↗](#)



View Crossmark data [↗](#)



Citing articles: 1 View citing articles [↗](#)

RESEARCH

Analytic Thinking, Religion, and Prejudice: An Experimental Test of the Dual-Process Model of Mind

Onurcan Yilmaz^a, Dilay Z. Karadöller^b, and Gamze Sofuoglu ^b

^aDepartment of Psychology, Dogus University, Istanbul, Turkey; ^bDepartment of Psychology, Boğaziçi University, Istanbul, Turkey

ABSTRACT

Dual-process models of the mind, as well as the relation between analytic thinking and religious belief, have aroused interest in recent years. However, few studies have examined this relation experimentally. We predicted that religious belief might be one of the causes of prejudice, while analytic thinking reduces both. The first experiment replicated, in a mostly Muslim sample, past research showing that analytic thinking promotes religious disbelief. The second experiment investigated the effect of Muslim religious priming and analytic priming on prejudice and showed that, although the former significantly increased the total prejudice score, the latter had an effect only on antigay prejudice. Thus, the findings partially support our proposed pattern of relationships in that analytic thinking might be one of the cognitive factors that prevents prejudice, whereas religious belief might be the one that increases it.

Human beings are argued to have evolved two distinct but interacting systems for information processing (Evans, 2003), which are often referred to simply as System 1 and System 2 (Morewedge & Kahneman, 2010; Stanovich & West, 2000). System 1 is evolutionarily older and is preprogrammed to generate implicit thoughts and instinctive behaviors, as well as automatic, rapid, and parallel processes. System 2, on the other hand, is thought to have evolved more recently; is unique to humans; and generates explicit, rule-based, rational, and analytical thought, as well as being slow and sequential (Evans, 2003; Frederick, 2005).

Some researchers argued that religious belief, rather than being a fixed personality trait (see Shariff, Cohen, & Norenzayan, 2008), comes to mind more automatically and effortlessly, thereby depending more on intuitive or System 1 thinking (Gervais & Norenzayan, 2012a; Norenzayan, 2013). On the other hand, one way that leads to religious doubt is analytic or System 2 thinking (see Kahneman, 2011; Norenzayan, 2013). Although only a decade ago, the amount of empirical support for this hypothesis had been rather scarce, such support has become increasingly available in recent years (Gervais & Norenzayan, 2012a; Pennycook, Cheyne, Seli, Koehler, & Fugelsang, 2012; Shenhav, Rand, & Green, 2012). The convergent findings by multiple independent teams showed that analytic thinking enhances religious disbelief. In one of those studies, Gervais and Norenzayan (2012a) set out to test this hypothesis and found that unobtrusive priming of analytic thinking led to religious disbelief using a variety of well-established techniques. This finding is robust in different demographic groups such as a broad nationwide sample of American adults. Yet little is known about its applicability to different religions like Islam.

Just as religious belief seems to be based on intuitive thinking processes (see Gervais & Norenzayan, 2012a), we propose that prejudice could be seen as depending on System 1's automatic intuition mechanisms. The mind as a computational system always tries to save energy in every

possible way, mostly by spending less time and effort and by using some useful heuristics (Gilovich, Griffin, & Kahneman, 2002), which then leads our minds to work in an automatic manner. The mind also clusters things and people—for example, men or women, white or black—and automatically categorizes the world around it. Prejudice also seems to be cognitively beneficial for efficient information processing (Macrae, Stangor, & Milne, 1994) and is seen depending on an uncontrolled, thus more intuitive, process (Bargh, 1999). Because the fact that prejudice can be defined as having a feeling either favorable or unfavorable toward something in the absence of factual knowledge on the issue (Allport, 1954), and that it often comes from the perceived threats posed by outgroups rather than reasoned arguments (Cottrell & Neuberg, 2005), it also seems to be a product of System 1 thinking. The finding that older adults are more prejudiced than younger adults is consistent with this interpretation, as older adults have deficits in executive functioning and self-regulatory processes, which in turn leads to a failure in inhibiting their prejudiced attitudes (Gonsalkorale, Sherman, & Klauer, 2009; see also von Hippel, 2007).

Religion and Prejudice

The idea that religions promote negative attitudes and prejudice toward out-groups has also a relatively long theoretical and empirical history in social psychology (Allport & Ross, 1967; Altemeyer & Hunsberger, 1992; Spilka, 1986; Whitley & Bernard, 1999). Recent experimental studies have provided evidence for the causal influence of religious beliefs on prejudice. For instance, priming religion by exposing White Christian participants to Christian words (*Bible*, *Jesus*) increased aggressiveness and hostility toward out-groups such as non-Christians and African Americans (Johnson, Rowatt, & LaBouff, 2010) and similarly increased the support for vengeful action on out-group members (Saroglou, Corneille, & Van Cappellen, 2009). In general, in-group cooperation among religious people might also lead to between-group competition, which in turn leads to out-group conflict and hostility (Norenzayan & Shariff, 2008; see also Norenzayan, 2013). In parallel with this account, when people were primed with religious words, they showed greater in-group cooperation (Preston & Ritter, 2013) and increased level of negative attitudes toward value-violating out-groups (Johnson, Rowatt, & LaBouff, 2012). Thus, prejudice has a central role for religious groups in protecting their communities (see also Ramsay, Pang, Shen, & Rowatt 2014). For that kind of cooperation to be evolutionarily stable, strangers who are not members of the community should be automatically detected and excluded from altruistic interactions. Thus, not surprisingly, as religious belief is the product of System 1 or intuitive thinking, prejudice could also be seen as a product of System 1 mechanism.

The Present Research

There is enough evidence (Gervais & Norenzayan, 2012a; Kahneman, 2011; Shenhav et al., 2012) to suggest that the two systems interact with each other and this interaction manifests itself in people's beliefs and choices. Thus, it has been stated that activation of System 2 has an effect on the processing and behavioral outcomes of System 1. For instance, the controlled processing of System 2 can inhibit System 1 mechanisms that promote both religious belief and prejudice. Thus, we predict that activating System 2 mechanisms through analytic thinking will not only inhibit intuitive support for religious belief but also explicit manifestation of prejudice.

The contribution of the present research is therefore threefold. In Experiment 1, we attempted to replicate the past research (Gervais & Norenzayan, 2012a) that analytic thinking inhibits intuitive support for religious belief in a mostly Muslim sample, as there are concerns about reproducibility in psychological research, especially for priming studies in contexts different from the ones in which the original studies were conducted (Open Science Collaboration, 2015). Because studies conducted in Muslim countries are underrepresented in psychological studies in general, and in religion studies in particular, it is important to replicate the impact of religious priming studies on prejudice with

specifically Muslim prime words on Muslim participants. Therefore, in Experiment 2 we predicted that priming Muslim religious concepts would increase religious/moral prejudice toward various out-groups, as it was expected that the activation of System 1 (religious concept priming) would reveal itself through another System 1 process (prejudice).

The most novel part of our main predictions is that, contrary to the effect of Muslim religious priming, analytic thinking would prevent not only intuitive support for religious belief but also the explicit manifestation of prejudice by inhibiting System 1's automatic activations. Overall, in these two experiments, we investigated the effect of System 2's more controlled processes on System 1's more automatic and intuitive processes, and hence tested the predictions of the dual process model of mind.

Experiment 1

Method

Participants

Five hundred thirty-two undergraduates completed an online survey at Boğaziçi University for extra course credit. Seventy-five of these undergraduates (46 female, 29 male; M age = 20.63, SD = 1.54) subsequently participated in the main study in return for extra course credit. They were randomly assigned to either the analytic-prime (n = 40) or the neutral-prime (n = 35) condition. All participants were native Turkish speakers. Forty-eight participants indicated identification with Islam. Of the remaining, 14 were atheists, 12 were theists without any organized religion, and one declined to report.¹

Materials

Primes

Participants were randomly assigned to either the analytic-prime or the neutral-prime condition. In both conditions, they solved a scrambled sentence task adapted from Gervais and Norenzayan (2012a), which consisted of 10 groups of five words. Participants were required to take out an unrelated word from each group and form a meaningful sentence of four words. In the analytic prime condition, five of the 10 groups included a target word (*think, reason, analyze, ponder, rational*) related to analytic thinking. The remaining five groups in the analytic prime condition and all 10 sentences in the neutral prime condition did not prime any coherent concept (e.g., *shoe, train, sky, time, morning*).

Religiosity level. A single item was used to measure the extent to which participants considered themselves religious on a scale from 1 (*not at all religious*) to 7 (*highly religious*). Participants responded to this question via an online survey at least 3 weeks before the experiment. As there was a strong non-normal distribution in responses to this religiosity item (Kolmogorov-Smirnov p < .001), we separated them into three groups (1–2 = low religiosity, n = 18; 3–4–5 = moderate religiosity, n = 35; 6–7 = high religiosity, n = 22). In addition, all participants responded to demographic questions including self-reported religious affiliation.

Intuitive Religious Belief Scale

This scale consists of five statements (original α = .85) that closely correspond to intuitive religious belief (IRB) rated on a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). We translated and validated Gervais and Norenzayan's (2012a) original IRB scale in a

¹A chi-square test of independence was performed to examine whether the percentage of atheist and Muslim participants are equal across conditions. The results revealed no significant effects, $\chi^2(2, N = 74) = 0.89, p = .641$, indicating that religious affiliations were equally distributed across conditions.

different sample. We changed some items of the original IRB scale because some were unclear when translated and some were inapplicable due to cultural differences. The final items are as follows: “I believe in God,” “When I am troubled, I feel the need to seek help from God,” “People think they talk to God when they are praying but in fact they just talk to themselves,” “Religion does not make sense to me,” “Religion plays no role in my daily life” (Cronbach’s α for this experiment = 0.94).

Awareness check

At the conclusion of the experiment, we probed participants in written for awareness of any connection between analytic thinking priming and religious belief (see Bargh & Chartrand, 2000). No participant in Experiment 1 had any suspicion about the study’s hypothesis.

Design and Procedure

This study consisted of two sessions with 3 weeks of recess. In the first session, all participants filled out a prescreening demographic questionnaire including the one-item religiosity measure and religious affiliation in an online survey.

In the second session, data were collected in a classroom setting with groups of four to six. Participants came to the classroom, and once seated they were asked to complete the scrambled sentence task, the IRB scale, and a demographics questionnaire, respectively. Participants were then probed for suspiciousness, debriefed, and thanked.

Results and Discussion

We conducted a 2 (prime: analytic, neutral) \times 3 (religiosity: low, moderate, high) between-subjects analysis of variance (ANOVA). As hypothesized, this analysis revealed a significant main effect of our priming manipulation, $F(1, 69) = 4.83, p = .031, \eta^2 = .065$. The analytic prime group reported lower IRB scores ($M = 3.34, SE = 0.11$) than the control group ($M = 3.68, SE = 0.11$). The results also revealed a significant main effect for religiosity condition, $F(2, 69) = 138.3, p < .001, \eta^2 = .800$; however, there was no interaction, $F(2, 69) = 2.21, p = .118, \eta^2 = .060$, providing evidence that baseline religiosity did not moderate the effect of priming on IRB scores in the experiment. Alternative analyses treating baseline religiosity as a continuous covariate variable, from 1 (*not at all religious*) to 7 (*highly religious*), produced highly convergent inferences, $F(1, 72) = 6.29, p = .014, \eta^2 = .080$.²

We thus replicated Gervais and Norenzayan’s (2012a) original finding—that analytic thinking promotes religious disbelief—in a mostly Muslim population, consistent with the dual process model. We also showed that baseline religiosity did not moderate the relationship. In other words, analytic prime affected all participants from different religious levels equally.

Experiment 2

In Experiment 2, we investigated the causal effect of both religious belief and analytic thinking on another System 1-based phenomenon, prejudice. We specifically predicted that priming Muslim religious concepts increases religious/moral prejudice toward different out-groups, whereas priming analytic thinking reduces it.

²We conducted five different 2 (prime: analytic, neutral) \times 3 (religiosity: low, moderate, high) between-subjects ANOVAs to understand whether the prime had different effects on each of the five items of IRS. The results revealed a significant effect for only “When I am troubled, I feel the need to seek help from God” item ($p = .010$), and marginally significant effects for “People think they talk to God when they are praying but in fact they just talk to themselves” ($p = .058$) and “Religion plays no role in my daily life” items ($p = .083$).

Method

Participants

A different sample of 127 undergraduates (80 female, 47 male, 1 unreported; M age = 20.31, SD = 1.51) were drawn from among those who previously attended the online survey (see Experiment 1) and participated in the main study in return for extra course credit. They were randomly assigned to the analytic-prime ($n = 44$), the religious-prime ($n = 45$), or the neutral-prime ($n = 38$) conditions. All participants were native Turkish speakers. To hold a more conservative test of the hypotheses and thereby prevent any in-group biases on the prejudice measures, we recruited only undergraduates who reported themselves as Muslim and heterosexual in their online survey responses.

Materials

Primes

Participants were randomly assigned to the analytic, the religious, or the neutral prime condition. In each condition, they followed the same procedure as in Experiment 1. In the religious prime condition, the target words were *Kaaba*, *divine*, *Allah*, *mosque*, and *Muhammad*.

Right-Wing Authoritarianism Scale

The Right-Wing Authoritarianism (RWA) scale was developed by Altemeyer (1996) and was used in the online survey to statistically control for its potential covariate effect on prejudice (see Jonathan, 2008; Rowatt & Franklin, 2004). Higher scores indicate higher levels of the individual's obeying societal rules and authorities and of tendency to authority-approved aggression. It consists of 22 items on a 9-point Likert-type scale and was adapted into Turkish by Güldü (2011). Scores were averaged for each participant (Cronbach's α for this experiment = .92).

Religiosity level

The same measure as in Experiment 1 was used. As there was a strong non-normal distribution in responses to this item (Kolmogorov-Smirnov $p < .001$), we separated them into three groups (1–2 = low religiosity, $n = 37$; 3–4–5 = moderate religiosity, $n = 51$; 6–7 = high religiosity, $n = 39$) as in Experiment 1.

Feeling thermometer

We measured prejudice with four different feeling thermometers (using Jews, Christians, gays, and lesbians as the target groups) ranging from 0 to 100 in which higher scores indicated more warmth toward the particular group and lower scores indicated colder feelings. We reverse-scored the variable for ease of comparison. Thus, higher scores indicate more prejudiced attitudes. Scales for four different groups were averaged with the object of creating one general religious/moral prejudice score.

Distrust of Atheists Scale

This scale consists of seven items rated on a 7-point Likert-type scale ranging from 0 (*strongly disagree*) to 6 (*strongly agree*). All items were averaged for each participant (see Gervais & Shariff, 2010). Higher scores indicate more prejudiced attitudes toward atheists (Cronbach's α for this experiment = .92). We translated this scale into Turkish and validated in a different sample by using the scale on a 7-point scale.

Awareness check

This check was the same as that in Experiment 1. No participant had any suspicion about the study's hypothesis. Although 14 participants in the religious prime group indicated awareness of the Muslim prime words, no one indicated awareness of the study's objectives and hypothesis. We found that

excluding (vs. including) these 14 participants had no effect on the final results. Thus, the following analyses include the entire sample.

Design and Procedure

Participants followed the same priming procedure as in Experiment 1, with the addition of the religious prime condition. Following the priming procedure, participants completed the feeling thermometer for the four groups in a fixed order and then provided their responses on the distrust of atheists scale.

Results and Discussion

Analyses regarding religious/moral prejudice

We first conducted a 3 (prime: religious, neutral, analytic) \times 3 (religiosity: low, moderate, high) between-subjects ANOVA on religious/moral prejudice scores of the participants. There was a main effect of prime, $F(2, 118) = 14.54, p < .001, \eta^2 = .198$, on religious/moral prejudice scores. The religious prime group reported more negative attitudes ($M = 49.90, SE = 3.07$) compared to the analytic ($M = 27.14, SE = 3.12$) and the neutral prime groups ($M = 33.11, SD = 3.30$). Tukey Honestly Significant Difference (HSD) post hoc test revealed that these differences were significant at the $p < .001$ level. The analytic prime group, however, did not differ from the neutral group ($p = .336$), although the analytic prime led to a slight decrease in religious/moral prejudice.

Moreover, there was also a main effect of baseline religiosity, $F(2, 118) = 18.65, p < .001, \eta^2 = .240$, in which the participants who are low in religiosity reported less negative attitudes ($M = 21.37, SE = 3.34$) compared to participants who are moderate ($M = 39.21, SE = 2.87$) or high ($M = 49.56, SE = 3.27$) in religiosity. Tukey HSD post-hoc test indicated that all comparisons were significant (all $ps < .013$).³

Analyses regarding atheist prejudice

A similar pattern emerged with regard to our second dependent variable. There was a main effect of prime, $F(2, 118) = 4.57, p = .012, \eta^2 = .072$, and a main effect of baseline religiosity, $F(2, 118) = 47.90, p < .001, \eta^2 = .448$, on prejudice toward atheists. We performed a Tukey HSD post hoc test and found that participants in the religious prime condition reported more distrust of atheists ($M = 3.45, SE = 0.16$) compared to the neutral ($M = 2.98, SE = 0.17, p = .022$) and the analytic ($M = 2.77, SE = 0.16, p = .002$) conditions. However, the analytic group did not significantly differ from the neutral group ($p = .802$). Moreover, participants who are low in religiosity ($M = 1.77, SE = 0.18$) showed lower distrust toward atheists compared to participants who are medium ($M = 3.27, SE = 0.15$) and high ($M = 4.15, SE = 0.17$) in religiosity (all $ps < .001$).⁴

Additional analyses

We also performed additional exploratory analyses in order to understand whether analytic prime has differential effects on the four target out-groups that were rated on the feeling thermometer. Thus, we performed a 3 (prime: religious, neutral, analytic) \times 3 (religiosity: low, moderate, high) between-subjects ANOVA on prejudice toward gays, lesbians, Christians, and Jews separately.⁵ The results showed that there is a main effect of prime and baseline religiosity for all of the four groups; however, analytic prime has a main effect for only one group—gay people: main effect of prime, $F(2, 118) = 16.36, p < .001, \eta^2 = .217$, and main effect of baseline

³When we statistically control RWA scores of the participants, the main effects of our priming manipulation, $F(2, 117) = 16.86, p < .001, \eta^2 = .224$; and baseline religiosity, $F(2, 117) = 4.11, p = .019, \eta^2 = .066$, are still significant.

⁴Using RWA as a covariate in these analyses yielded the same pattern of results: main effect of manipulation, $F(2, 117) = 9.71, p < .001, \eta^2 = .142$, and main effect of baseline religiosity, $F(2, 117) = 9.23, p < .001, \eta^2 = .136$.

⁵Because there were four different comparisons, we performed a Bonferroni correction and divided the critical p value by four, obtaining a new critical p value of .013.

religiosity, $F(2, 118) = 16.00, p < .001, \eta^2 = .213$, on prejudice toward gays. The religious prime group reported higher prejudice toward gays ($M = 55.01, SE = 4.15$) compared to the neutral ($M = 38.61, SE = 4.47, p = .011$) and the analytic ($M = 21.11, SD = 4.23, p < .001$) conditions. Analytic group is also significantly different from the neutral group ($p = .012$). Participants low in religiosity scored lower on prejudice toward gays ($M = 18.03, SE = 4.52$) compared to the moderate ($M = 45.25, SE = 3.88$) and high ($M = 51.44, SE = 4.43$) religious groups. The difference between the participants who are low in religiosity and moderate and high ones are significant at $p < .001$ level, but moderate and high groups did not significantly differ from each other ($p = .237$).

Although there is a gender difference on the prejudice level toward gays, $F(1, 125) = 6.06, p = .015, \eta^2 = .046$ —women reported more positive attitudes ($M = 34.17, SE = 3.14$) toward gays than men ($M = 47.74, SE = 4.34$)—it did not moderate any relationship regarding our independent variables (all the interactions regarding gender are nonsignificant).

Overall, Experiment 2 found that priming religion led to an increase in both religious/moral and atheist prejudice. That is, priming Muslim concepts in a Turkish university sample caused a slight but significant negative shift in attitudes toward Christians, Jews, gays, lesbians, and atheists. This effect is robust when controlling for RWA scores of the participants. However, we did not find a significant relationship of the effect of analytic prime on atheist and religious/moral prejudice, although there was a tendency in the expected direction. Rather, the results provided evidence for our proposed relationship for prejudice only toward gay people.

General Discussion

We reasoned that activating System 2 via priming analytic thinking inhibits System 1's intuitive mechanisms that promote both religious belief and prejudice. In a sense, then, we argued that religion and prejudice might be evolutionarily inextricable, as they are both rooted in System 1 or intuitive thinking mechanism. The first experiment replicated past research by showing that analytic thinking inhibits religious belief (Gervais & Norenzayan, 2012a). This was true for all religiosity levels. Experiment 2 revealed that, whereas activating Muslim religious concepts significantly augments explicit manifestation of prejudice, priming analytic thinking does not significantly decrease it overall. Analytic prime, however, still had a significant inhibitory effect on antigay prejudice. This provides partial support for our proposed relationship and suggests that there may be boundary conditions for our predicted effects.

The effect of religious priming can be explained in three ways. From a social identity theory (Tajfel & Turner, 1986) perspective, the religious prime could have served as a prime of the participants' Muslim identity (to the extent that they identify with Islam) and, for this simple reason, increased their prejudice. According to social identity theory, the most important function of group membership is to increase self-esteem. To fulfill this function, people view their group and its members as positively as possible in comparison to out-groups. Correspondingly, favoring one's in-group leads to in-group favoritism but also an out-group conflict (see Norenzayan, 2013), as well as activation of general social stereotypes (see Johnson et al., 2012). Thus, priming participants with Muslim religious concepts can lead to prejudice due to simply in-group favoritism.

The second account could be the dual-process model, which asserts that when religious belief is activated, it can activate System 1 and prejudice at the same time because, as we predicted, both religious belief and prejudice should be rooted in the same System 1 mechanism.

In a similar vein, and not mutually exclusively, the ideomotor hypothesis (Bargh, Chen, & Burrows, 1996; James, 1890; see also Randolph-Seng & Nielsen, 2007) suggests that, just as priming a concept related to old age triggers slow walking behavior (Bargh et al., 1996), religious primes can automatically trigger behaviors related to religion, and an increase in negative attitudes toward different out-groups can be one of them. Therefore, the effect of religious priming on prejudice can be explained through an

implicit semantic association between religion and prejudice (including the specific prejudicial attitudes toward the target groups that we employed).

However, the results regarding analytic thinking are more complex. Analytic prime had an effect only on antigay prejudice, and our proposed relationship was, therefore, supported only within this context.

To make sense of this pattern of results, one could turn to the argument that prejudice toward different out-groups originates from different motives (Gervais, Shariff, & Norenzayan, 2011). For instance, gay prejudice is based on the feeling of disgust (e.g., Clobert, Saroglou, & Hwang, 2015), whereas atheist prejudice is based on distrust (Gervais & Norenzayan, 2012b) and priming participants with secular authorities, which provides a feeling of generalized trust in society, reduces prejudice toward atheists but not gays. Based on this idea, one can speculate that analytic thought may have played the function of boosting self-regulation of emotion (see Lieberman, 2007)—in this case, disgust—and that this is why it reduced prejudice toward gays. Consistent with this, there are some arguments about the effect of cognitive styles on moral judgments (Greene, 2012; Paxton & Greene, 2010). Paxton, Unger, and Greene (2012) showed that priming analytic thinking increases utilitarian moral judgments. In a similar vein, a more recent study suggested that analytic thinking can be a factor in determining disgust-based moral judgments (Pennycook, Cheyne, Barr, Koehler, & Fugelsang, 2014). That is, individual differences in analytic thinking predict variation in judgments of wrongness about conventionally immoral acts: People who have a tendency to think more analytically are less likely to find disgusting acts immoral. Thus, it is possible that analytic thinking reduces prejudice toward gays by suppressing conventional disgust-based morality. The effect of analytic thinking on disgust-based antigay prejudice should therefore be further investigated.

Another possibility is that, among the four different out-groups, gays might be the most stereotyped group in Turkish culture, and the analytic prime might have boosted participants' ability to inhibit the automatic activation of this stereotype. There is indirect evidence consistent with this argument. Although Gelbal and Duyan (2006) showed that negative attitudes toward gays and lesbians are prevalent in Turkish culture, homosexuality is represented by mostly gay people, which in turn might lead to more negative attitudes toward gays compared to lesbians (see also Sakalli, 2002; Sakalli & Ugurlu, 2001). Moreover, homosexuals are seen as the coldest group on a standard feeling thermometer for Turkish university students in comparison with atheists, Christians and Jews (Yilmaz, 2015). Although the mean prejudice scores for gays and lesbians were very close to each other (59 for lesbians and 60 for gays) in our small sample, this interpretation might still be seen as a plausible alternative explanation.

In these two studies, we investigated only the effect of analytic thinking on explicit manifestation of religious/moral prejudice with relatively simple and too explicit measures. In addition, because it was the first usage of the priming materials in the Turkish language, a pretesting of the materials would have been preferable. Another possible limitation is that, because the data were collected by the experimenters themselves, who knew which participants were assigned to which condition, the design of the experiment was not double-blind. One other limitation is that our analytic prime technique—scrambled sentence task—may be too simple and artificial for examining its relation with prejudice. Alternatively, analytic and holistic cultural thought primes might be used to investigate the inhibitory effect of cognitive styles on explicit manifestation of prejudice (see Talhelm et al., 2015). More important, we did not specifically investigate the underlying mechanisms that explain the relation between the variables in question. To this end, implicit measures can be used for further investigating the inhibitory effect of analytic thinking on prejudice by considering possible mediating factors (i.e., need for cognitive closure) with larger samples.

Conclusion

It is known that religion increases in-group conformity and prosociality and at the same time hostility toward out-groups (see Norenzayan, 2013). That religious or sectarian conflicts in the Middle East often lead to great destruction and political turmoil is an example in point. In this study, we examined, within the framework of the dual process model of mind, whether analytic thinking

has an inhibitory influence on people's explicit expressions of prejudice. However, it should be kept in mind that the variables in question are multifarious. Religious belief is just one dimension of religion (Saroglou, 2011) and analytic thinking is just one way that leads to religious disbelief (Norenzayan & Gervais, 2013). In a parallel fashion, prejudice or negative attitudes toward outgroups have other dimensions that have not been touched upon in the current study. For this reason, the claim that activating analytic thinking will suppress automatic and intuitive activations and decrease intergroup conflict requires further and multidimensional scrutiny.

Acknowledgments

We gratefully acknowledge Ali İ. Tekcan for his wise advice, support, and feedback on every stage of this work. We also thank Hasan G. Bahçekapılı, Adil Sarıbay, Will Gervais, and one anonymous reviewer for their helpful comments on a version of the manuscript.

ORCID

Gamze Sofuoğlu  <http://orcid.org/0000-0002-6932-4789>

References

- Allport, G. W. (1954). *The nature of prejudice*. Reading, MA: Addison-Wesley.
- Allport, G. W., & Ross, J. M. (1967). Personal religious orientation and prejudice. *Journal of Personality and Social Psychology*, 5, 432–443.
- Altemeyer, B., & Hunsberger, B. (1992). Authoritarianism, religious fundamentalism, quest, and prejudice. *The International Journal for the Psychology of Religion*, 2, 113–133.
- Altemeyer, B. (1996). *The authoritarianism specter*. Cambridge, MA: Harvard University Press.
- Bargh, J. A. (1999). The cognitive monster: The case against the controllability of automatic stereotype effects. In S. Chaiken & Y. Trope (Eds.), *Dual-process theories in social psychology* (pp. 361–382). New York, NY: Guilford Press.
- Bargh, J. A., & Chartrand, T. L. (2000). The mind in the middle: A practical guide to priming and automaticity research. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 253–285). New York, NY: Cambridge University Press.
- Bargh, J. A., Chen, M., & Burrows, L. (1996). Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action. *Journal of Personality and Social Psychology*, 71(2), 230–244.
- Clobert, M., Saroglou, V., & Hwang, K. K. (2015). East Asian religious tolerance versus Western monotheist prejudice: The role of (in) tolerance of contradiction. *Group Processes & Intergroup Relations*, <http://dx.doi.org/10.1177/1368430215603458> [Advance online publication].
- Cottrell, C. A., & Neuberg, S. L. (2005). Different emotional reactions to different groups: A sociofunctional threat-based approach to “prejudice.” *Journal of Personality and Social Psychology*, 88, 770–789.
- Evans, J. S. B. (2003). In two minds: Dual-process accounts of reasoning. *Trends in Cognitive Sciences*, 7, 454–459.
- Frederick, S. (2005). Cognitive reflection and decision making. *Journal of Economic Perspectives*, 19(4), 25–42.
- Gelbal, S., & Duyan, V. (2006). Attitudes of university students toward lesbians and gay men in Turkey. *Sex Roles*, 55, 573–579.
- Gervais, W. M., & Shariff, A. F. (2010). [The negative attitudes towards atheists scale: Psychometric properties, reliability, and validity.] Unpublished raw data.
- Gervais, W. M., Shariff, A. F., & Norenzayan, A. (2011). Do you believe in atheists? Distrust is central to anti-atheist prejudice. *Journal of Personality and Social Psychology*, 101, 1189–1206.
- Gervais, W. M., & Norenzayan, A. (2012a). Analytic thinking promotes religious disbelief. *Science*, 336, 493–496.
- Gervais, W. M., & Norenzayan, A. (2012b). Reminders of secular authority reduce believers' distrust of atheists. *Psychological Science*, 23, 483–491.
- Gilovich, T., Griffin, D., & Kahneman, D. (2002). *Heuristics and biases: The psychology of intuitive judgment*. New York, NY: Cambridge University Press.
- Gonsalkorale, K., Sherman, J. W., & Klauer, K. C. (2009). Aging and prejudice: Diminished regulation of automatic race bias among older adults. *Journal of Experimental Social Psychology*, 45, 410–414.
- Greene, J. D. (2012). *The moral brain and how to use it*. New York, NY: Penguin.
- Güldü, H. (2011). Sağ kanat yetkeçiliği ölçeği: Uyarlama çalışması [Right-wing authoritarianism scale: The adaptation study]. *Ankara Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 2, 27–50.

- James, W. (1890). *The principles of psychology*. New York, NY: Holt.
- Johnson, M. K., Rowatt, W. C., & LaBouff, J. (2010). Priming Christian religious concepts increases racial prejudice. *Social Psychological and Personality Science*, *1*, 119–126.
- Johnson, M. K., Rowatt, W. C., & LaBouff, J. P. (2012). Religiosity and prejudice revisited: In-group favoritism, out-group derogation, or both? *Psychology of Religion and Spirituality*, *4*, 154–168.
- Jonathan, E. (2008). The influence of religious fundamentalism, right-wing authoritarianism, and Christian orthodoxy on explicit and implicit measures of attitudes toward homosexuals. *The International Journal for the Psychology of Religion*, *18*, 316–329.
- Kahneman, D. (2011). *Thinking, fast and slow*. New York, NY: Macmillan.
- Lieberman, M. D. (2007). Social cognitive neuroscience: A review of core processes. *Annual Review of Psychology*, *58*, 259–289.
- Macrae, C. N., Stangor, C., & Milne, A. B. (1994). Activating social stereotypes: A functional analysis. *Journal of Experimental Social Psychology*, *30*, 370–389.
- Morewedge, C. K., & Kahneman, D. (2010). Associative processes in intuitive judgment. *Trends in Cognitive Sciences*, *14*, 435–440.
- Norenzayan, A. (2013). *Big gods: How religion transformed cooperation and conflict*. Princeton, NJ: Princeton University Press.
- Norenzayan, A., & Gervais, W. M. (2013). The origins of religious disbelief. *Trends in Cognitive Sciences*, *17*, 20–25.
- Norenzayan, A., & Shariff, A. F. (2008). The origin and evolution of religious prosociality. *Science*, *322*, 58–62.
- Open Science Collaboration. (2015). Estimating the reproducibility of psychological science. *Science*, *349*(6251), aac4716. <http://dx.doi.org/10.1126/science.aac4716>
- Paxton, J. M., & Greene, J. D. (2010). Moral reasoning: Hints and allegations. *Topics in Cognitive Science*, *2*, 511–527.
- Paxton, J. M., Unger, L., & Greene, J. D. (2012). Reflection and reasoning in moral judgement. *Cognitive Science*, *36*, 163–177.
- Pennycook, G., Cheyne, J. A., Barr, N., Koehler, D. J., & Fugelsang, J. A. (2014). The role of analytic thinking in moral judgments and values. *Thinking & Reasoning*, *20*, 188–214.
- Pennycook, G., Cheyne, J. A., Seli, P., Koehler, D. J., & Fugelsang, J. A. (2012). Analytic cognitive style predicts religious and paranormal belief. *Cognition*, *123*, 335–346.
- Preston, J. L., & Ritter, R. S. (2013). Different effects of religion and God on prosociality with the ingroup and outgroup. *Personality and Social Psychology Bulletin*, *39*, 1471–1483.
- Ramsay, J. E., Pang, J. S., Shen, M. J., & Rowatt, W. C. (2014). Rethinking value violation: Priming religion increases prejudice in Singaporean Christians and Buddhists. *The International Journal for the Psychology of Religion*, *24*, 1–15.
- Randolph-Seng, B., & Nielsen, M. E. (2007). Honesty: One effect of primed religious representations. *The International Journal for the Psychology of Religion*, *17*, 303–315.
- Rowatt, W. C., & Franklin, L. M. (2004). Christian orthodoxy, religious fundamentalism, and right-wing authoritarianism as predictors of implicit racial prejudice. *The International Journal for the Psychology of Religion*, *14*, 125–138.
- Sakalli, N. (2002). Pictures of male homosexuals in the heads of Turkish college students: The effects of sex difference and social contact on stereotyping. *Journal of Homosexuality*, *43*, 111–126.
- Sakalli, N., & Ugurlu, O. (2001). Effects of social contact with homosexuals on heterosexual Turkish university students' attitudes towards homosexuality. *Journal of Homosexuality*, *42*, 53–62.
- Saroglou, V. (2011). Believing, bonding, behaving, and belonging: The big four religious dimensions and cultural variation. *Journal of Cross-Cultural Psychology*, *42*, 1320–1340.
- Saroglou, V., Corneille, O., & Van Cappellen, P. (2009). “Speak, Lord, your servant is listening”: Religious priming activates submissive thoughts and behaviors. *The International Journal for the Psychology of Religion*, *19*, 143–154.
- Shariff, A. F., Cohen, A. B., & Norenzayan, A. (2008). The devil’s advocate: Secular arguments diminish both implicit and explicit religious belief. *Journal of Cognition and Culture*, *8*, 417–423.
- Shenhav, A., Rand, D. G., & Greene, J. D. (2012). Divine intuition: Cognitive style influences belief in God. *Journal of Experimental Psychology: General*, *141*, 423–428.
- Spilka, B. (1986). The meaning of personal faith: A continuing research odyssey. *Journal of Psychology and Christianity*, *5*, 85–90.
- Stanovich, K. E., & West, R. F. (2000). Advancing the rationality debate. *Behavioral and Brain Sciences*, *23*, 701–717.
- Tajfel, H., & Turner, J. C. (1986). The social identity theory of intergroup behaviour. In S. Worchel & W. Austin (Eds.), *Psychology of intergroup relations* (pp. 7–24). Chicago, IL: Nelson-Hall.
- Talhelm, T., Haidt, J., Oishi, S., Zhang, X., Miao, F. F., & Chen, S. (2015). Liberals think more analytically (more “WEIRD”) than conservatives. *Personality and Social Psychology Bulletin*, *41*, 250–267.
- von Hippel, W. (2007). Aging, executive functioning, and social control. *Current Directions in Psychological Science*, *16*, 240–244.
- Whitley, B. J., & Bernard, E. (1999). Right-wing authoritarianism, social dominance orientation, and prejudice. *Journal of Personality and Social Psychology*, *77*, 126–134.
- Yilmaz, O. (2015). *The effect of political orientation and religiosity on prejudice toward atheists: The role of divine command, subjective morality and moral foundations* (Unpublished master’s thesis). Istanbul University, Istanbul, Turkey.