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Analytic Thought Training Promotes Liberalism on Contextualized (But Not Stable) Political Opinions

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Abstract

Previous research revealed that inducing an intuitive thinking style led people to adopt more conservative social and economic attitudes. No prior study, however, has shown a causal effect of analytic cognitive style (ACS) on political conservatism. It is also not clear whether these cognitive-style manipulations influence stable or contextualized (less stable) political attitudes differentially. The current research investigated the causal effect of ACS on both stable and contextualized political opinions. In Experiment 1, we briefly trained participants to think analytically (or not) and assessed their contextualized and stable political attitudes. Those in the analytic thinking group responded more positively to liberal (but not conservative) arguments on contextualized opinions. However, no significant change occurred in stable opinions. In Experiment 2, we replicated this basic finding with a larger sample. Thus, the results demonstrate that inducing ACS causally influences contextualized liberal attitudes, but not stable ones.

Keywords

analytic cognitive style, analytic thought training, political liberalism, political conservatism, dual-process model

Our mental operations are carried out by two separate but interacting systems according to the dual-process model. The evolutionarily older system, Type 1, handles automatic and intuitive decisions whereas Type 2, which is evolutionarily newer and unique to *Homo sapiens*, is responsible for analytic and reflective thought processes (Evans, 2003; Evans & Stanovich, 2013; Frederick, 2005; Morewedge & Kahneman, 2010; Stanovich & West, 2000). In other words, while intuitive judgments are based on low-effort and automatic processes, analytic judgments are based on reflective and deliberative thought processes that function best by deactivating automatic processes. When Type 2 processes are activated, Type 1 intuitions are inhibited or overridden, which leads to less intuitive or more counterintuitive thought (Evans & Stanovich, 2013; Shenhav, Rand, & Greene, 2012).

These systems may provide the bases of different social attitudes and beliefs. For instance, there may be differences in cognitive style between theists and nontheists (Shariff, Piazza, & Kramer, 2014). Indeed, people who more strongly believe in God obtain lower scores on the "cognitive reflection test" (CRT; Gervais & Norenzayan, 2012; Pennycook, Cheyne, Seli, Koehler, & Fugelsang, 2012; Shenhav, Rand, & Greene, 2012; Yilmaz & Saribay, 2016; see also Pennycook, Ross, Koehler, & Fugelsang, 2016), a test used to measure the tendency to think analytically (Frederick, 2005). More importantly, when people are experimentally manipulated to think analytically, their religious convictions decrease (Gervais & Norenzayan, 2012; Shenhav, Rand, & Greene, 2012; Yilmaz, Karadöller, & Sofuoglu, 2016) presumably because religious belief depends mostly on Type 1 thinking. In the present research, we rely on this dual-process model of the mind to shed light on systematic differences in thinking that characterize people of distinct political convictions.

Political ideology has been investigated on an individual basis via variables such as right-wing authoritarianism (Altemeyer, 1981) and social dominance orientation (Sidanius & Pratto, 1999). Jost and his colleagues (Jost, Glaser, Kruglanski, & Sulloway, 2003) systematically analyzed variables related to political attitudes in their extensive meta-analysis of 88 studies and argued that there are two core elements underlying conservative political ideology: resistance to change and opposition to equality (support for hierarchy) in society. Jost et al. (2003) also claimed that ideological orientations originate mostly from epistemic and existential needs and motives. Epistemic needs are characterized by uncertainty avoidance and existential needs by situation-specific threat avoidance (Jost et al., 2003, 2007).

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Death anxiety and fear of system instability are examples of existential needs, whereas intolerance for ambiguity, openness to experience, and need for cognitive closure are examples of epistemic needs (Jost et al., 2003). Epistemic needs influence political ideology by way of resistance to change, whereas existential needs influence political ideology through opposition to equality (Jost et al., 2007). Conservatives and liberals[1] are, in general, psychologically different from each other in these respects: Conservatives respond more strongly to existential threats and system instability than liberals (Jost et al., 2003, 2007; Landau et al., 2004).

There is also evidence that upholding egalitarian values (aligned with liberalism) is mentally effortful (Van Berkel, Crandall, Eidelman, & Blanchar, 2015), whereas supporting hierarchy (aligned with conservatism) is relatively automatic (Zitek & Tiedens, 2012). In addition, there is correlational evidence showing that liberals tend to think more analytically whereas conservatives tend to think more intuitively (Deppe et al., 2015; Eidelman, Crandall, Goodman, & Blanchar, 2012; Iyer, Koleva, Graham, Ditto, & Haidt, 2012; Pennycook et al., 2012; Talhelm et al., 2015; Yilmaz & Saribay, 2016; but see Kahan, 2013; Landy, 2016).

There are also experimental studies on this topic. However, the findings of such studies present challenges. For instance, Eidelman, Crandall, Goodman, and Blanchar (2012) experimentally demonstrated that directing participants to think intuitively (''low-effort mode'') led them to adopt more conservative stable attitudes (traditionally measured by standard questionnaire items, such as ''A first consideration of any society is the protection of property rights'') on a number of social and economic issues. However, low-effort thinking did not lead participants to adopt less liberal attitudes (measured by items such as ''large fortunes should be taxed fairly heavily over and above income taxes''). In addition, although Deppe et al. (2015) distinguished social and economic attitudes, they were unable to manipulate analytic cognitive style (ACS) using standard priming procedures such as visual priming and scrambled sentence tasks (Gervais & Norenzayan, 2012; see also Yilmaz & Saribay, 2016, Study 3a and b for failures to replicate standard procedures used to prime analytic thinking). Yilmaz and Saribay (2016; Study 4) also attempted a conceptual replication of Eidelman et al.'s (2012) results with a larger sample size, but it failed.

The correlational and experimental research mentioned above examined the effect of cognitive styles on only stable opinions. In one exception (see also Yilmaz & Saribay, 2016), Talhelm et al. (2015) manipulated holistic and analytic cultural thinking styles, and, more originally, they investigated their effects on both contextualized (less stable, e.g., responses to news articles) and more stable (responses to standard questionnaire items, e.g., ''flag burning should be illegal'') opinions. This distinction is important because, as some previous research (Talhelm et al., 2015; Yilmaz & Saribay, 2016; see also Deppe et al., 2015) has shown, cognitive-style manipulations do not seem to affect people's attitudes regarding context-independent statements that are generally thought to reflect more stable dispositions (e.g., ''I'm a socially liberal person'' or ''burning flags should be outlawed''). However, cognitive-style differences may affect domain-specific opinions such as those discussed daily in the media. Instead of using standard questionnaire items such as ''I am against immigrants entering the country,'' if one uses context-embedded items such as ''Trump stated that he is against immigrants being accepted into the country based on security reasons while a spokesperson for the Democratic party did not approve of this because it impinges on freedoms'' where people can process opposing arguments regarding ongoing issues on the spot, then it may be possible to observe an effect of cognitive style.

In sum, contextualized opinions are embedded in the context of ongoing societal discussions and contain multiple sides of an argument while stable opinions are one sided and more abstract. Their measurement corresponds to these differences with the former requiring longer, more complicated stimuli while short, single sentences are often sufficient for the latter. Talhelm et al. (2015) relied precisely on this distinction to demonstrate that holistic cultural thought training increased social conservatism whereas analytic cultural thought training increased social liberalism, for only contextualized opinions. However, like others, they did not investigate the direct role of ACS (high-effort thinking) on political ideology (for why holistic and analytic thinking distinction is different from analytic and intuitive thinking distinction, see Buchtel & Norenzayan, 2009; Evans, 2009; Evans & Stanovich, 2013).[2] Thus, there is a need to further investigate the causal effect of ACS on both contextualized and stable social and economic attitudes.

In the present research, we examined these issues in a non-Western, predominantly Muslim sample because such research is almost completely nonexistent outside of Western, Educated, Industrialized, Rich, Democratic (WEIRD) cultures (Henrich, Heine, & Norenzayan, 2010; see for an exception, Yilmaz & Saribay, 2016). We hypothesized that the ACS manipulation would not influence stable political opinions, which form over many years and are recalled from memory and might, therefore, not be susceptible to experimental manipulation in general. However, we predicted that it would influence contextualized political opinions which are actively being processed by the participants. More specifically, we predicted that invoking ACS will lead people to adopt more liberal and less conservative contextualized opinions, but that it would have no significant effect on stable opinions. We then tried to replicate this finding with a larger sample.

Experiment 1

Method

Participants

We estimated a medium effect (*f*) of .3, which required a total sample of at least 90 to attain 80% power of detecting any effect. Considering potential attritions, we collected data from

106 undergraduates. All participants had previously completed an online survey (see ''Design and Procedure'' section) and were offered extra course credit. Participants in the analytic-prime group were excluded from the analyses if they responded incorrectly to the manipulation check questions ($n = 13$; see below). The final sample consisted of 93 (mean age = 20.31, standard devition [*SD*] = 1.31, 66 females, 27 males) participants randomly assigned to the analytic-prime ($n = 40$) or the control ($n = 53$) conditions. All students were native Turkish speakers, and all materials were administered in Turkish.

Measures

Manipulation. We had first tried to manipulate analytic thinking via standard procedures used in published research, but our manipulation checks failed when we used the thought prime (Shenhav, Rand, & Greene, 2012) and cognitive disfluency paradigms (Gervais & Norenzayan, 2012) in two different samples (see Yilmaz & Saribay, 2016; Study 3a and b). Thus, we used a new method to prime analytic thinking. We trained people to think analytically by providing them the solutions of standard CRT (Frederick, 2005) and base-rate conflict problems (BRC; see De Neys & Glumicic, 2008; Pennycook et al., 2012), along with explanations.

The CRT contains three problems, each having both an intuitive (low effort) and an analytic (high effort) answer. The former is always incorrect. An example is ''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?'' The intuitive and automatic answer is ''10 cents.'' Producing the correct response (''5 cents'') requires a more effortful and careful analysis of the problem using analytic thinking.

In BRC problems, the first sentence provides base-rate information (e.g., ''In a study, 1,000 people were tested. Among the participants, there were 4 kindergarten teachers and 996 executive managers. Lilly is a randomly chosen participant of this study''). Subsequently, misleading stereotypical information is provided about the mentioned person. For instance, the following description matches the stereotype of kindergarten teachers but not executive managers: ''Lilly is 37 years old. She is married and has three kids. Her husband is a veterinarian. She is committed to her family and always watches the daily cartoon shows with her kids.'' The question is whether it is more likely that (a) Lilly is an executive manager (correct answer) or (b) Lilly is a kindergarten teacher. In these kinds of questions, one can provide the correct answer if one attends to the base-rate information. Ignoring the stereotype information is made possible only with the use of high effort, analytic thought (see also De Neys & Glumicic, 2008).

In the analytic-prime condition, participants were first asked to complete the three standard CRT problems one by one. At the end of each, we provided written instructions indicating the correct answer accompanied by an explanation of why it is correct. To check whether they understood or not, we asked them to complete a new but similar CRT question (see Supplemental Material for details). Afterward, a similar problem (with differing numbers) was given to participants to check whether they understood the logic explained. We applied this procedure (i.e., three training questions and one check question) for the three BRC problems as well. We excluded the participants who failed at any of the check points ($n = 13$). In the control condition, participants were asked to complete three standard CRT and three BRC problems without any training.

Social Conservatism Scale. Revised version of scale of social conservatism was developed by Henningham (1996) in Australia and adapted to the current American political system by Piazza and Landy (2013). Yilmaz and Saribay (2016) adapted this scale to the Turkish political system and demonstrated its reliability. We used this scale to measure social conservatism (Cronbach's $\alpha = .89$). Participants were asked to rate their support for 15 policy issues (e.g., execution, euthanasia, gay marriage) on an 11-point scale ranging from −5 (*strongly disagree*) to +5 (*strongly agree*). We coded items such that higher scores represent more social conservatism.

Contextualized political opinions. Similar to Talhelm et al. (2015), we presented participants with four semifabricated news articles (for the full texts of two of these, see Yilmaz & Saribay, 2016, Appendix A). Each article contained a specific policy dispute between conservative and liberal positions within Turkish politics. In two of the articles, the disputes were related to conservative policies and included a conservative anchor (a new security law which gives more power to police forces and a new internet law which enables government to entirely ban internet sites). In the remaining two articles, the disputes were related to liberal policies and included a liberal anchor (an argument that the primary function of the prison system should be rehabilitation and an argument that gay marriage should be legal).

Participants were asked to carefully read each article and to answer a single question measuring their attitude toward the promoted policy. The 7-point response scale had conservative (e.g., ''I am strongly supportive of the internet law'') and liberal (e.g., ''I am strongly against the internet law'') anchors at the extremes and a neutral middle point (''I do not have an opinion''). Higher scores in the conservative policy articles represented endorsement of a more conservative contextualized opinion whereas higher scores in the liberal policy articles represented endorsement of a more liberal contextualized opinion. We averaged responses to the conservative policy and liberal policy articles separately.

Mood. To check for the possibility that participants in the analytic-prime (vs. control) condition would experience more frustration (due to the training), we measured participants' current mood using the Positive and Negative Affect Scale developed by Watson, Clark, and Tellegen (1988) and adapted into Turkish by Gençöz (2000). Participants were asked to indicate the extent to which each of a series of positive and negative adjectives were descriptive of their current mental state. We averaged responses to the positive and negative items separately for use as covariates in the main analyses.

Design and procedure. The study consisted of two sessions. Students enrolled in the introduction to psychology course at Boğaziçi University were invited by e-mail to complete an online battery of measures for extra course credit. Those who agreed were given instructions that they were free to complete the measures at their own pace, that they should complete it in one sitting, and that it would take them about 45 min. The battery contained the Social Conservatism Scale, a demographic form (age, sex, socioeconomic status [SES], hometown size, ethnicity, religious, and political affiliation), and the 1-item political orientation self-placement question with a scale ranging from 1 (*left*) to 7 (*right*). In the second session, at least 5 weeks later, participants were individually invited to the social psychology lab at Boğaziçi University, where they were seated in isolated cubicles and randomly assigned to either the analytic-prime or the control condition. The entire procedure was implemented on the computer. After the manipulation, mood was measured and participants were presented with four semifabricated news articles (as in Talhelm et al., 2015) in randomized order. After reading each article, they were asked to indicate their opinion regarding the dispute it contained. Finally, they completed items of the Social Conservatism Scale[3] presented in individually randomized order.

Results and Discussion

Contextualized Political Opinions

As predicted, an independent samples *t*-test revealed a significant effect of the manipulation on the liberalism score, $t(91) = 2.18$, $p = .032$, Cohen's $d = .47$.[4] The analytic-prime group ($M = 5.63$, $SD = 0.86$; 95% confidence interval [CI; 5.35, 5.90]) reported more liberal attitudes than the neutral-prime group ($M = 5.15$, $SD = 1.15$; 95% CI [4.83, 5.47]). When we controlled for baseline political orientation, gender, SES, age, and the current mood of the participants with analysis of covariance (ANCOVA), the results remained constant, $F(1, 85) = 5.04$, $p = .027$, $\eta p^2 = .056$.

However, there was no significant difference between the analytic-prime group ($M = 2.36$, $SD = 1.37$; 95% CI [1.93, 2.80]) and the neutral-prime group ($M = 2.47$, $SD = 1.43$; 95% CI [2.08, 2.87]) on responses to the conservative news articles, $t(91) = -.371$, $p = .711$, Cohen's $d = -.08$. When we controlled for baseline political orientation, gender, SES, age, and the current mood of the participants with ANCOVA, the results remained constant, $F(1, 85) = 0.19$, $p = .67$, $\eta p^2 = .002$.

Stable Political Attitudes

As predicted, training participants to think analytically did not significantly influence their long-term political attitudes. An independent samples *t*-test revealed no main effect on social conservatism, $t(91) = -1.24$, $p = .218$, Cohen's $d = -.25$. Although participants in the analytic-prime group ($M = 3.39$, $SD = 2.37$; 95% CI [2.63, 4.15]) reported less conservative social attitudes than the control condition ($M = 4.03$, $SD = 2.55$; 95% CI [3.33, 4.74]), this difference was not significant. The results remained constant when controlling for baseline political orientation, gender, SES, age, and the current mood of the participants with ANCOVA, $F(1, 85) = 0.95$, $p = .332$, $\eta p^2 = .011$.

We also compared the pre- and postexperimental social conservatism scores of the participants as another test of whether our manipulation had an effect. A 2 (time: pretest vs. posttest) $\times$ 2 (condition: analytic-prime vs. control) mixed ANOVA (where the latter factor was between subjects) failed to yield a significant interaction among conditions, $F(1, 89) = 1.39$, $p = .241$, $\eta p^2 = .015$.

Overall, the findings provide evidence for the causal link between analytic thought and liberal political ideology for contextualized political attitudes. In addition, the effect is independent from baseline political orientation, postmanipulation mood, and basic demographic characteristics of the participants. However, the manipulation did not lead people to adopt less conservative political opinions on the disputes presented in the news articles. As predicted, briefly training people to think analytically did not lead to a change in stable political opinions on social issues either.

As there were multiple inferential tests, the effect on liberal contextualized opinions could be spurious (i.e., due to an inflated experimentwise Type I error rate). Thus, we wanted to replicate the same effect in a larger sample. In addition, the dual-process model predicts a decrease in conservative opinions as well as an increase in liberal opinions. However, we only observed evidence for the latter. Thus, one might suppose that the two conservative-anchored news articles somehow did not work well. This might have happened because in the political atmosphere of Turkey at the time of data collection, both internet and security laws were actually matters of dispute between the conservative ruling party and the opposition movements. Importantly, such opposition included not just liberal parties but also other conservative parties. That is, there was no clear polarization between conservative and liberal parties in Turkish politics on the issues presented in the two conservative-anchored articles, which may have rendered them unsuitable for our purposes. Thus, we did not use these two articles in the replication study.

Experiment 2

Method

Participants

As replications should ideally exceed the size of the original sample, and considering potential attritions, we collected data from 167 students enrolled in the introduction to psychology course who participated in return for extra course credit. Participants in the analytic-prime group were excluded from the analyses if they responded incorrectly to the manipulation check questions ($n = 16$). The remaining sample consisted of 151 (mean age = 21.73, $SD = 1.78$, 92 females, 54 males,

5 unanswered) participants randomly assigned to the analytic-prime ($n = 72$) or the control ($n = 79$) conditions.

Materials and Procedure

Unlike Experiment 1, data in Experiment 2 were collected in a single, online session. All the materials were the same as Experiment 1 except that we omitted the conservative-anchored news articles (see above) and used only the two liberal-anchored news articles. We averaged responses to these two articles into a contextualized liberalism score. In addition to the Social Conservatism Scale (Cronbach's $\alpha = .89$) used in Experiment 1, we analyzed the Economic Conservatism Scale (see Yilmaz & Saribay, 2016) in this study since it had, unlike in Experiment 1, sufficient reliability (Cronbach's α for this experiment = .85). This scale is comprised of 16 items with a response scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*; sample item: ''Incentives for encouraging rich people to invest should be increased''). Higher scores indicate higher levels of economic conservatism.

Results and Discussion

Contextualized Political Opinions

As predicted, an independent samples *t*-test revealed a significant effect of the manipulation on the contextualized liberalism score, $t(147) = -2.46$, $p = .015$, Cohen's $d = .41$.[5] The analytic-prime group ($M = 5.35$, $SD = 1.28$; 95% CI [4.99, 5.70]) reported more liberal attitudes than the control group ($M = 4.73$, $SD = 1.71$; 95% CI [4.39, 5.07]). When we controlled for baseline political orientation, gender, SES, age, and the current moods of the participants with ANCOVA, the results remained constant, $F(1, 132) = 6.88$, $p = .010$, $\eta p^2 = .050$.

Stable Political Attitudes

As predicted and consistent with the results of Experiment 1, training participants to think analytically did not significantly influence their long-term political attitudes. An independent samples *t*-test revealed that the social conservatism level of the analytic-prime group ($M = 4.61$, $SD = 2.12$; 95% CI [4.09, 5.13]) did not differ significantly than that of the control group ($M = 4.72$, $SD = 2.06$; 95% CI [4.25, 5.18]), $t(141) = 0.31$, $p = .761$, Cohen's $d = -.05$. The results remained constant when controlling for baseline political orientation, gender, SES, age, and the current mood of the participants with ANCOVA, $F(1, 128) = 0.28$, $p = .601$, $\eta p^2 = .002$.

Another independent samples *t*-test also revealed no main effect on economic conservatism, $t(136) = 0.36$, $p = .722$, Cohen's $d = -.06$. The analytic-prime group ($M = 3.21$, $SD = 0.64$; 95% CI [3.05, 3.37]) was not significantly different than the control group ($M = 3.26$, $SD = 1.01$; 95% CI [3.03, 3.49]). The results remained constant when controlling for baseline political orientation, gender, SES, age, and the current mood of the participants with ANCOVA, $F(1, 124) = 0.59$, $p = .445$, $\eta p^2 = .005$.

Overall, these results directly replicate the findings of Experiment 1 and demonstrate that ACS causally influences contextualized liberal opinions, but not more stable ones traditionally used in political psychology research.

General Discussion

In Experiment 1, we manipulated ACS and found that whereas activating analytic thinking enhances political liberalism for contextualized opinions (i.e., responses to the news articles), it did not decrease contextualized political conservatism, and did not influence more stable political attitudes (i.e., social conservatism), even when examined in a pretest–posttest design with measurements taken weeks apart. Experiment 2 directly replicated this effect and showed that whereas ACS causally influences contextualized liberal opinions, it had no effect on more stable ones (i.e., social and economic conservatism).

The current set of studies contributes to the literature by demonstrating clearly the causal effect of ACS on contextualized liberal attitudes. The effect is specific as it does not occur for either contextualized conservative attitudes or stable political attitudes. Our results are in line with some previous research findings showing the relationship between cognitive style and political ideology (Brandt, Evans, & Crawford, 2015; partially Eidelman et al., 2012, since they found an effect on stable attitudes; Deppe et al., 2015; Iyer et al., 2012; Jost et al., 2003; Pennycook et al., 2012; Talhelm et al., 2015; Van Berkel et al., 2015). However, they go beyond those previous findings. For instance, most of the mentioned research reports correlational findings and very few studies are experimental. In one of them, Talhelm et al. (2015) showed that analytic cultural thought prime leads people to favor more contextualized liberal attitudes whereas holistic cultural thought prime leads to more contextualized conservative opinions in an American sample, whereas they found no effect of these primes on stable attitudes. In the other one, Eidelman et al. (2012) showed that when people are induced to think intuitively, a conservative shift occurred in their stable attitudes. However, Eidelman et al. (2012) did not control for preexisting political orientations (which is an important limitation given their small sample sizes) and also did not differentiate social versus economic attitudes and stable versus contextualized political opinions. In short, among such demonstrations, none of them that we know of specifically investigated the causal role of ACS on political attitudes separately for both contextualized and stable attitudes (see Deppe et al., 2015; Yilmaz & Saribay, 2016; Study 3a and b, for failed attempts at manipulating ACS) while also paying attention to the distinction between social and economic attitudes. Thus, the current set of studies contributes to the emerging literature on the relationship between cognitive style and political ideology by extending earlier research and showing that high-effort thinking can enhance political liberalism but only on contextualized opinions.

Why some studies only found evidence on contextualized opinions (e.g., Talhelm et al., 2015; the present research), whereas some of them found effects on stable political attitudes

(e.g., Eidelman et al., 2012), and some of them found no effect at all (Yilmaz & Saribay, 2016; Study 4) is a question that requires further research (see Supplemental Material for one possibility).

One should also note that all of the cited studies above investigated the effect of cognitive style on political ideology. However, the reverse causal direction (i.e., from political ideology to cognitive style) is also plausible. That is, the adoption of liberal or conservative ideologies can lead to differences in cognitive styles. This is a future direction that would benefit from both experimental and longitudinal investigations.

While the present findings, considered together with those from Western cultures, suggest that some consistency across cultures is present, it must be noted that Turkey is unique in terms of the complexity of its political structure. The strength and/or direction of the effect of cognitive style on political ideology may vary depending on political complexity or stability. Thus, the basic findings of the present research should be replicated in politically less complex places like the United States (with its two-party system) and more complex places like Middle Eastern countries (e.g., Egypt).

Limitations

A potential limitation of the present studies was that we provided participants with analytic training in the experimental condition, but only exposed them to questions in the control condition. Future research should remedy this by designing the control condition to involve a comparable training that does not increase the tendency to think analytically.

Conclusion

All in all, cognitive-style differences, specifically between analytic and intuitive in our case, seem to be an important component of the differences between conservative and liberal ideologies. These different cognitive styles may be the basis of various differences observed between liberals and conservatives such as openness to experience, need for cognitive closure, negativity bias, and integrative complexity (see Jost et al., 2003). ACS might mediate the relations between political orientation and relevant traits. However, as the present research shows along with previous studies, there are important nuances to be considered. Temporarily adopting an analytic style seems to affect contextualized (but not stable) attitudes, and liberalism, but not conservatism. Our findings corroborate some previous ones and extend them into a non-WEIRD context and future research should seek to elucidate these nuances and possibilities.

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Supplemental Material

The supplemental material is available in the online version of the article.

Notes

1. These correspond respectively to rightists and leftists in Turkey, the context of the present research. We use these terms interchangeably throughout.
2. More specifically, from the perspective of the dual-process model, analytic thought (Type 2) is effortful in the sense of relying on working memory while intuitive thought (Type 1) is effortless (automatic). However, cultural thinking styles (analytic vs. holistic thought) do not involve such a distinction. Both can be either effortless or effortful. On the other hand, Talhelm et al. (2015) found that participants who received high scores on analytic cultural thought tended to get high scores on the cognitive reflection test as well, indicating some similarity between these two conceptions of analytic thought. Further research is needed to clarify how similar the two distinctions (i.e., between analytic vs. intuitive and analytic vs. holistic thought) are as well as the nature of mental effort involved in each type of thinking.
3. We also administered an Economic Conservatism Scale in the online battery and in the experiment. In the latter, the order of Social and Economic Conservatism Scales were counterbalanced. We did not use the Economic Conservatism Scale in the analyses since the reliability of the scale was too low. We administered this scale in Experiment 2 as well, where it had better reliability and was therefore included in the analyses.
4. This finding holds when those participants who failed the manipulation check are included in the analysis, $t(104) = 1.20$, $p = .049$, Cohen's $d = .39$. The analytic-prime group ($M = 5.57$, standard deviation [SD] = 0.98; 95% confidence interval [CI; 5.30, 5.84]) reported more liberal attitudes than the neutral-prime group ($M = 5.15$, $SD = 1.15$; 95% CI [4.83, 5.47]).
5. This finding holds when those participants who failed the manipulation check are included in the analysis, $t(163) = -2.08$, $p = .039$, Cohen's $d = .32$. The analytic-prime group ($M = 5.22$, $SD = 1.32$; 95% CI [4.94, 5.51]) reported more liberal attitudes than the neutral-prime group ($M = 4.73$, $SD = 1.71$; 95% CI [4.34, 5.12]).

References

Altemeyer, R. A. (1981). *Right-wing authoritarianism*. Manitoba, Canada: University of Manitoba Press.

Brandt, M. J., Evans, A. M., & Crawford, J. T. (2015). The unthinking or confident extremist? Political extremists are more likely than moderates to reject experimenter-generated anchors. *Psychological Science*, *26*, 189–202.

Buchtel, C., & Norenzayan, A. (2009). Thinking across cultures: Implications for dual processes. In J. St. B. T. Evans & K. Frankish (Eds.), *In two minds: Dual processes and beyond* (pp. 217–238). Oxford, England: Oxford University Press.

De Neys, W., & Glumicic, T. (2008). Conflict monitoring in dual process theories of thinking. *Cognition*, *106*, 1248–1299.

Deppe, K. D., Gonzalez, F. J., Neiman, J. L., Jacobs, C., Pahlke, J., Smith, K. B., & Hibbing, J. R. (2015). Reflective liberals and intuitive conservatives: A look at the cognitive reflection test and ideology. *Judgment and Decision Making*, *10*, 314–331.

Eidelman, S., Crandall, C. S., Goodman, J. A., & Blanchar, J. C. (2012). Low-effort thought promotes political conservatism. *Personality and Social Psychology Bulletin*, *38*, 808–820.

Evans, J. St. B. T. (2003). In two minds: Dual-process accounts of reasoning. *Trends in Cognitive Sciences*, *7*, 454–459.

Evans, J. St. B. T. (2009). How many dual-process theories do we need: One, two or many? In J. St. B. T. Evans & K. Frankish (Eds.), *In two minds: Dual processes and beyond* (pp. 31–54). Oxford, England: Oxford University Press.

Evans, J. St. B. T., & Stanovich, K. E. (2013). Dual-process theories of higher cognition: Advancing the debate. *Perspectives on Psychological Science*, *8*, 223–241.

Frederick, S. (2005). Cognitive reflection and decision making. *Journal of Economic Perspectives*, *19*, 25–42.

Gençöz, T. (2000). Pozitif ve negatif duygu ölçeği: Geçerlik ve güvenirlik çalışması [7Positive and negative affect scale: A study of validity and reliability]. *Türk Psikoloji Dergisi*, *15*, 19–26.

Gervais, W. M., & Norenzayan, A. (2012). Analytic thinking promotes religious disbelief. *Science*, *336*, 493–496.

Henningham, J. P. (1996). A 12-item scale of social conservatism. *Personality and Individual Differences*, *20*, 517–519.

Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences*, *33*, 61–83.

Iyer, R., Koleva, S., Graham, J., Ditto, P., & Haidt, J. (2012). Understanding libertarian morality: The psychological dispositions of self-identified libertarians. *Plos One*, *7*, e42366.

Jost, J. T., Glaser, J., Kruglanski, A. W., & Sulloway, F. J. (2003). Political conservatism as motivated social cognition. *Psychological Bulletin*, *129*, 339–375.

Jost, J. T., Napier, J. L., Thórisdóttir, H., Gosling, S. D., Palfai, T. P., & Ostafin, B. (2007). Are needs to manage uncertainty and threat associated with political conservatism or ideological extremity? *Personality and Social Psychology Bulletin*, *33*, 989–1007.

Kahan, D. M. (2013). Ideology, motivated reasoning, and cognitive reflection. *Judgment and Decision Making*, *8*, 407–424.

Landau, M. J., Solomon, S., Greenberg, J., Cohen, F., Pyszczynski, T., Arndt, J., . . . Cook, A. (2004). Deliver us from evil: The effects of mortality salience and reminders of 9/11 on support for President George W. Bush. *Personality and Social Psychology Bulletin*, *30*, 1136–1150.

Landy, J. F. (2016). Representations of moral violations: Category members and associated features. *Judgment and Decision Making*, *11*, 496–508.

Morewedge, C. K., & Kahneman, D. (2010). Associative processes in intuitive judgment. *Trends in Cognitive Sciences*, *14*, 435–440.

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.

Pennycook, G., Ross, R. M., Koehler, D. J., & Fugelsang, J. A. (2016). Atheists and agnostics are more reflective than religious believers: Four empirical studies and a meta-analysis. *Plos One*, *11*, e0153039.

Piazza, J., & Landy, J. F. (2013). "Lean not on your own understanding": Belief that morality is founded on divine authority and non-utilitarian moral judgments. *Judgment and Decision Making*, *8*, 639–661.

Shariff, A. F., Piazza, J., & Kramer, S. R. (2014). Morality and the religious mind: Why theists and nontheists differ. *Trends in Cognitive Sciences*, *18*, 439–441.

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.

Sidanius, J., & Pratto, F. (1999). *Social dominance: An inter-group theory of social hierarchy and oppression*. New York, NY: Cambridge University Press

Stanovich, K. E., & West, R. F. (2000). Advancing the rationality debate. *Behavioral and Brain Sciences*, *23*, 701–717.

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.

Van Berkel, L., Crandall, C. S., Eidelman, S., & Blanchar, J. C. (2015). Hierarchy, dominance, and deliberation: Egalitarian values require mental effort. *Personality and Social Psychology Bulletin*, *41*, 1207–1222.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*, 1063–1070.

Yilmaz, O., Karadöller, D. Z., & Sofuoglu, G. (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*, 360–369.

Yilmaz, O., & Saribay, S. A. (2016). An attempt to clarify the link between cognitive style and political ideology: A non-western replication and extension. *Judgment and Decision Making*, *11*, 287–300.

Zitek, E. M., & Tiedens, L. Z. (2012). The fluency of social hierarchy: The ease with which hierarchical relations are seen, remembered, learned, and liked. *Journal of Personality and Social Psychology*, *102*, 98–115.

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