



# Are neo-liberals more intuitive? Undetected libertarians confound the relation between analytic cognitive style and economic conservatism

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## Abstract

Previous studies consistently showed that analytic cognitive style (ACS) is negatively correlated with social conservatism, but there are mixed findings concerning its relation with economic conservatism. Most tests have relied on a unidimensional (liberal-conservative) operationalization of political orientation. Libertarians tend not only to identify themselves as conservative on this scale but also to score higher on ACS than liberals and conservatives. The presence of libertarians might be the reason for the above-mentioned mixed findings. We investigated the relation between social and economic conservatism and ACS (operationalized using the Cognitive Reflection Test; CRT) in a large, web-based sample. There was a *negative* correlation between CRT and social conservatism both when libertarians were included and excluded. However, the correlation between CRT and economic conservatism was significantly reduced in magnitude and became non-significant when libertarians were excluded. The results support the argument that the undetected presence of libertarians may confound the ACS-economic conservatism relation.

**Keywords** Analytic cognitive style · Libertarians · Liberals · Conservatives · Cognitive reflection test

The dual-process model of the mind argues that human mental operations are supported by two sets of processes. The evolutionarily older set—Type 1—provides automatic, intuitive, and fast responses whereas the newer set—Type 2—supports analytic, controlled, and slower responses (Evans 2003; Evans and Stanovich 2013; Morewedge and Kahneman 2010). Although this initial model has received some criticisms (Baron et al. 2015; Białek and De Neys 2016; Klein 2011; Pennycook et al. 2015; Thompson 2009; Trémolière and Bonnefon 2014; Sinayev and Peters 2015), it has been used to explain a variety of belief systems from religious to political. For instance, it is thought that Type 1 may play a prominent role in religious belief because such belief, in many cases, relies on automatic acceptance of arguments while Type 2 is thought to be important for rejection of religious beliefs (Bahçekapılı and Yilmaz 2017;

Gervais and Norenzayan 2012; Norenzayan and Gervais 2013; Pennycook et al. 2012; Pennycook et al. 2016; Shenhav et al. 2012; Saribay and Yilmaz 2017; Yilmaz et al. 2016; but see Sanchez et al. 2017; Yonker et al. 2016).

Likewise, there is an emerging literature on the relation between political ideology and cognitive styles (Brandt et al. 2015; Deppe et al. 2015; Eidelman et al. 2012; Iyer et al. 2012; Jost et al. 2017; Kahan 2013; Landy 2016; Piazza and Sousa 2014; Pennycook et al. 2012; Saribay and Yilmaz 2017; Sterling et al. 2016; Talhelm et al. 2015; Van Berkel et al. 2015; Yilmaz and Saribay 2016, 2017a, 2017b, 2017c, 2018). More specifically, there are some findings showing a negative correlation between political conservatism and scores on the Cognitive Reflection Test (CRT: e.g., Deppe et al. 2015; Iyer et al. 2012; Pennycook et al. 2012; Talhelm et al. 2015; Yilmaz and Saribay 2016), a test used to measure analytic cognitive style (ACS; Frederick 2005). However, other studies found no significant relation (Baron 2017; Kahan 2013; Landy 2016; Piazza and Sousa 2014; Yilmaz and Saribay 2017b). The latter studies highlight the lack of considerable differences between liberals and conservatives' CRT scores. Jost et al. (2017) meta-analyzed these findings and found evidence of a slightly weaker effect of economic conservatism (unweighted average  $r = -.08$ ) compared to social conservatism (unweighted average  $r = -.15$ ) on measures of CRT.

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However, most tests of the ACS-political orientation relationship have relied on a unidimensional (liberal-conservative) operationalization of political orientation, thereby failing to allow participants to indicate identification with other political groups. For example, according to (Iyer et al. 2012) non-representative data, libertarians might be one of the largest political groups in the U.S. and they are known to identify as conservative when forced to use the liberal-conservative continuum. Critically, they also tend to score higher on CRT than both liberals and conservatives Iyer et al. (2012). Thus, we suspected that the undetected presence of libertarians in previous samples may have obscured the negative relationship between CRT and conservatism.

In other words, we suspect that what masked the systematic CRT-conservatism relationship in some previous studies was the presence of non-negligible proportions of libertarians together with the inability (of researchers) to identify this group of people due to reliance on the liberal-conservatism continuum as the sole measure of political ideology. More specifically, we believe that the reason for the positive relationship between CRT scores and economic conservatism in some previous studies (e.g., Deppe et al. 2015) might be the presence of libertarians (i.e., people who are economically conservative and socially liberal) in the samples. For instance, one of Deppe et al.'s four studies showed a moderate and significant negative correlation between the CRT and economic conservatism while two others showed no such relation. Critically, in the study whose sample was the most representative of the U.S. population, there was a relatively strong positive correlation between economic conservatism and CRT scores (see Baron 2015). The presence of non-negligible proportions of libertarians in the samples might explain these mixed findings in Deppe et al. (2015). That is, the more libertarians there are in a given sample, the more positive the relation between economic conservatism and CRT should tend to be, whereas when they are lower in numbers, the same relation might reduce in magnitude and become non-significant. This should occur because libertarians are not only high in economic conservatism but also score higher in CRT than any other ideological group (i.e., liberals, conservatives; see Iyer et al. 2012) and tend to identify as conservative when not given the option to identify as libertarian. In line with this argument, we expected that there will be a positive correlation between CRT and economic conservatism when libertarians were included, and a weaker, if not non-significant relation among the two when they were excluded from the analyses.

In sum, the undetected presence of libertarians potentially confounds investigations of the relationship between cognitive style and political orientation. This is also highly likely to be an issue whenever the single item (liberal-conservative) measure of political orientation is used because on this measure, libertarians tend to lean toward the conservative end of the scale. Feldman and Johnston (2014) have recently

demonstrated that nearly 20% of self-identified conservatives are actually libertarians and warned researchers regarding the perils of using the unidimensional conceptualization of political orientation (see also Talhelm et al. 2015). Although we were unable to find a rigorous estimate, the 20% estimate is similar to surveys that have estimated that 17–23% of the US population identifies as libertarian (Boaz and Kirby 2006). In addition, libertarians score higher on the CRT than liberals and conservatives (Iyer et al. 2012). Knowledge of these two tendencies alone is enough to conclude that most previous tests of the relationship between CRT and political orientation lack sufficient clarity to highlight differences between liberals and (non-libertarian) conservatives.

To test these ideas, we examined the raw data of the previous samples that reported mixed findings (e.g., Deppe et al. 2015; Kahan 2013; Landy 2016). Unfortunately, none seemed to have given participants the option to identify as libertarian. If this had been the case, it would have been possible to re-analyze those data by excluding libertarians to obtain a clearer picture of the differences in ACS between liberals and conservatives.

Thus, we investigated the reason for mixed evidence concerning the relationship between CRT and political orientation in previous research with a novel and large ( $n = 8648$ ) web-based sample from [YourMorals.org](http://YourMorals.org) and compared estimates of the relation between economic (and social) conservatism and ACS when self-identified libertarians were excluded versus included.

## Method

### Participants

The analyses are based on data from 10,526 participants who were recruited via [YourMorals.org](http://YourMorals.org), an online data collection platform.<sup>1</sup> Participants from outside the U.S.A. were excluded from analyses. This resulted in 8648 participants (Mean age = 43.09,  $SD = 16.67$ , 3118 female, 5529 male, 1 missing).

### Materials and Procedure

Participants were recruited through an online platform ([YourMorals.org](http://YourMorals.org); see Iyer et al. 2012 for details). Participants had already provided their basic demographics in order to be able to participate in the main studies offered through this website.

We operationalized ACS using the Cognitive Reflection Test (CRT, Frederick 2005). CRT is a test used frequently in the literature to measure cognitive style. The test consists of

<sup>1</sup> Approximately 95% of the current data was collected after Iyer et al. (2012) data had been collected. Thus, there is, at most, negligible overlap between the two datasets.

three different questions and the correct answer for each can be found through high-effort thought (see Pennycook and Ross 2016). For example, “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?” Producing the right answer to this question (5 cents) is facilitated by the tendency to think analytically. The correct responses given to the three questions were coded and summed for a total CRT-correct score.

Political self-identification was measured with the following question: “When it comes to politics, do you usually think of yourself as liberal, moderate, conservative, or something else?” Possible responses were “very liberal” (13.8%), “liberal” (25.5%), “somewhat liberal” (11.1%), “moderate/middle of the road” (9.3%), “somewhat conservative” (5.4%), “conservative” (9.4%), “very conservative” (4%), “don’t know/not political” (2.4%), “libertarian” (14%), “other” (4.4%). When we collapsed the liberal and conservative responses, 49.2% ( $n = 3569$ ) of participants selected one of the three liberal options, while 19.5% ( $n = 1417$ ) selected one of the three conservative options. We also asked their social and economic orientations with two questions on a 7-points scale from 1 (very liberal) to 7 (very conservative): “In general, how liberal (left-wing) or conservative (right-wing) are you on social/ economic issues?.”

## Results

### Main Analyses

We first tested ACS-political orientation relationship with the one-item social and economic conservatism questions (i.e., 1 = very liberal, 7 = very conservative). However, unlike previous studies, after reporting the whole dataset, we excluded non-liberal and non-conservative participants (i.e., “Libertarians,” “Don’t know/not political,” and “Other”). Table 1 shows the correlation among variables for the whole dataset, and Table 2 shows the correlations when the non-conservative and non-liberal participants were excluded. Although CRT and social conservatism were negatively

**Table 1** Correlations among variables in the whole dataset. Bolds are significant at  $p < .01$

	1	2	3	4	5	6
1- CRT	1	<b>-.069</b>	<b>.044</b>	<b>.217</b>	<b>-.072</b>	<b>.121</b>
2- Social conservatism		1	<b>.576</b>	<b>.148</b>	<b>.065</b>	-.014
3- Economic conservatism			1	<b>.216</b>	.015	-.009
4- Sex (1 = male)				1	-.014	.013
5- Age					1	.445
6- Education						1

**Table 2** Correlations among variables when non-conservative and non-liberal participants were excluded. Bolds are significant at  $p < .01$

	1	2	3	4	5	6
1- CRT	1	<b>-.071</b>	.003	<b>.209</b>	<b>-.066</b>	<b>.118</b>
2- Social conservatism		1	<b>.676</b>	<b>.165</b>	<b>.061</b>	-.015
3- Economic conservatism			1	<b>.177</b>	<b>.065</b>	.012
4- Sex (1 = male)				1	.002	.022
5- Age					1	.439
6- Education						1

correlated, the correlation coefficient is small [ $r(6,581) = -.069, p < .001$ ] in the whole dataset. When non-conservative and non-liberal participants were excluded, the result remained constant [ $r(5,361) = -.071, p < .001$ ], showing the robustness of this relation. We further used the Fisher  $r$ -to- $z$  transformation in order to be able to compare the magnitude of the crucial difference in correlations and found that correlations are not significantly different from each other ( $z = 0.11, p = .456$ ).

As expected, CRT and economic conservatism were positively, albeit weakly, correlated with each other [ $r(6,485) = .044, p < .001$ ] in the whole dataset. As predicted, when non-conservative and non-liberal participants were excluded, there was no relation between CRT and economic conservatism [ $r(5,286) = .003, p = .832$ ].<sup>2</sup> We used the Fisher  $r$ -to- $z$  transformation in order to be able to compare the magnitude of the crucial difference in correlations. As expected, correlations are significantly different from each other ( $z = 2.21, p = .014$ ). Thus, the results support our contention that the previous mixed findings on the relation between CRT and economic conservatism might be due to the presence of different proportions of libertarians in different samples.

To view this differently, we conducted two additional hierarchical regression analyses predicting social conservatism using CRT and economic conservatism and predicting economic conservatism using CRT and social conservatism. Our argument suggests that controlling for the other dimension of conservatism in this way should yield a stronger negative association between social conservatism and CRT and a stronger positive association between economic conservatism and CRT, respectively. In the first analysis predicting social

<sup>2</sup> It should be clear to the reader that because individuals who choose the options “don’t know/not political” or “other” refuse to identify as either liberal or conservative and hence, these groups also potentially confound tests of the relation between ACS and conservatism. However, since our theoretical argument focused specifically on libertarians, we also computed the correlation between social and economic conservatism and ACS excluding only libertarians (i.e., retaining the “don’t know/not political” and “other” groups in the data set). Compared to the correlation coefficients from the whole dataset, they lead to the same conclusions as reported in the text (social conservatism-CRT [ $r = -.071, p < .001$ ]; economic conservatism-CRT [ $r = .005, p = .689$ ]).

conservatism, CRT was entered first, followed by economic conservatism. The results showed that, in the first step, CRT ( $\beta = -.077, p < .001$ ) independently predicted social conservatism. But more importantly, in step 2, after controlling for the effect of economic conservatism ( $\beta = .563, p < .001$ ) CRT made a significant, and stronger, contribution ( $\beta = -.093, p < .001$ ). In the second analysis predicting economic conservatism, CRT was again entered first followed by social conservatism. The results showed that, in the first step, CRT ( $\beta = .028, p = .015$ ) independently predicted economic conservatism. But more importantly, in step 2, after controlling for the effect of social conservatism ( $\beta = .566, p < .001$ ) the CRT made a significant, and stronger, contribution ( $\beta = .072, p < .001$ ) in line with our argument.<sup>3</sup>

### ACS and Self-Identified Ideological Groups

We also investigated the differences in ACS and among self-identified ideological groups. Figure 1 shows that the average CRT score of libertarians was slightly higher than both liberals and conservatives.

As in Iyer et al. (2012) study, we combined three liberal and conservative options for ease of comparison. Figure 2 presents the mean CRT correct responses for liberals, conservatives, moderates, and libertarians. Libertarians ( $M = 2.09, SD = 1.04; 95\% CI [2.03, 2.15]$ ) scored higher than both liberals

( $M = 1.85, SD = 1.10; 95\% CI [1.81, 1.88]$ , Cohen's  $d = 0.22$ ), conservatives ( $M = 1.77, SD = 1.13; 95\% CI [1.71, 1.82]$ , Cohen's  $d = 0.29$ ), and moderates ( $M = 1.64, SD = 1.14; 95\% CI [1.56, 1.73]$ , Cohen's  $d = 0.41$ ). However, the difference between liberals and conservatives was negligible (Cohen's  $d = 0.07$ ) according to Cohen's (1988) criteria. These results suggest that libertarians think more analytically than any other ideological group and that the other groups do not tend to differ from each other. These findings also converge with the previous ones demonstrating that libertarians score higher in ACS than the other groups (Iyer et al. 2012; Pennycook and Rand 2018; Talhelm et al. 2015).

### Discussion

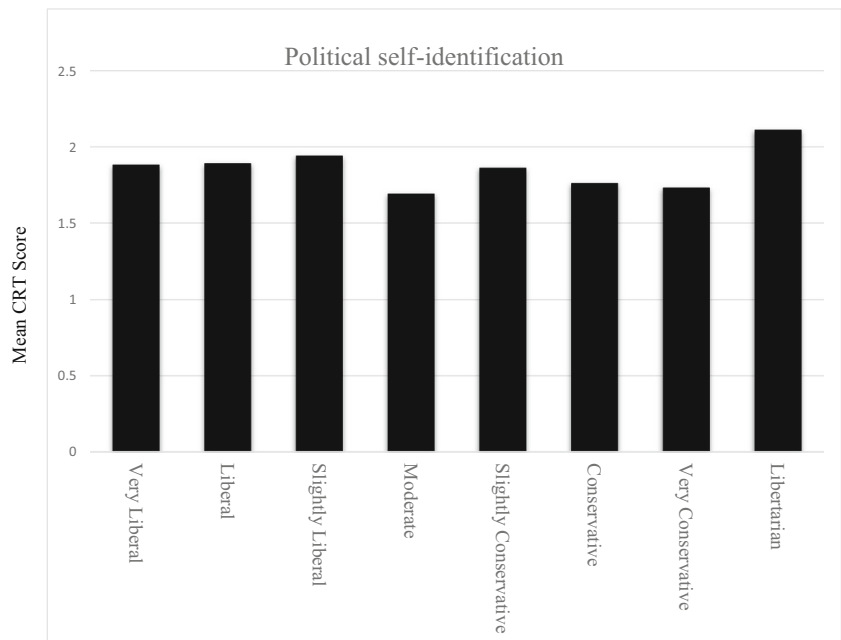
We argued that if a study includes a non-negligible proportion of libertarians and measures political orientation on the single-item self-placement scale, then it might produce misleading results regarding the relationship between cognitive style and economic conservatism. Specifically, such a procedure may produce misleading results because the libertarians tend to score relatively higher on both variables (i.e., ACS and economic conservatism) and they also tend to self-place toward the conservative end of the political spectrum (see Iyer et al. 2012; Talhelm et al. 2015). In other words, the existence of different proportions of libertarians might produce mixed findings across those samples. The current effort is a demonstration of the importance of considering political affiliation (e.g., libertarian) beyond self-placement on the liberal-conservative continuum and, specifically, of the utility of repeating analyses including and excluding libertarians.

The results suggested that the negative (but small) correlation between ACS and social conservatism holds whether libertarians (and other non-mainstream groups) are included or excluded. This is consistent with the previous literature showing that there is a negative correlation between social conservatism and ACS (Deppe et al. 2015; Saribay and Yilmaz 2017; Pennycook et al. 2012; Yilmaz and Saribay 2016, 2017b, 2018). This finding also supports the social orientation hypothesis suggesting that social political orientation is a better predictor of cognitive style differences than economic political orientation (Talhelm et al. 2015). However, our finding also suggests that this relation is weak.

On the other hand, the relation between ACS and economic conservatism differs depending on the inclusion versus exclusion of libertarians (and other non-mainstream groups). The positive correlation between CRT and economic conservatism in the whole dataset lost its significance and was reduced to virtually zero when the non-liberal and non-conservative participants were excluded. The results remained constant when we only excluded libertarian participants (instead of all non-liberals and non-conservatives including “Don't know/not

<sup>3</sup> As an alternative to these correlations and regression models, because the CRT data is a series of binary (correct vs. incorrect) responses, it could be analyzed as a binomial-linked generalized linear model (GLM; see analysis of the Triad Categorization Task in Talhelm 2018; and Talhelm et al. 2015). We conducted two such GLMs with CRT as outcome and social and economic conservatism as predictors; one for the whole sample and one excluding non-conservatives and non-liberals. In the whole sample, social conservatism was negatively related to CRT scores,  $B = -0.116, p < .00001$ ; and economic conservatism was positively related to CRT scores,  $B = 0.095, p < .00001$ . When non-conservatives and non-liberals were excluded, the results are similar: Social conservatism was negatively related to CRT scores,  $B = -0.107, p < .00001$ ; and economic conservatism was positively related to CRT scores,  $B = 0.073, p < .00001$ . An effect size in terms of correlation could be provided for these predictors by excluding the other predictor from the model and taking the square root of Nagelke's  $R^2$ . However, sample sizes should ideally be equal for these separate analyses with each predictor. Since this was not the case (due to different missing values on social and economic conservatism variables), we repeated these analyses for only the subset of participants who had complete values on both social and economic conservatism. The regression model coefficients were nearly identical to those reported above. For the whole sample, the correlation effect sizes were  $r = .091$  for social conservatism and  $r = .057$  for economic conservatism. For the subset excluding non-conservatives and non-liberals, they were  $r = .094$  for social conservatism and  $r = .002$  for economic conservatism. These results differ from those reported in the main body of the present article in that economic conservatism is related to CRT in both samples. Because most of the literature investigating these relations relies on regular correlations and regressions, rather than the binomial-linked GLM reported in this footnote, we emphasize the results in the main body: They still point out that the inferences made on the basis of correlations and regressions are influenced in important ways depending on the presence of participants of non-mainstream political conviction in the sample. However, these binomial-linked GLM results serve as a warning that inferences will also differ depending on the method of analysis employed.

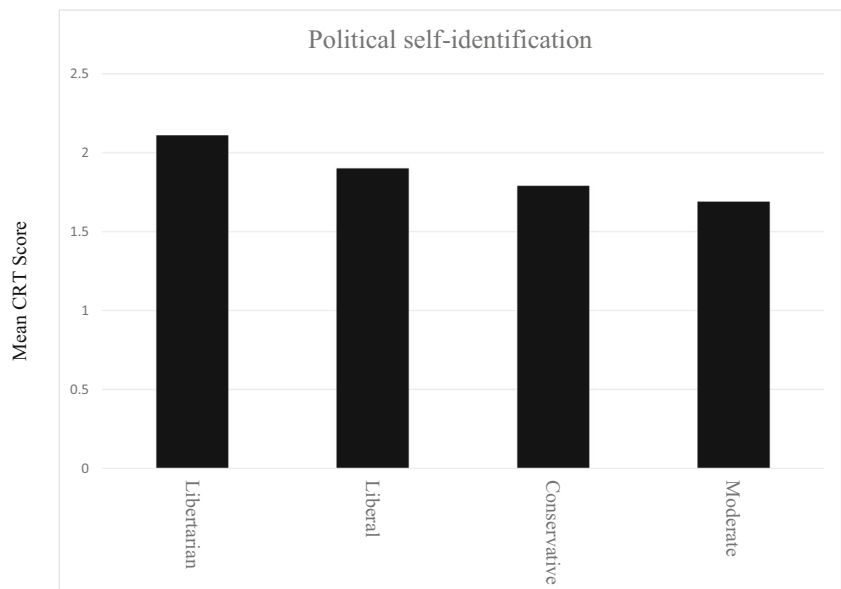
**Fig. 1** Mean CRT scores and political self-identification



political,” and “Other”). Thus, the current findings suggest that the presence of libertarians (and other non-mainstream groups) confounds the relation between ACS and economic conservatism. They clarify why previous findings regarding this relation were mixed. As noted earlier, some previous findings suggested a non-significant relation (Deppe et al. 2015; Pennycook et al. 2012; Yilmaz and Saribay 2016, 2017b), some others showed a negative relation (Sterling et al. 2016), and some others even showed a positive relation (e.g., one of four studies of Deppe et al. 2015). Jost et al. (2017) meta-analyzed these findings and showed a negative—albeit weak—correlation between ACS and

economic conservatism (unweighted average  $r = -.08$ ). Our contention that different proportions of libertarians might determine the direction and size of the correlation regarding ACS-economic conservatism relation is compatible with these findings since the Study 2 of Deppe et al. (2015), where the correlation between ACS and economic conservatism is positive, was arguably the most-representative sample of American population (see Baron 2015). Our results also replicated Iyer et al. (2012) previous finding that libertarians think more analytically than both liberals and conservatives, however, there were no such differences between self-reported liberals and conservatives.

**Fig. 2** Mean CRT scores and political self-identification





## Limitations and Future Directions

It must be noted that our ACS measure (CRT) has been widely criticized for measuring numeracy skills rather than high-effort thought (Sinayev and Peters 2015), as well as problems resulting from participants' increasing familiarity with it (Haigh 2016; Stieger and Reips 2016; but see Bialek and Pennycook 2017; Meyer et al. 2018; Pennycook and Ross 2016; Stagnaro, Pennycook and Rand 2018). In line with these criticisms, Yilmaz and Saribay (2017b) using three different ACS measures (CRT, CRT-2, base-rate conflict problems) found that while CRT-2 and base-rate conflict scores were significantly (and negatively) correlated with social (but not economic) conservatism and political orientation, CRT was not related to any of these conservatism measures. Thus, our results might also be influenced by the measurement biases of the CRT. However, using CRT in our study provided the advantage of making our results comparable to earlier research, which had also relied solely on CRT to measure ACS (e.g., Deppe et al. 2015; Iyer et al. 2012; Kahan 2013). Future research should test our hypotheses using alternative operationalization of ACS, such as the more verbally oriented CRT-2 (Thomson and Oppenheimer 2016).

The same study mentioned above Yilmaz and Saribay (2017b) also found that Actively Open-Minded Thinking (AOT), a measure of attitudes toward self-critical thinking, is more strongly (and negatively) related to social, economic, and general conservatism than other ACS measures. Baron et al. (2015) suggested that AOT measures a different type of cognitive style than CRT-type measurements (see also Baron 2017). While the CRT is generally defined as a desire to spend more time on a particular task in order to be able to give more accurate answers, the AOT is a measure of how much time a person will tend to take to hear opposing arguments and how open they will be to such arguments (see Baron 2017; see also Yilmaz and Saribay 2017b). Thus, cognitive style, represented by CRT-type measures, is generally related to how well one can justify his own position, while cognitive style, represented by AOT-type measures, is more related to how receptive one is to opposing arguments. Concordantly, Baron (2017) argues that political attitudes might be more related to latter type measures. Thus, comparing different ideologies on AOT-type measures in large samples are necessary in order to examine whether there really are cognitive style differences among different ideological groups.

Although we did not exactly use the single-item political orientation scale (i.e., ranging from 1 = liberal to 7 = conservative) in this study (since the survey administered at [YourMorals.org](http://YourMorals.org) did not include this question), the findings of the current study explicitly shows the limitation of the ubiquitous one-item political orientation question (cf., Jost 2006 and Iyer et al. (2012)). To exactly test the argument that

the presence of libertarians in the samples of previous studies explains mixed findings across those previous studies, one might directly look at whether the relationship of such single-item political orientation measure with ACS changes when libertarians are excluded from the analysis. It would be expected no relationship, or a weak negative relationship, when libertarians are included, and a much stronger negative relationship when they are excluded. To our knowledge, no study using both single item political orientation question and ACS has not asked the participants to self-place them as libertarians. Thus, future studies investigating differences between liberals and conservatives should take care to identify libertarians and also other political groups (such as African-Americans, who tend to be socially conservative, but also to vote for the Democratic Party) that have not been touched upon in the current study, and repeat analyses including (vs. excluding) these groups.

While it is not within the scope of this article, the question of why libertarians are more analytic thinkers than other ideological groups is a future research direction. Education level, AOT-type traits (i.e., flexible mindset), or weaker moral convictions (see Skitka 2010) might be related to libertarians' stronger ACS.

Although Iyer et al. (2012) previously detailed the main characteristics of self-identified libertarians, it must be noted that both Iyer et al. (2012) study and the current one were based on non-representative samples. In addition, since [YourMorals.org](http://YourMorals.org) does not pay participants, it is mostly comprised of a self-selected population of people who are curious about morality and psychology. Thus, we urge caution for generalizing these results to the American population. In addition, there is even a possibility that this selection procedure itself could result in correlation estimates that do not match the larger population. Given this limitation, we would like to point out that Moral Foundations Theory was advanced largely on the basis of data collected from [YourMorals.org](http://YourMorals.org). Subsequent standardization research with independent samples replicated the initial research with [YourMorals.org](http://YourMorals.org) samples. This suggests that the conclusions reached on the basis of data from [YourMorals.org](http://YourMorals.org) may converge with those reached on the basis of other samples. In any case, future research should investigate this question in representative samples.

## Conclusion

All in all, our results suggest that although there are some differences between liberals and conservatives in terms of their cognitive styles (see Eidelman et al. 2012; Iyer et al. 2012; Jost et al. 2017; Talhelm 2018, Van Hiel et al. 2010; Yilmaz and Saribay 2016, 2017a, 2017b, 2017c, 2018), this difference is very small when measuring ACS with CRT. To accurately capture such differences (or to accurately estimate

the relation of cognitive style to continuous measures of political views), researchers must take into account the presence of non-mainstream political groups in their samples. The main idea derived from the current findings is that the presence of undetected libertarians in research samples might help to explain mixed findings from prior work, but more direct tests of the current argument are warranted. Overall, there is a need for continued empirical research, especially with representative samples and using diverse operationalizations of both ACS and political ideology while considering the existence of different groups other than liberals and conservatives such as libertarians.

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### Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflict of interest.

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed Consent** Informed consent was obtained from all individual participants included in the study.

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