



# Lower Levels of Resistance to Change (but not Opposition to Equality) Is Related to Analytic Cognitive Style

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**Abstract:** In recent years, there has been increasing research attention to cognitive style differences between liberals and conservatives. While some studies have found a negative relation between conservatism and analytic thinking tendency, others have not observed such a relation. None of these studies has measured the core motives underlying conservative ideology and investigated their relation with analytic cognitive style (ACS). We predicted that ACS is related to only one of the core motives underlying conservatism (resistance to change), but not the other (opposition to equality). This hypothesis was supported in three non-Western samples (total  $n = 1,552$ ). This finding may clarify why some studies found a relation between cognitive style and conservatism, while others did not.

**Keywords:** analytic cognitive style, cognitive reflection test, conservatism, liberalism, resistance to change, opposition to equality

Research has revealed systematic differences between politically liberal and conservative people on variables such as integrative complexity, need for cognitive closure (NFCC), negativity bias, preference for status quo, and preference for hierarchy (see for meta-analyses of these differences, Jost, Glaser, Kruglanski, & Sulloway, 2003; Jost, Sterling, & Stern, 2018). Jost and his colleagues (2003) meta-analyzed extant psychological variables related to political attitudes across 88 studies. One major conclusion from this effort was that there are two core motives underlying conservative political ideology: resistance to change (preference for status quo) and opposition to equality (support for hierarchy) in society. More specifically, in many earlier studies, authoritarianism had been measured by the Right-Wing Authoritarianism scale (RWA; Altemeyer, 1981) and conservatism by the C-Scale (Wilson & Patterson, 1968). Jost and his colleagues (2003) demonstrated that these two concepts measure only one dimension of conservative political ideology, namely, resistance to change. In addition, they showed that other commonly used measures such as the F-scale (Adorno, Frenkel-Brunswik, Levinson, & Sanford, 1950) and Social Dominance Orientation (SDO; Pratto, Sidanius, Stallworth, & Malle, 1994) measure another dimension of conservative political ideology, namely, opposition to equality. These are related (i.e., often moderately correlated) but distinct dimensions of conservatism.

Jost et al. (2003) claimed that ideological orientations originate mostly from epistemic and existential needs and motives. Epistemic needs are characterized by uncertainty avoidance whereas existential needs by situation-specific threat avoidance (Jost et al., 2003, 2007). It is thought that 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). Death anxiety and fear of system instability are examples of existential needs, whereas intolerance for ambiguity, openness to experience, and NFCC are examples of epistemic needs (Jost et al. 2003). Conservatives and liberals are, in general, psychologically different from each other in the sense that conservatives respond more strongly to existential threats, system instability, and epistemic needs (Jost et al., 2003, 2007; Landau et al., 2004) whereas liberals are less sensitive to them (Jost et al., 2003).

The above-mentioned differences might include or go along with systematic differences in cognitive style (analytic vs. intuitive thinking styles) between liberals and conservatives. For instance, people with high integrative complexity tend to acknowledge multiple perspectives on a given issue and observe their interrelations, thereby relying more on reflective thought processes (Suedfeld & Tetlock, 1977). Importantly, liberals tend to exhibit higher integrative

complexity (e.g., Brundidge, Reid, Choi, & Muddiman, 2014; Tetlock, 1983). To take another example of well-established differences between liberals and conservatives, Kruglanski (2004) defines NFCC as a tendency to seek any answer to a given question regardless of its content as soon as the question, and hence uncertainty, arises. People with high NFCC tend to prefer order and predictability, to be uncomfortable with ambiguity, to be rigid-minded, and to prefer to make a stable decision as quickly as possible (Jost et al., 2003; Kruglanski & Freund, 1983; Thórisdóttir & Jost, 2011). Kruglanski (2004) states that conservative policies, which emphasize tradition and resistance to change, have greater potential to satisfy this need, whereas liberal policies often run contrary to it. Consistent with this, NFCC is positively correlated with conservatism and voting for conservative parties (Chirumbolo & Leone, 2008; Jost et al., 2003; Kemmelmeier, 1997; Webster & Kruglanski, 1994).

Differences between liberals and conservatives have also been observed in the domain of perceptual biases. For instance, negativity bias refers to differential processing of information from the environment whereby negative information is weighed more heavily (i.e., processed faster, with stronger reactions, remembered better, etc.) compared to positive information. Negativity bias is thought to be a central component underlying some psychological differences between people of different ideologies (see Hibbing, Smith, & Alford, 2014; but see comments on this review). For instance, conservatives were found to spend more time looking at negative images than liberals (Dodd et al., 2012) and to show stronger selective attention toward threatening stimuli (Carraro, Castelli, & Macchiella, 2011). Stronger negativity bias in conservatives might lead them to adopt an intuitive style of thought because negativity bias requires responding to stimuli more automatically, quickly, and effortlessly.

Finally, preference for the existing state of affairs (status quo) represents another core element of political conservatism (Burke, 1790/1999; Eidelman, Crandall, & Pattershall, 2009; Jost et al., 2003; Stone, 1994). Preferring to stick to the status quo, compared to seeking change, requires less effort (Eidelman & Crandall, 2009).

These research lines suggest that conservatives are less analytical and more intuitive thinkers than liberals, overall, and research that directly investigates the effect of cognitive style on political attitudes bolsters this conclusion. For instance, experimentally invoking intuitive thinking style increases political conservatism (Eidelman, Crandall, Goodman, & Blanchar, 2012), whereas briefly training people to think analytically increases liberalism for contextualized political opinions (Yilmaz & Saribay, 2017a). Van Berkel, Crandall, Eidelman, and Blanchar (2015) demonstrated that endorsing authoritarian values

and hierarchy (aligned with conservatism) requires less cognitive effort compared to egalitarianism (see also Zitek & Tiedens, 2011). Correlational studies have shown that those who are more politically conservative tend to score lower on the Cognitive Reflection Test (CRT: Deppe et al., 2015; Pennycook, Cheyne, Seli, Koehler, & Fugelsang, 2012; Iyer, Koleva, Graham, Ditto, & Haidt, 2012; Talhelm et al., 2015; Yilmaz & Saribay, 2016), which measures analytic cognitive style (ACS; Frederick, 2005). All of these findings support the view that conservatives tend to think more intuitively whereas liberals think more reflectively, on average (see also Cornelis & Van Hiel, 2006; Saribay & Yilmaz, 2017).

However, other studies have challenged these findings. More specifically, some studies have shown an absence of considerable differences between self-described liberals and conservatives' CRT scores or that the latter is unrelated to continuous measures of ideology (Baron, 2017; Kahan, 2013; Landy, 2016; Piazza & Sousa, 2014; Yilmaz & Saribay, 2017b). What explains these conflicting findings?

First of all, studies differ in their sampling procedures and materials. For instance, most studies rely solely on the one-item political orientation measure, whereas others distinguish between social and economic conservatism. In addition, most of the studies recruited university students or Amazon Mechanical Turk (mTurk) samples, both known for their relatively liberal tendency (Henrich, Heine, & Norenzayan, 2010; Paolacci, Chandler, & Ipeirotis, 2010; Sears, 1986). Among these studies, only Kahan (2013) recruited a representative sample of US Americans and found no significant relation between CRT scores and political conservatism. However, he measured political ideology with only the one-item political orientation scale. In studies differentiating social and economic conservatism, the results generally show that CRT is significantly and negatively correlated with social conservatism, but not with economic conservatism (Deppe et al., 2015; Pennycook et al., 2012; Talhelm et al., 2015; Yilmaz & Saribay, 2016; but see Sterling, Jost, & Pennycook, 2016). A recent study which used several ACS measures showed that CRT is correlated with neither social nor economic conservatism in a US American mTurk sample (Yilmaz & Saribay, 2017b), whereas other ACS measures are significantly related to social (but not economic) conservatism. In addition, a recent meta-analysis suggested that the relation between CRT and social conservatism is stronger (unweighted average  $r = -.15$ ) than that between CRT and economic conservatism (unweighted average  $r = -.08$ ; Jost et al., 2018).

How can these conflicting findings be reconciled? In our view, an important shortcoming of previous studies has been the lack of measures of core ideological motives

(i.e., resistance to change and opposition to equality). While the single-item measure of overall political orientation has been very useful in research given its simplicity (Jost, 2006), it may have also masked important interindividual differences. This is especially apparent when one considers libertarians (see Iyer et al., 2012). Libertarians are known to lean toward the conservative side of the single-item political orientation scale. Yet, libertarians tend to resemble conservatives on economic attitudes, whereas they tend to resemble liberals on social attitudes. Critically, libertarians score higher than both conservatives and liberals on the CRT (Iyer et al., 2012). All these findings considered together make it clear that, in studies of the relationship between cognitive style and political ideology, the presence of libertarians combined with a failure to distinguish between social and economic conservatism is likely to lead to mistaken conclusions.

To put it differently, in the US, self-identified conservatives are mostly both socially and economically conservative (i.e., supporting traditional values and capitalist free market economy, respectively). Liberals, on the other hand, tend to be socially progressive and to support the social welfare state system economically. Libertarians are socially liberal but economically conservative (Iyer et al., 2012; see also Talhelm et al., 2015). Thus, support for capitalist free market economy – related to opposition to equality – commonly characterizes conservatives and libertarians. However, support for traditional values and the status quo – related to resistance to change – distinguishes conservatives from libertarians and liberals (see Feldman & Johnston, 2014). Thus, research must examine core ideological motives separately, rather than relying solely on measures of overall political orientation, and investigate how cognitive style is related to these motives to reconcile the previous mixed findings.

So, which aspect of conservatism or which ideological motive is related more strongly to analytic thinking tendency? We hypothesized that the resistance to change motive (which is related to conservation of societal traditions including religious values), but not the opposition to equality motive (which is related to competition over resources) is related to ACS. This is because, firstly, the weight of the evidence reviewed above points in this direction. Other suggestive evidence on this issue also exists. For instance, Landy (2016) observed significant negative relationships between CRT scores and binding moral

foundations (ingroup, authority, purity) – which are mostly related to resistance to change (e.g., Nilsson & Erlandsson, 2015), but CRT was not significantly related to individualizing foundations – which are mostly related (inversely) to social dominance orientation (see Sinn & Hayes, 2017; see also for similar findings about the relation between binding foundations and thinking styles, Nash, Baumgartner, & Knoch, 2017; Pennycook, Cheyne, Barr, Koehler, & Fugelsang, 2014; Yilmaz & Saribay, 2017c). In sum, empirical evidence points in the direction of suggesting a negative relation between ACS and resistance to change and no relation between ACS and opposition to equality. We expected to bolster such evidence with direct tests in the present research.

Second, on a more theoretical basis, opposition to equality, competitiveness, and support for capitalist free-market economy do not appear to be tendencies that would benefit from low-effort thought (but see Sterling et al., 2016). To the contrary, engaging in competition over resources with others should require significant uncertainty (e.g., with regard to the outcome of competition, changing contextual factors, and the potential actions of rivals) and a good deal of cognitive effort (e.g., the need to remain vigilant and to anticipate rivals' actions and contextual changes that result from the ongoing competition) into one's life.<sup>1</sup> On the other hand, resistance to change clearly goes along with cognitive miserliness because it simplifies one's construal of the social world with the help of familiar constructs afforded by societal traditions (Zitek & Tiedens, 2011; see also Jost et al., 2003). Since maintaining the tendency to think analytically requires relative cognitive effort, it is incompatible with resistance to change but not necessarily with opposition to equality.

## The Present Research

The present research was motivated by the above-mentioned observation that our understanding of the ACS-conservatism relation could be improved by utilizing measures of core ideological motives in addition to relatively coarse measures of conservatism. Going beyond this, we advanced the hypothesis that ACS is related to resistance to change, but not to opposition to equality for the theoretical reasons stated above. In our attempt to test this hypothesis, we sought to produce a unique contribution to

<sup>1</sup> This argument may seem to be inconsistent with Van Berkel et al.'s (2015) finding that hierarchy endorsement is cognitively less effortful than egalitarianism. However, a competitive orientation should not be equated with hierarchy endorsement. Endorsing an established hierarchy or generally supporting authoritarian values may indeed be cognitively less effortful than egalitarianism, as Van Berkel et al. (2015) have shown. On the other hand, competition should be strongest when hierarchy has not been firmly established. Thus, competition must be cognitively more taxing than endorsing an established hierarchy. In contrast, since resistance to change is typically compatible with established societal hierarchies (e.g., patriarchy, heterosexism, etc.), it is cognitively easier than opposition to equality.

the literature in several ways. First, we recruited three samples (two student and one community; total  $n = 1,552$ ) from a non-Western, predominantly Muslim country, because there is a scarcity of data from such cultures on these issues. In one of our previous studies (Yilmaz & Saribay, 2016, Study 2), the core ideological motives and CRT were measured together in a non-Western student sample, but not analyzed to test the current hypothesis. In Study 1, we reanalyzed the data from that earlier study. Even though this sample was from a non-Western culture, it could, in some ways, be considered as WEIRD (Western, Educated, Industrialized, Rich, and Democratic, see Henrich et al., 2010). Thus, in Study 2, we replicated the main findings in an adult community sample. In both studies, ACS was operationalized by CRT, which has been criticized on various fronts (Haigh, 2016; Sinayev & Peters, 2015; Stieger & Reips, 2016; but see Pennycook & Ross, 2016). Thus, we tested our hypothesis in a third student sample by measuring ACS with three different measures (CRT, CRT-2, and base-rate problems).

Second, because of the historically strong and growing influence of religion in Turkey (e.g., Çarkoğlu & Kalaycioğlu, 2009), we accounted for the effect of religiosity as well as other relevant demographic variables. This is important because, in the Turkish political context, a simple association between Muslim religiosity and conservatism might be unwarranted, especially in terms of opposition to equality (e.g., Özbudun, 2006). Indeed, we have recently observed that self-identified Islamists in Turkey value the individualizing moral foundations, which seems consistent with egalitarianism (e.g., Nilsson & Erlandsson, 2015), just as much as leftists do (Yılmaz, Saribay, Bahçekapılı, & Harma, 2016). Third, instead of taking RWA and SDO, or any other established scales, as direct measures of resistance to change and opposition to equality, respectively, we employed a more data-driven approach to measuring core ideological motives by allowing items from various scales to freely organize into clusters representing those motives (see Saribay, Olcaysoy Ökten, & Yılmaz, 2017). Aspects of conservatism are often measured with either a single-item self-placement scale (Federico, Ergun, & Hunt, 2014) or a relatively small set of self-report items (e.g., Bakker, 2017; Malka, Soto, Inzlicht, & Lelkes 2014). We employed more detailed measures of resistance to change and opposition to equality that left little ambiguity regarding how participants understood these concepts. A further advantage of our measures was that they included locally developed items and were validated previously with similar samples (Saribay et al., 2017).

## Study 1: Reanalysis of Yilmaz and Saribay (2016, Study 2)

### Participants

We report how we determined our sample size, all data exclusions, all manipulations, and all measures in this study. Data for all four studies is available in the Electronic Supplementary Materials, ESM 1–4. Data from this sample was previously reported in Yilmaz and Saribay (2016, Study 2).<sup>2</sup> We estimated a correlation coefficient of .15, which required a total sample of at least 476 to attain 95% power of detecting any effect. We exceeded this limit as long as the participants were readily available. A total of 750 Boğaziçi University (Istanbul) undergraduates ( $M_{\text{age}} = 20.63$ ,  $SD = 2.13$ ; min: 18, max: 45; 452 females, 276 males, 22 unreported) enrolled in introductory psychology courses participated in the study. They were given course credit in return for their participation. All participants were native Turkish speakers. The majority of the participants (61%) defined themselves as Muslim ( $n = 464$ ). The average response to the single-item self-placement political orientation question was 3.34 ( $SD = 1.43$ ), which differed significantly from the midpoint (4) of the scale,  $t(718) = -12.37$ ,  $p < .001$ . This suggests that the sample was skewed in terms of political orientation like most of the published literature using American undergraduates or online samples.

### Materials and Procedure

Jost et al. (2003) conceptualized conservatism as involving two core ideological motives – resistance to change and opposition to equality. To measure them, we used a set of items compiled from the Social Dominance Orientation scale (Pratto et al., 1994), Right-Wing Authoritarianism scale (Altemeyer & Hunsberger, 1992), F-scale (Adorno et al., 1950), Social and Cultural Attitudes scale (Küçüker, 2007), Egalitarianism-Inegalitarianism scale (Kluegel & Smith, 1983), and items measuring resistance to change used by Jost et al. (2007). Saribay et al. (2017) factor analyzed responses to a pool of items from these scales, which supported the existence of two factors corresponding to resistance to change and opposition to equality. In three subsequent studies, they provided additional evidence for the reliability and validity of items showing that these two core motives are related to other conservatism measures (such as social conservatism, political identity, and just world beliefs). Resistance to change is measured by 8 items (e.g., “The love of Westernization will result in the assimilation of our

<sup>2</sup> The data are available at <http://journal.sjdm.org/vol11.3.html>. This dataset included variables that were not analyzed here.



[Turkish] culture and identity”) and opposition to equality by 17 items (e.g., “If people were treated more equally we would have fewer problems in this country” – reverse coded). Participants responded to the items on a scale ranging from 1 (= *strongly disagree*) to 7 (= *strongly agree*), in randomized order. Higher scores indicate stronger resistance to change ( $\alpha = .88$ ) or opposition to equality ( $\alpha = .75$ ).

To measure ACS, we used the CRT (Frederick, 2005), which has been used in many other studies for the same purpose. Participants were given three test items each with an intuitive (but wrong) answer. Arriving at the correct answer requires relatively high-effort thinking. A sample item 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?” To most people, “10 cents” jumps out as a low-effort answer to this question. Those with a stronger tendency to think analytically are more likely to override this response and produce the logically correct answer (“5 cents”). Responses were coded as correct (1) or incorrect (0) and summed to produce a total CRT score.

In addition, a demographic form requested basic information (gender, age, self-reported socioeconomic status [SES], size of hometown size, ethnicity). Political orientation was measured on the 1 (= *left*) to 7 (= *right*) self-placement scale. Religiosity was measured on a 1 (= *not at all religious*) to 7 (= *highly religious*) scale.

## Results and Discussion

As predicted, CRT was negatively correlated with resistance to change ( $r = -.118, p = .002$ ), but not with opposition to equality ( $r = -.062, p = .102$ ), and political orientation ( $r = -.031, p = .418$ ). CRT was also significantly correlated with religiosity ( $r = -.077, p = .043$ ). We used Lee and Preacher’s (2013) online calculator in order to be able to compare the magnitude of the crucial difference in correlations (i.e., comparing CRT-resistance to change to CRT-opposition to equality). As expected, the correlations of resistance to change and opposition to equality with CRT are significantly different from each other ( $z = -4.26, p < .001$ ).

To test the independent effect of CRT on resistance to change, a hierarchical multiple regression analysis was carried out predicting resistance to change while controlling for sex (Females = 0, Males = 1), age (in years), SES (1 = *very high*, 5 = *very low*), hometown size (1 = *metropolis*, 5 = *village*), and religiosity (Table 1). Demographic variables were entered first, followed by CRT. In the first step, sex ( $\beta = -.156, p < .001$ ), hometown size ( $\beta = .112, p = .001$ ), and religiosity ( $\beta = .486, p < .001$ ) independently predicted resistance to change. But more importantly, in step 2, CRT made a significant independent contribution

**Table 1.** Hierarchical multiple regression: Standardized regression coefficients predicting resistance to change with CRT controlling for gender, age, SES, hometown size, and religiosity (Study 1)

	Resistance to change		Adjusted $R^2$
	Step 1	Step 2	
Demographics			.269***
Gender	-.156***	-.192***	
Age	-.057	-.055	
SES	-.040	-.041	
Hometown size	.112**	.106**	
Religiosity	.486***	.478***	
Cognitive measure			.282***
CRT		-.127***	

Notes. SES = Socioeconomic Status; CRT = Cognitive Reflection Test. \*\* $p < .01$ , \*\*\* $p < .001$ .

( $\beta = -.127, p < .001$ ). Thus, the results showed that CRT is negatively related to resistance to change and religiosity, but not opposition to equality and political orientation in this sample. The results also showed that lower levels of ACS predicted resistance to change motive independently of sex, age, SES, hometown size, and religiosity. In Study 2, we recruited a non-Western community sample and tried to replicate the main findings revealed in the student sample.

## Study 2

### Method

#### Participants

We report how we determined our sample size, all data exclusions, all manipulations, and all measures in this study. Eight undergraduate research assistants were each asked to recruit up to as many as 40 volunteers among their acquaintances in their communities. This resulted in data being collected from a total of 315 participants ( $M_{\text{age}} = 28.63, SD = 11.50$ , 155 female, 160 male). The majority of the participants (77%) defined themselves as Muslim ( $n = 242$ ). The average response to the single-item self-placement political orientation question was 3.90 ( $SD = 1.36$ ), which did not differ significantly from the midpoint (4) of the scale,  $t(313) = -1.28, p = .20$ . This suggests that the sample was not skewed in terms of political orientation, unlike Study 1.

#### Materials and Procedure

Participants were given a paper-and-pencil questionnaire that took approximately 15 min to complete. We used the same measures as in Study 1 except we did not ask for hometown size in the demographic form. The measures possessed adequate reliabilities (resistance to change

Cronbach's  $\alpha = .82$ ; opposition to equality Cronbach's  $\alpha = .77$ ).

## Results and Discussion

Unlike Study 1, CRT scores were significantly and negatively correlated with political orientation ( $r = -.128, p = .024$ ). Consistent with Study 1, CRT and religiosity ( $r = -.136, p = .016$ ) were negatively correlated. More importantly, as expected and consistent with Study 1, CRT showed a significant negative correlation with resistance to change ( $r = -.168, p = .003$ ) but no correlation with opposition to equality ( $r = -.026, p = .654$ ). As in Study 1, we compared the magnitude of the crucial difference in correlations (i.e., comparing CRT-resistance to change to CRT-opposition to equality). As expected, the correlations of resistance to change and opposition to equality with CRT are significantly different from each other ( $z = -1.94, p = .026$ ).

To test the independent effect of CRT on resistance to change and political orientation, two hierarchical multiple regression analyses were carried out predicting resistance to change and political orientation while controlling for sex (Females = 0, Males = 1), age (in years), SES (1 = *very high*, 5 = *very low*), and religiosity. In these analyses, all demographic variables were entered first, followed by CRT. In the analysis with resistance to change as the outcome variable, in the first step, only religiosity ( $\beta = .409, p < .001$ ) independently predicted resistance to change. But more importantly, in step 2, CRT made a significant contribution ( $\beta = -.120, p = .027$ ) in addition to religiosity ( $\beta = .392, p < .001$ ; Table 2).

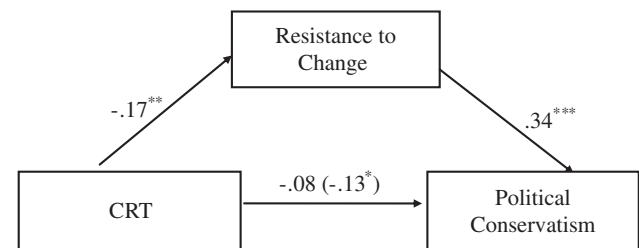
In the second hierarchical multiple regression analysis, we investigated the independent effect of CRT on political orientation. As in the first analysis, in the first step, only religiosity ( $\beta = .540, p < .001$ ) independently predicted conservatism. However, in step 2, CRT ( $\beta = -.066, p = .180$ ) did not significantly predict political orientation.

We next sought to test whether resistance to change mediates the relationship between CRT and political conservatism (i.e., political orientation). Therefore, we used a bootstrapping analysis (Preacher & Hayes, 2004) to estimate 95% confidence intervals (CIs) for the indirect effect of CRT via resistance to change on political conservatism, using 5,000 bootstrap resamples. We conducted the analysis with the CRT as the predictor, resistance to change as the mediator, and political conservatism as the outcome variable. The indirect effect of CRT on political conservatism through resistance to change was significant (95% CI [-.114, -.025]). More importantly, the direct effect of CRT on political conservatism was not significant when controlling for resistance to change ( $p = .127$ ; 95% CI [-.224, .028]).

**Table 2.** Hierarchical multiple regression: Standardized regression coefficients predicting resistance to change with CRT controlling for gender, age, SES, hometown size, and religiosity (Study 2)

	Resistance to change		Adjusted $R^2$
	Step 1	Step 2	
Demographics			.171***
Gender	.030	.057	
Age	-.118*	-.122*	
SES	.015	.000	
Religiosity	.418***	.400***	
Cognitive measure			.184***
CRT		-.127*	

Notes. SES = Socioeconomic Status; CRT = Cognitive Reflection Test. \* $p < .05$ , \*\*\* $p < .001$ .



**Figure 1.** The mediating role of resistance to change on the relationship between CRT and Political Conservatism (Study 2). Total effect in parentheses. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

That is, resistance to change mediated the relationship between CRT and political conservatism (see Figure 1).

Thus, the results showed that CRT is negatively related to resistance to change, religiosity, and general political orientation, but not to opposition to equality in this sample. The significant relation between CRT scores and political orientation is not consistent with Study 1. However, the regression result showed that lower levels of ACS, as indexed by CRT, predicted resistance to change (but not political orientation) independently of sex, age, SES, and religiosity, as in Study 1. The results also showed that resistance to change mediated the relation between CRT and political orientation. Thus, it seems that resistance to change motive appears central to why conservatives tend to think less analytically.

However, it is important to note that the CRT has been criticized because of its increasing familiarity among participants (Haigh, 2016; Stieger & Reips, 2016) and because it emphasizes numeracy rather than high-effort thinking (Sinayev & Peters, 2015; see also Baron, Scott, Fincher, & Metz, 2015). Thus, we wanted to replicate the main findings revealed in both studies by operationalizing ACS using other measures in addition to CRT.

## Study 3

### Method

#### Participants

We report how we determined our sample size, all data exclusions, all manipulations, and all measures in this study.<sup>3</sup> We did not determine the sample size with reference to any prior effect size. Instead, we invited all undergraduate students enrolled in the psychology subject pool to take part in the study and imposed a deadline for participation. That is, the participants had 2 weeks to complete the online survey. This procedure resulted in a total of 487 Boğaziçi University (Istanbul) undergraduates ( $M_{\text{age}} = 20.84$ ,  $SD = 1.87$ ; min: 18, max: 30; 201 males, 251 females, 35 unreported) taking part in the study. They were given course credit in return for their participation. All participants were native Turkish speakers. The majority of the participants (54%) defined themselves as Muslim ( $n = 263$ ). The average response to the single-item self-placement political orientation question was 3.39 ( $SD = 1.42$ ), which differed significantly from the midpoint (4) of the scale,  $t(455) = -9.10$ ,  $p < .001$ . This suggests that the sample was skewed in terms of political orientation like most of the published literature using American undergraduates or online samples.

#### Materials and Procedure

We used the same measures as in Study 1 but added three other ACS measures besides CRT. The political attitude measures possessed adequate reliabilities (resistance to change Cronbach's  $\alpha = .81$ ; opposition to equality Cronbach's  $\alpha = .86$ ).

The first alternative measure of ACS that we added was CRT-2 (Thomson & Oppenheimer, 2016). It was developed to overcome some limitations of CRT. It is comprised of four verbal questions. A sample item is:

“If you're running a race and you pass the person in second place, what place are you in? (intuitive answer: first; correct answer: second)”

The second alternative measure of ACS we added was base-rate problems (De Neys & Glumicic, 2008). Three of the six base-rate questions included a conflict between base-rate information and a misleading stereotypic information. Consider the following:

In a study 1,000 people were tested. Among the participants there were 5 engineers and 995 lawyers. Jack is a randomly chosen participant of this study.

Jack is 36 years old. He is not married and is somewhat introverted. He likes to spend his free time reading science fiction and writing computer programs.

What is most likely?

- a) Jack is a lawyer (correct answer)
- b) Jack is an engineer

Taking into account the base-rate information given in the question, it is very likely that Jack is a lawyer. However, participants must ignore the misleading and intuitively appealing stereotypic information in order to be able to choose the base-rate respecting answer. An additional set of three base-rate questions are comprised of only base-rate information and lack any stereotypic information. In these, participants need only to consider the base-rate information to reach the base-rate respecting answer. A sample item is:

In a study 1,000 people were tested. Among the participants there were 3 who play the saxophone and 997 who play the drums. Tom is a randomly chosen participant of this study.

Tom is 20 years old. He is studying in Washington and has no steady girlfriend. He just bought a second-hand car with his savings.

What is most likely?

- a) Tom plays the saxophone
- b) Tom plays the drums (correct answer)

The order of all measures (ACS and political) was randomized. We combined all three measures (CRT, CRT-2, and base-rate problems) into a total ACS score.

## Results and Discussion

ACS was negatively correlated with political orientation, but this relation failed to reach significance ( $r = -.087$ ,  $p = .068$ ). Consistent with Studies 1 and 2, ACS and religiosity ( $r = -.206$ ,  $p < .001$ ) were negatively correlated. More importantly, as expected and consistent with Studies 1 and 2, ACS showed a significant negative correlation with resistance to change ( $r = -.190$ ,  $p < .001$ ) but no correlation with opposition to equality ( $r = -.018$ ,  $p = .709$ ). As in the other studies, we compared the magnitude of the crucial difference in correlations (i.e., comparing ACS-resistance to change to ACS-opposition to equality). As expected, the correlations of resistance to change and opposition to

<sup>3</sup> This dataset included variables (i.e., metaethics scale, intergroup tolerance scale) that were not related to current purposes and hence not analyzed here.

**Table 3.** Hierarchical multiple regression: Standardized regression coefficients predicting resistance to change with CRT controlling for gender, age, SES, hometown size, and religiosity (Study 3)

	Resistance to change		Adjusted $R^2$
	Step 1	Step 2	
Demographics			.310***
Gender	.179***	.225***	
Age	-.064	-.065	
SES	-.050	-.062	
Hometown size	.011	.007	
Religiosity	.541***	.513***	
Cognitive measure			.331***
ACS		-.159***	

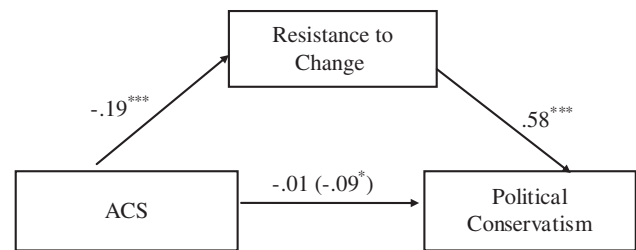
Notes. SES = Socioeconomic Status; ACS = Analytic Cognitive Style. \*\*\* $p < .001$ .

equality with ACS are significantly different from each other ( $z = -3.21, p < .001$ ).

To test the independent effect of ACS on resistance to change and political orientation, two hierarchical multiple regression analyses were carried out predicting resistance to change and political orientation while controlling for sex (Females = 0, Males = 1), age (in years), SES (1 = *very high*, 5 = *very low*), hometown size (1 = metropolis, 5 = village), and religiosity. In these analyses, all demographic variables were entered first, followed by ACS. In the analysis with resistance to change as the outcome variable, in the first step, sex ( $\beta = .179, p < .001$ ) and religiosity ( $\beta = .541, p < .001$ ) independently predicted resistance to change. But more importantly, in step 2, ACS made a significant contribution ( $\beta = -.159, p < .001$ ) in addition to sex ( $\beta = .225, p < .001$ ) and religiosity ( $\beta = .513, p < .001$ ; Table 3).

In the second hierarchical multiple regression analysis, we investigated the independent effect of ACS on political orientation. As in the first analysis, in the first step, sex ( $\beta = .105, p = .008$ ) and religiosity ( $\beta = .614, p < .001$ ) independently predicted conservatism. However, in step 2, ACS ( $\beta = -.009, p = .835$ ) did not significantly predict political orientation, in line with Study 2.

As in Study 2, we next sought to test whether resistance to change mediates the relationship between ACS and political conservatism (i.e., political orientation). Therefore, we used a bootstrapping analysis (Preacher & Hayes, 2004) to estimate 95% CIs for the indirect effect of ACS via resistance to change on political conservatism, using 5,000 bootstrap resamples. We conducted the analysis with the ACS as the predictor, resistance to change as the mediator, and political conservatism as the outcome variable (Figure 2). The indirect effect of ACS on political conservatism through resistance to change was significant (95% CI [-.084, -.030]). More importantly, the direct effect of ACS on political conservatism was not significant when controlling for resistance to change ( $p = .803$ ;



**Figure 2.** The mediating role of resistance to change on the relationship between ACS and Political Conservatism (Study 3). Total effect in parentheses. \* $p < .07$ , \*\*\* $p < .001$ .

95% CI [-.037, .048]). That is, resistance to change mediated the relationship between ACS and political conservatism, as in Study 2. However, we urge caution when interpreting this mediation analysis (used in both Study 2 and Study 3) since one cannot infer a cause-effect relation from a correlational design. Instead, ACS should be manipulated, and the mediating role of resistance to change should be investigated in future studies.

## General Discussion

The present findings suggest that ideological motives may be differentially implicated in conservatives' tendency to think less analytically than liberals. We found in three non-Western, predominantly Muslim samples consisting of students (Studies 1 and 3) and community adults with no apparent liberal bias (Study 2), that ACS, as measured by either CRT (Studies 1 and 2) or three separate measures (Study 3), is negatively related to resistance to change, but unrelated to opposition to equality. Although the relation between ACS and political orientation was significant in the community sample (Study 2), and marginally significant in one student sample (Study 3), it disappeared once demographic variables were controlled for. However, the effect of ACS on resistance to change remained constant in all three studies when controlling for the same demographic variables. In addition, the ACS-political orientation relationship was mediated by resistance to change. Thus, the results suggest that people who are higher in resistance to change think less analytically. In other words, among the ideological motives underlying conservatism, it is resistance to change, rather than opposition to equality, that is related to cognitive style. The effects were consistent and their sizes comparable across the studies. These findings may explain why some previous studies found a significant relationship between CRT and the one-item political orientation measure (Bağçekapılı & Yilmaz, 2017; Deppe et al., 2015; Iyer et al., 2012; Pennycook et al., 2012; Talhelm et al., 2015; Yilmaz & Saribay, 2016) while others



failed to do so (Kahan, 2013; Landy, 2016; Yilmaz & Saribay, 2017b).

In their “conservatism as motivated social cognition” account, Jost et al. (2003, p. 344) have explicitly stated the parallels between RWA and resistance to change on the one hand and SDO and opposition to equality on the other. Opposition to equality fuels support for capitalist free market economy (i.e., economic conservatism) whereas resistance to change fuels the desire to preserve tradition (i.e., social conservatism). Conservatives tend to score higher on measures of both social and economic conservatism and their respective underlying motives (resistance to change and opposition to equality) than liberals (Jost et al., 2003). A third group, libertarians, are more similar to conservatives economically but more similar to liberals socially (Iyer et al., 2012). In light of Iyer et al.’s examination of libertarians, our findings that resistance to change is related to ACS while opposition to equality is not, might suggest that conservatives tend to think less analytically than other groups (e.g., liberals, libertarians) because resistance to change is highest in conservatives compared to these other groups.

The present research contributes to the diversity of the samples on which the relationship between ACS and conservatism is tested. Most of the previous studies on the topic come from WEIRD samples (see Henrich et al., 2010) which are likely to be biased in the liberal direction. As far as our knowledge goes, only Kahan (2013) recruited a representative sample, but that sample was from the US. In the present research, we went a step further and recruited two non-Western student samples as well as a non-Western community sample which showed no apparent liberal bias. It is reassuring that both the reanalysis of our liberally biased student sample collected earlier and the student and community samples added here showed a consistent pattern of results. Future research should continue the effort to widen sample diversity on this topic.

One limitation of the present research should be acknowledged. We employed an undergraduate student sample and a non-probability adult community sample. While both samples were relatively large, caution is necessary in drawing conclusions about Turkish society in general because we did not use a representative sample. Another limitation of the current studies might be due to our reliance on CRT. It has been criticized for its wide familiarity due to its recurrent usage in psychology literature (Haigh, 2016; Stieger & Reips, 2016) and being mostly based on numeracy skills (Sinayev & Peters, 2015; but see Pennycook & Ross, 2016). For this reason, in Study 3, we used alternative ACS measures including a verbally oriented one (CRT-2) and found very similar results. Thus, the current research is important both because it enables a direct comparison with previous Western research that has also relied on the

CRT and also because it extends that previous research with the use of alternative ACS measures. However, we urge caution in the analysis regarding our religiosity measure since it is only based on one item and may not be a strong measure of religious belief. Future studies should use both religious belief and engagement measures in future studies (e.g., Pennycook et al., 2012).

## Conclusion

The present research contributes to the political psychological literature by providing data from a non-Western, predominantly Muslim culture, using relatively large samples and carefully selected measures that are often not available in large-scale representative surveys. To summarize, our data generally support the motivated social cognition model of conservatism (Jost et al., 2003), but additionally suggest that having a stronger motive to resist change (rather than to oppose equality) is related specifically to a decreased tendency to think analytically.

## Electronic Supplementary Material

The electronic supplementary material is available with the online version of the article at <https://doi.org/10.1027/1864-9335/a000328>

*ESM 1.* Data (.csv)

Study 1 data.

*ESM 2.* Data (.csv)

Study 2 data.

*ESM 3.* Data (.csv)

Study 3 data.

*ESM 4.* Text (.doc)

Translation of the Social/Political Conservatism Scale.

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