

The Changing Association Between Political Ideology and Closed-Mindedness: Left and Right Have Become More Alike

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Supplementary Materials: Materials [see [Index of Supplementary Materials](#)]



Abstract

Evidence suggests that politically right-leaning individuals are more likely to be closed-minded. Whether this association is inherent or subject to change has been the subject of debate, yet has not been formally tested. Through a meta-analysis, we find evidence of a changing association between conservatism and facets of closed-mindedness in the U.S. and international context using 341 unique samples, over 200,000 participants, and 920 estimates over 71 years. In the U.S., data ranging from 1948 to 2019 revealed a linear decline in the association between social conservatism (SC) and closed-mindedness, though economic conservatism (EC) did not vary in its association with closed-mindedness over time. Internationally across 18 countries, excluding the U.S., we observed a curvilinear decline in the association between SC and closed-mindedness over that same time, but no change in ECs association. We also tested variation over time for attitudinal measures of conservatism ranging between 1987 to 2018. In the U.S., we observed a linear increase in the association between right-wing authoritarianism (RWA) and closed-mindedness, with a similar linear increase in the association between social dominance orientation (SDO) and closed-mindedness. Internationally, there was a curvilinear increase in the association between RWA and closed-mindedness, but no change in the association with SDO. We discuss the changes to the political landscape that might explain our findings.

Keywords

political ideology, social cognition, closed-mindedness, meta-analysis

Non-Technical Summary

Background

Compared to liberals, conservatives tend to score higher on individual difference measures of closed-mindedness. That is, conservatives tend to describe themselves as less tolerant of uncertainty, more likely to rely on intuition rather than effortful thinking, and as avoiding rather than embracing change. Previously, scholars have argued that traditionalism and mainstream ideas have an inherent appeal to people who are more closed-minded. Conservatives often adopt a traditional stance on a host of issues, whereas liberals are more likely to embrace a non-traditional stance. That is, self-described differences between conservatives and liberals in closed-mindedness seem to demonstrate a preference for certain types of political beliefs.



Why was this study done?

We asked whether conservatives and liberals always differ in their self-reported closed-mindedness, or whether the size of this difference may have changed over time. We tested the hypothesis that the differences have increased against the hypothesis that the differences have shrunk in size. The hypothesis that difference would have increased is based on the observation that, across the world, the public has become more polarized, implying that liberals and conservatives have become more distinct on a host of political values and beliefs. If individual differences in closed-mindedness reflect a preference for matching values and beliefs, then we would expect conservatives and liberals to be more different today than they once were. The hypothesis that the difference between conservatives and liberals would have decreased is based on the notion that once liberal ideas have become much more mainstream; thus, embracing such beliefs may no longer reflect low closed-mindedness. At the same time, conservatism may no longer appeal mainly to people motivated to avoid uncertainty, effortful thinking, and change. Today's conservatives are more likely to present themselves as proponents of change than was once the case. Given these competing hypotheses, we wanted to test how differences in conservatives' and liberals' self-descriptions have evolved over time.

What did the researchers do and find?

We conducted a meta-analysis over a 71-year period (1948-2019). We obtained all data sets we could find (published or unpublished) that assessed the correlation between political conservatism-liberalism and various self-report measures of closed-mindedness. We found hundreds of such data sets, which we analyzed in various ways, with the bulk of the data coming from the U.S. In, and outside of, the U.S. we confirmed that conservatives score higher on self-reported closed-mindedness compared to liberals. However, in the U.S. we found that the originally modest-sized difference has been steadily declining since 1948, and by 2019 was very small. Across 18 non-U.S. countries, we found a different trajectory of change over time, but the differences between conservatives and liberals were the smallest by 2019. These conclusions primarily held for 1) social conservatism, but not economic conservatism, and 2) self-description of political identity, but not attitudinal measures of conservatism-liberalism.

What do these findings mean?

Especially in the U.S. liberals and conservatives have become more similar in their self-described closed-mindedness over time. Based on our data, we cannot say if liberals have become more or conservatives less closed-minded (or both). We also do not believe that the preference for mainstream ideas on the part of closed-minded individuals has changed. Rather, we suggest that the change in the shrinking differences between liberals and conservatives reflect a changing political environment and political messages as to which kinds of beliefs are seen as more mainstream.

Research on the association between closed-mindedness (CM) and political orientation has often assumed an inherent link between the two, such that higher CM orients people toward embracing conservatism. Based on a comprehensive meta-analysis, Jost et al. (2003) provided evidence for a motivated account of the so-called “rigidity of the right” hypothesis. The authors argued that the conservative emphasis on traditionalism and maintaining existing status hierarchies serves to appease the psychological needs of people who are dogmatic, intolerant of uncertainty and change, and rigid in their thinking. Thus, a positive correlation between CM and conservatism is dominant in the literature (Jost et al., 2003; Jost, 2017; van Hiel et al., 2010; van Hiel et al., 2016). However, there has long been criticism of the presumed linear relationship between conservatism and CM. Some scholars argued for a “rigidity of the extremes” hypothesis, according to which those at either end of the political spectrum are more intransigent and closed-minded than those in the political center (e.g., Greenberg & Jonas, 2003; Taylor, 1960). Others have argued that precisely those in the center are less cognitively flexible than those at the extremes (Sidanius, 1985). Yet, others have questioned the intellectual soundness of this type of analysis altogether (Martin, 2001).

Recently, Federico and Malka (2018) questioned why anyone would expect there to be an *inherent* link between conservatism and CM. Their research found that the association varies across issue domains (i.e., social versus economic conservatism) and cultural contexts (cf. Conway et al., 2016). Even if there is a typical pattern, Federico and Malka highlighted that this does not constitute evidence that a different constellation is not possible. Nevertheless, existing

meta-analyses on the association between conservatism and CM paint a rather stable pattern of a positive relationship across all points in time (e.g., van Hiel et al., 2010).

We explore the stability and variability of the association between facets of CM and political conservatism over time. We argue that two changes in the political landscape offer competing expectations as to the strengthening and weakening of the association. First, we highlight how a politically polarized public may now, more than ever, distinguish between conservative and liberal ideals and policies, making the “match” between a person’s cognitive needs and their political ideologies much stronger. To the extent that conservative ideology does appease closed-minded needs, a politically polarized public could indicate an *increase* in the correlation between CM and conservatism.

Alternatively, people with a closed-minded orientation tend to adhere closely to familiar and dominant norms of society. We highlight evidence and discourse in the U.S. suggesting that liberalism may be increasing in dominance and liberal ideals may be becoming much more normative. Thus, the orientation of conservatives (relative to liberals) on dimensions of traditionalism and maintaining the status quo may be shifting. This suggests that any latent affinity between conservatism and CM may be *decreasing* over time. We review each competing hypothesis below and test them in a series of meta-analyses.

The Motivated Account of Political Conservatism

Research supports the notion that political ideology is associated with cognitive styles or preferences. Jost and colleagues (2003) supported a motivated account of political conservatism based on meta-analytic tests (see also Jost, 2017; van Hiel et al., 2016). The motivated account assumes that people adopt ideological belief systems that correspond to their cognitive needs and motivations.

We focus here on “closed-mindedness” (e.g., Kruglanski, 2004), an encompassing term that refers to individual differences in socio-cognitive motivation measured by constructs such as intolerance of ambiguity, dogmatism, rigidity, and need for closure. Though the term “closed-mindedness” evokes negative associations, we acknowledge that being high on said dimensions is not inherently positive or negative in its consequences.¹ Yet, research generally shows that closed-minded individuals perceive ambiguous situations as threatening, avoid change in their beliefs and behaviors, and are motivated by cognitive clarity and simplicity (Berenbaum et al., 2008; Frenkel-Brunswik, 1949a, 1949b; Kruglanski, 1989; Webster & Kruglanski, 1994). As a result, people who are closed-minded utilize various behavioral and cognitive strategies to reduce ambiguity and increase perceived structure (Stanley Budner, 1962). We focus on the idea that people adopt ideological positions that correspond to their cognitive needs.

Why people are motivated to adopt a political identity has been the subject of some debate. Political scientists initially assumed that people adopt ideological positions that correspond to their issue stances (see Levitin & Miller, 1979). However, studies suggest that only a small segment of the public hold issue attitudes corresponding with their ideological identities (e.g., Klingemann, 1979; Levitin & Miller, 1979; RePass, 2008) and some even lack sophisticated knowledge of ideological issues altogether (Kinder & Kalmoe, 2017; Pew Research Center, 2012). Instead, the public appears to define their political identities on broad-based symbolic attitudes. The preservation of traditional values and existing status hierarchies is one symbolic attitude that lies at the heart of conservatism. Typically, it is referenced by support for capitalism, social control, and a commitment to the status quo (Conover & Feldman, 1981). In contrast, liberalism entails a preference for social change and a commitment to equality, which is referenced by a preference for progressive policies and a commitment to social reform. This is compatible with Jost et al.’s (2003) proposition that conservatism is characterized by *resistance to change* and *acceptance of inequality*.

The substantive difference between liberalism and conservatism is thought to be one of the major reasons why closed-minded individuals tend to prefer conservative over liberal ideals. One dimension of CM is the need for cognitive closure. People scoring high on this dimension are likely to seize and freeze on information over time; exhibiting a

1) Research by Dijksterhuis et al. (1996) argued that individuals high in need for closure effectively ignore information that does not jibe with preexisting expectations (see also Kruglanski et al., 1991; Webster & Kruglanski, 1994). However, Kemmelmeier (2015a) found that there are circumstances under which those high in need for structure are highly sensitive to information that is *incompatible* with prior beliefs. The author claimed that greater commitment to one’s preexisting expectations allowed people to be more likely to notice any discrepancies between evidence and prior expectations.

strong desire to maintain existing beliefs and circumstances while actively avoiding changes (Kruglanski et al., 2007; Webster & Kruglanski, 1994). These motivations are akin to the conservative valuation of maintaining norms and traditions (i.e., avoiding change). Similarly, need for cognition (NFC) is defined as a person's motivation to engage in effortful thought. People characterized as low in NFC tend to resist changing existing beliefs and attitudes (e.g., Haddock et al., 2008) and avoid new and unfamiliar experiences (Fleischhauer et al., 2010). Aversion to change has similarly characterized other psychological constructs like dogmatism (Johnson, 2010; Rokeach, 1960), intolerance of ambiguity and uncertainty (Bochner, 1965; Grenier et al., 2005), and psychological rigidity (Steinmetz et al., 2011). In support of this view, in a series of meta-analyses, Jost and colleagues (2003; Jost, 2017) showed that facets of CM predict political conservatism. According to these authors, individuals with a strong need to maintain a sense of security and certainty tend to prefer the political right due to its emphasis on stability and authority, whereas those with weaker needs to maintain security and minimize uncertainty tend to prefer the political left with its emphasis on change and creating equality.

Similarly, several studies have demonstrated a relationship between closed-mindedness and attitudinal correlates of political conservatism. Right-wing authoritarianism (RWA) and social dominance orientation (SDO) are thought to be highly emblematic of political conservatism's characterization of resistance to change and acceptance of inequality (Duckitt & Sibley, 2009). People high in RWA exhibit deference toward authority figures and conventional ideals, also relating to aggression toward social deviants (Altemeyer, 1981, 1998). Those high in SDO hold attitudes that legitimize inequality (Sidanius & Pratto, 1999). As might be expected, studies demonstrate positive relationships between closed-mindedness and RWA and SDO (e.g., Federico et al., 2014; Kugler et al., 2010; Roets & Van Hiel, 2006; Webster & Kruglanski, 1994).

It is also worth noting that social conservatism and economic conservatism reflect two different dimensions of ideological values and must be carefully distinguished (e.g., Crowson, 2009; Stenner, 2005, 2009). Economic attitudes reflect issues like social welfare and government spending/regulation, whereas social attitudes reflect issues such as abortion, same-sex marriage, and immigration. Although both issue domains are likely to map reasonably well on the more broad-based values that differentiate liberals from conservatives (i.e., resistance to change and acceptance of inequality), there may be less overlap between the dimensions than is often assumed (Feldman & Johnston, 2014). Researchers often find that in contrast to social conservatives, economic conservatives tend to be more open-minded in their respective views (Johnson & Tamney, 2001; see also van Hiel et al., 2004). We are interested in whether there is a change in the association between conservatism and closed-mindedness over time. In this regard, we are open to the possibility that the trajectory of change between social versus economic conservatism and CM may not mirror each other and, thus, must be examined separately.

Closed-Mindedness and Political Conservatism: Exploring Variation Over Time

Politics is an ever-changing institution. Yet, theorizing on the link between closed-mindedness and conservatism often assumes an *inherent* link and offers little in the form of the potential for a change in the relationship over time (Federico & Malka, 2018). We explore two possible sources of change in the political landscape that may contribute to variation in this often-cataloged association.

First, we consider the possibility that an increase in political polarization may have sharpened the distinction between liberalism, conservatism, and their attendant values, which should make it easier for a match between cognitive needs and political ideology to emerge. Thus, we would expect a strengthening of the association between conservatism and CM over time.

Alternatively, we consider the possibility that at some point conservatism may have been identified with stability and aversion to change. Yet, over time conservatives may have become increasingly advocates of change, and liberals the advocates of prevailing norms and values. Under this hypothesis, one would expect the association between conservatism and CM to have become weaker over time.

Political Polarization and Ideological Awareness: The Case for a Stronger Association

Communication from political leaders is theorized to be seminal in influencing political followers. For instance, from 2007 to 2015, U.S. citizens were largely supportive of a border wall between the U.S. and Mexico to reduce illegal border crossings. However, following Trump's 2016 election and signature campaign promise to build a border wall, support among Democrats fell sharply, but increased among Republicans (Ekins, 2019). Political events like this highlight the discursive nature of political ideology (e.g., Federico & Malka, 2018; Haslam et al., 2011; Jost et al., 2009); namely, the messages of political leaders are most influential in shaping followers' values and beliefs. The discursive nature of political ideology is a potential avenue through which the association between conservatism and closed-mindedness might be subject to change.

For people to be aware of the conservative orientation on traditional values and the liberal orientation on social change, they must receive these messages from the political information environment (Jost et al., 2009; Zaller, 1992). Political elites tend to package liberal and conservative ideals on the traditionalism-progressivism dimensions and are therefore responsible for determining how well each orientation suits individual psychological needs. Psychological needs (i.e., closed-mindedness) may bear little resemblance to the values or identities followers hold if political elites fail to communicate the values of their respective parties. In other words, closed-mindedness should be less predictive of a person's political orientation to the extent that messages about the values of liberals and conservatives are relatively ambiguous.

Research suggests that elite messages have been increasingly coherent with their political alignments. In the U.S., Democratic and Republican congressional officials have become more tightly aligned with their respective parties: Democrat leaders are more liberal than they ever have been in the past, and Republican leaders are more conservative (McCarty et al., 2006; Pew Research Center, 2014). This might suggest that the public is receiving clear and consistent cues as to the nature of their ideological orientation. Arguably, conservatism and liberalism present clear stances on traditional values, social change, inequality, adherence to authority, and specific social and political issues. In the past, evidence of elite coherence along party lines has not corresponded with greater coherence along party lines for the mass public (e.g., Jennings, 1992). However, more recent research suggests that elite polarization tends to correspond with polarization in the mass public (Druckman et al., 2013). As political elites have become more coherent in their issue stances and values, so too have political followers. If this is the case, then individuals with their own social-cognitive needs should have an easier time "sorting" themselves into conservative and liberal political camps; the consequence should be an increase in the correlation between self-reported political orientation and closed-mindedness.

Two caveats bear mentioning. Much of the research on political polarization focuses on the United States. Though polarization has been diagnosed in other countries as well (e.g., Alt & Lassen, 2006; Barisione, 2017; Lemennicier, 2005; Urman, 2020), political landscapes might be more complex relative to the U.S.'s two-party system. Moreover, research within the U.S. has supported evidence of affective polarization in the U.S. (Iyengar et al., 2019), but debates persist as to whether a cognitive polarization has occurred in the public (Abramowitz & Saunders, 2008; Fiorina & Abrams, 2008; Fiorina et al., 2005). That is, whereas conservatives and liberals express a higher level of dislike for their political opponents, few if any actual differences in ideological issue stances are observed. If this is the case, then political polarization may not be sufficient evidence for an increase in the association between closed-mindedness and conservatism.

Changing Ideological Norms: The Case for a Weaker Association

Political change can represent a source of uncertainty and hardship. How an individual responds to changes in the environment can vary as a function of their personal motivations. People with a closed-minded orientation generally resist changes in their environment and tend to prefer what is familiar (Kruglanski, 2004). In Western cultures, conservatism has long represented the traditional ideals of American society, which favor existing status hierarchies, obedience to authority, and maintaining traditional values. Put simply, conservatism has long resisted change in Western cultures (Federico & Malka, 2018).

Conservatism in other cultural contexts represents a different set of ideals. In post-communist countries, researchers have uncovered an association between facets of closed-mindedness and *left-wing* political attitudes (e.g., McFarland et al., 1992; Malka et al., 2014; see Federico & Malka, 2018 for review). These associations likely occurred as a function of the fall of communist regimes, when the introduction of market economies implied social change, with the consequence that attitudes favoring capitalism became associated with a liberal mindset. By comparison, in Western nations, the same types of attitudes favoring markets and capitalism have long been considered economically conservative. As a result, in post-communist societies, political elites cluster socially conservative issues with opposition to capitalism and free markets, viewpoints that are often associated with leftist views in the West. Conversely, post-communist societies associate socially liberal issues with support for capitalism and free markets—attitudes typically associated with right-leaning views in the West. Unlike in Western nations, market economics and capitalism represent uncertain and unfamiliar territory, whereas left-leaning politics with high levels of state involvement reflect established tradition and familiarity. As such, political liberalism tends to appeal to those highly motivated to seek out security and certainty in post-communist nations, but the opposite has been true in Western nations (see Malka et al., 2014).

In summary, the historical dominance of political ideals can impact their appeal to closed-minded people. Closed-minded individuals prefer what is familiar due in part to their desire to avoid change. The aforementioned research demonstrates how conservatism and liberalism may vary in their dominance across different cultural contexts. Yet, certain streams of research also suggest that the dominance of any ideology within a single culture can also change.

In “The Emerging Democratic Majority,” Judis and Teixeira (2004) predict a realignment of political power favoring Democrats in the U.S. They argue that shifts in U.S. demographics and institutions, including increasing racial and ethnic diversity, the gender voting gap, and the postindustrial economy all represent changes to U.S. culture that is likely to favor a Democratic majority. Several national polls appear to lend support to these notions, as shifts along ideological lines are becoming increasingly apparent. Since 1992 citizens have grown increasingly likely to describe themselves as liberal (Saad, 2019) and the majority now holds liberal views on issues like economic fairness, protecting the environment, and the influence of wealth on the government (even among Republicans) (Kellman & Swanson, 2017; Pew Research Center, 2017; Quinnipiac University Poll, 2017).

Even rhetoric among conservative leaders appears to echo these changes toward a Democratic majority. Rather than opposing change and endorsing the status quo, conservatives often present themselves as *anti*-status quo and committed to social change in the direction of a conservative vision. In the United States, this is illustrated by the “conservative revolution” of the mid-1990s, when House Speaker Newt Gingrich proposed a comprehensive change agenda labeled “Contract with America” (Gingrich et al., 1994). Similar calls for change were issued by right-wing movements in other countries (Travers, 2001). In other words, a central characteristic deemed to be at the heart of conservatism (resistance to change) may not necessarily apply. Instead, conservatives might be increasingly advocating for change, whereas liberals might be increasingly resisting change (e.g., by wanting to hang on to existing policies geared toward the protection of minorities or aimed at the reduction of inequality). This might imply a similar change in the socio-cognitive characteristics of liberals and conservatives. With the rising dominance of political liberalism and the calls for change echoed among conservative elites, people with a closed-minded orientation might be increasingly more likely to adopt a liberal, and increasingly less likely to adopt a conservative, ideology in the contemporary political context.

Linear Versus Curvilinear Change?

Above, we provide contrasting perspectives on the possibility of a weakening versus strengthening association between closed-mindedness and political orientation. Yet, we would be remiss to acknowledge that change does not have to occur monotonously in one direction. There may be periods when the association between closed-mindedness and conservatism/liberalism strengthened, whereas at other times it might have weakened again. Although we are unable to make any predictions as to when either type of development may have occurred, this study makes it a priority to not only test for linear change over time, but also allows for the possibility of curvilinear change.

The Present Study

The current research seeks to test two competing hypotheses regarding the relationship between closed-mindedness and political conservatism over time. Informed by the political development of political polarization in the United States, our first hypothesis suggests that the association between closed-mindedness and conservatism has increased over time. We contrast this with the prediction that, with the increasing dominance of liberal ideals in the United States, the association between closed-mindedness and conservatism has decreased over time. In doing so, we carefully distinguish measures of general/social conservatism and economic conservatism. Our focus is on self-descriptions of “conservative” or “liberal,” which have been the focus of most of the research on political orientation, among other things because such simple labels are the most potent predictors of worldviews and attitudes (e.g., Jost, 2006).

To examine the generality of any observed changes, we also track the changing association between conservatism and closed-mindedness across the world, i.e. in all other countries for which data are available. Moreover, because RWA and SDO seem to capture critical aspects of Jost et al.’s (2003) characterization of conservatism, we also examine to what extent the association between closed-mindedness and these constructs may have changed over time.

Method

Inclusion Criteria

The current meta-analysis focused on self-identified political ideology as an individual difference variable and sought to relate it to measures of closed-mindedness (e.g., Neuberg & Newsom, 1993; Webster & Kruglanski, 1994). In terms of the data included in the analysis, we applied several inclusion and exclusion criteria. First, we only included data that reported both political ideology and relevant measures of closed-mindedness. Second, we selected data that reported political identification (i.e. symbolic self-descriptions) on a left-right or conservatism-liberalism dimension and attitudinal measures of conservatism-liberalism (i.e., SDO and RWA). Studies that reported measures of self-reported political ideology and self-reported political attitudes were recruited for the analysis, though we also included party identification if parties could be located clearly on a liberal-conservative continuum (i.e., Democrat-Republican). In the analysis, we refer to measures of political ideology as social or economic conservatism; this assumes that higher scores on said measures indicate a conservative orientation and lower scores a liberal orientation. Finally, the current work focuses on a list of *self-report* measures of cognitive-motivational orientation or closed-mindedness, which previous research has found to be related to political ideology.

Locating Relevant Studies

We used a wide variety of search procedures. First, online searches were conducted for a variety of research domains, including psychology (PsycINFO, PsycARTICLES), sociology (ProQuest Sociology), political science (ProQuest Political Science), and dissertations (ProQuest Dissertations & Theses Global). Google Scholar was also utilized due to differences in proprietary algorithms compared to other databases. When searching for articles, several search term combinations were used. Because the current work requires that studies assess both political ideology and measures of closed-mindedness, terms and phrases associated with both kinds of measures were often searched simultaneously. Political ideology terms included words or phrases such as: political, conservative, liberal, Republican, Democrat, left-wing, right-wing, right-wing authoritarianism (RWA), and social dominance orientation (SDO); which were combined with socio-cognitive words or phrases such as need for cognition, intolerance of ambiguity, cognitive complexity, etc. In all, approximately 120 combinations of search terms and phrases were used when recruiting studies. Second, we sought data by extracting relevant studies from past meta-analyses, such as Jost et al. (2003), Jost (2017), and van Hiel et al. (2010). Lastly, to obtain unpublished data or learn about additional details of published data needed for our meta-analysis, we emailed authors and researchers in this general area.

Overall, our search produced 234 articles, book chapters, and datasets with 341 studies conducted between 1948 and 2019 (see Appendix A in the [Supplementary Materials](#) for a complete list of studies included in all parts of our

analyses). These yielded 920 coefficients (893 correlations and 27 mean differences), often because the same study included multiple measures of cognitive style. Coefficients pertained to samples from 20 different countries, though the majority of which (60%) were from the U.S. Where reported, the samples were primarily reported as college students or general adult populations, 55% of which were female with a mean age of 27.²

Coding of Individual Studies and Coefficients

One of the current authors extracted information from individual studies and datasets. Firstly, because of underlying differences between general (often “social conservatism”), economic conservatism, and attitudinal dimensions of political ideology, each was coded separately. Because the type of conservatism measured was stated explicitly, there was no ambiguity for coding purposes. We extracted a total of 116 coefficients pertaining to economic conservatism, 533 coefficients pertaining to general conservatism or some subtype of conservatism (i.e., social, cultural, moral, and religious), 173 pertaining to RWA, and 98 coefficients pertaining to SDO.³ All coefficients were converted to Pearson’s r .

Results

Because a large number of data points were from the United States, we decided to report results separately for the U.S. and all remaining countries. A combined analysis is reported as part of Appendix B (Supplementary Materials).

Method of Analysis

In our meta-analytical approach, we relied on the R package *metafor* (Viechtbauer, 2010). A challenge in our analysis was the fact that sometimes the same study yielded multiple coefficients (e.g., one relating political orientation to need for closure and one relating political orientation to dogmatism). Because these coefficients were generated based on the same sample, they were inherently interdependent. To account for this, we use a mixed-effects approach in which we modeled differences between samples using a random effect. By the same token, all coefficients relating political orientation to closed-mindedness variable A (e.g., need for cognition) must be expected to be more similar to each other than all coefficients relating political orientation to closed-mindedness variable B (e.g., need for closure). Again, because this renders coefficients *a priori* similar to each other, we modeled the specific type of closed-mindedness variable as another source of interdependence using another random effect. As a result, we generated a mixed-effects model in which each data point (association between political orientation and a closed-mindedness variable) was cross-classified as part of a random effect involving sample, and as part of a random effect involving the type of closed-mindedness variable involved.

Whereas the above approach was suitable for the U.S. data, in the analysis of international (non-U.S.) data, country of origin must be considered another source of interdependence. That is, two randomly chosen data points chosen from the same society can be assumed to be more similar to each other than two randomly chosen data points from two different societies. Because country represented another source of interdependence, this was also modeled as a random effect in a cross-classified model. However, because *metafor* allows for only two random effects to be modeled at the same time, we relied on a linear mixed model (R’s *lmer*) in the modeling of these meta-analytic data, such that in the resulting three-fold cross-classified mixed model each data point was weighted by the inverse of its sampling variance. However, not all random effects turned out to be equally important. Once we verified that the omission of one of three random effects did not alter the findings, we decided to report the *metafor* findings. Original *lmer* analyses are available upon request.

2) Countries (and total coefficients extracted) included: Australia ($k = 13$); Belgium ($k = 106$); Brazil ($k = 2$); Canada ($k = 58$); France ($k = 2$); Germany/Austria ($k = 16$); Hungary ($k = 9$); Ireland ($k = 4$); Israel ($k = 1$); Italy ($k = 23$); Netherlands ($k = 5$); New Zealand ($k = 7$); Peru ($k = 14$); Poland ($k = 36$); South Africa ($k = 12$); Sweden ($k = 32$); Turkey ($k = 4$); U.K. ($k = 36$); U.S. ($k = 540$).

3) In our analyses involving RWA, we only included coefficients based on a version of Altemeyer’s (1981, 1996) RWA scale. In our analyses involving SDO, we only included coefficients based on a version of the scales by Pratto et al. (1994) or Ho et al. (2015).

In all models, we tested to what extent there were differential associations between closed-mindedness and social and economic conservatism. We examined both linear and curvilinear (quadratic) change over time. To reduce collinearity between the linear and the curvilinear terms over time, we centered the time variable (e.g., Aiken et al., 1991). However, when testing curvilinear effects simple mean centering (i.e., centering on the average year when the data were collected) turned out to not be helpful. Because of the heavily skewed distribution as to when the majority of data included in this research had been collected, mean-centering did not remove the substantial correlation between the linear and quadratic terms for time. Because reducing collinearity is the central purpose of centering, instead of the mean, we centered on the year where the correlation between conservatism and closed-mindedness was at its peak. The peak value would minimize the correlation between the linear and quadratic terms when used as a centering point.

All analyses were carried out using Fisher Z -transformed correlations though we repeated analyses by using bias-corrected correlation coefficients (Olkin & Pratt, 1958). All analyses produced conceptually the same results; for ease of understanding, we also report the corresponding Pearson correlations.

Cognitive Correlates of Political Ideology: Relationship and Change Over Time

U.S. Analysis

For the U.S., correlations between social conservatism and economic conservatism, on the one hand, and closed-mindedness, on the other hand, were available from 1948 to 2019. An initial analysis revealed that, across all measures, types of conservatism, and years, the estimated z -coefficient was $r_z = .156$, 95% CI [.119, .193], corresponding to a Pearson correlation of $r = .155$. As could be expected, the data set on which this estimate was based was highly heterogeneous, $Q(df = 401) = 2429.75$, $p < .0001$. When we introduced type of conservatism (economic vs. social) as well as a linear effect of time as moderators, levels of heterogeneity were substantially reduced, though still high, $Q(df = 398) = 2347.53$, $p < .0001$, with our moderators accounting for some of the heterogeneity, $Q_M(df = 3) = 25.46$, $p < .0001$.

More important, there was a linear decrease in the strength of the association between social conservatism and closed-mindedness, $b = -.003$, 95% CI [-.005, -.002]. This implied that roughly every 40 months (i.e. three years and four months), the average z -coefficient dropped by .01. Put differently, approximately every year, whether someone is a conservative or a liberal explained less in the variability of the self-report measures of closed-mindedness. This decrease occurred slowly, such that the decreased variance explained of subsequent years only amounted to 98% of variance explained of the preceding year.

The interaction between type of conservatism and the linear trend over time was not reliable, $b = .0009$, 95% CI [-.0005, .0022]. This implied that, in 1948, at the beginning of the time period when data were available, the average correlation between closed-mindedness and social conservatism was an estimated $r_z = .251$, 95% CI [.165, .336], corresponding to Pearson correlation of $r = .246$. In 2019, the end of the time period for when data were available, the correlation estimate had dropped to $r_z = .154$, 95% CI [.110, .199], corresponding to a Pearson correlation of $r = .153$. The estimates for economic conservatism were $r_z = .169$, 95% CI [.094, .245] ($r = .167$) in 1948, and for 2019 (the last year for which data were available) $r_z = .089$, 95% CI [.046, .132] ($r = .089$).

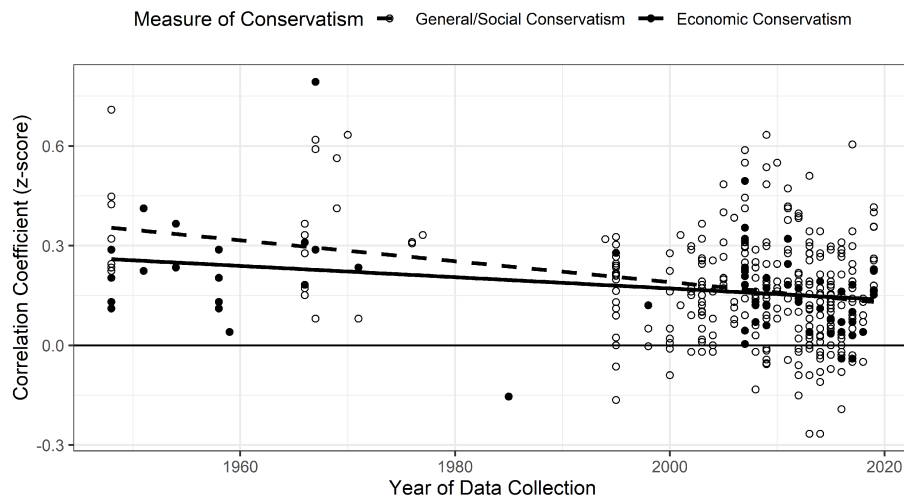
We also introduced a curvilinear term, which we allowed to interact with type of conservatism; however, neither this curvilinear trend itself nor its interaction with type of conservatism was statistically reliable.⁴ Hence, a linear trend seems to be the most parsimonious way to characterize the change in the size of correlations over time (see Figure 1).⁵

4) This conclusion was reached regardless of the year on which we centered—a necessary consequence of the fact that there was no discernible curvilinear trend in the data.

5) Instances where curvilinear trends were similarly excluded from models presented below indicate that their inclusion did not reliably improve our model estimates.

Figure 1

Association Between Conservatism/Liberalism and Closed-Mindedness, United States Only (1948-2019)



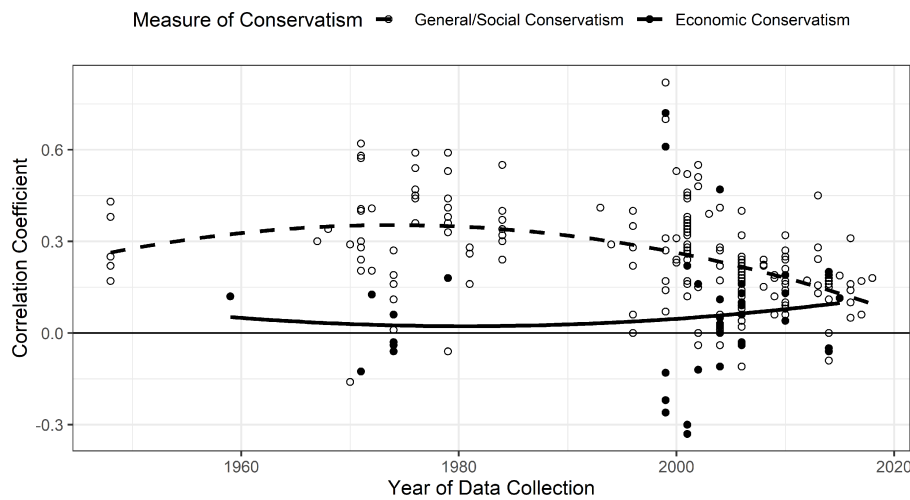
International Analysis (Without the U.S.)

Internationally, correlations between social conservatism and closed-mindedness were available from 1948 to 2019, though correlations between economic conservatism and closed-mindedness were available only from 1959 to 2015. The Year variable was centered on 1977, which was when the association between closed-mindedness and social conservatism was at its maximum. Across all measures, types of conservatism, and years, the average z -coefficient was $r_z = .212$, 95% CI [.144 .280] (Pearson $r = .209$). High levels of heterogeneity were once again observed, $Q(df = 244) = 2207.34$, $p < .0001$. When we introduced type of conservatism as well as a linear trend as moderator terms, heterogeneity was significantly reduced, $Q(df = 241) = 1617.69$, $p < .0001$, and moderators clearly accounted for some of this heterogeneity, $Q_M(df = 3) = 20.99$, $p = .0001$. However, when introducing a curvilinear term and its interaction with type of conservatism, heterogeneity was reduced further, $Q(df = 239) = 1530.29$, $p < .0001$, with $Q_M(df = 5) = 33.21$, $p < .0001$. A comparative test between the linear and the curvilinear model revealed the latter one to be superior, $-2LL = 197.36$ vs. vs. 190.78, likelihood ratio test ($df = 2$) = 6.59, $p = .037$. Once more, estimated z -coefficients for social conservatism were systematically higher than z -coefficient for economic conservatism, $b = .321$, 95% CI [.285, .417]. As summarized below in detail, at several points in time we observed changes in the association between closed-mindedness and social conservatism, but not in the association between closed-mindedness and economic conservatism.

At its peak in 1977, we observed a substantial correlation between closed-mindedness and social conservatism, $r_z = .351$, 95% CI [.285, .417], corresponding to a Pearson correlation of $r = .337$. Because we centered our Year variable at the peak of the association between the two variables, there was by definition no linear effect over time, $b = -.0000$, 95% CI [-0.003, .003], but we observed a significant quadratic trend, $b = -.0002$, 95% CI [-.0003, -.0000]. In 1948, at the beginning of the period when data were available, the average correlation between closed-mindedness and social conservatism was $r_z = .225$, 95% CI [.058, .392] (Pearson correlation $r = .221$). In 2018, the end of the period for when data were available, the correlation estimate had dropped to $r_z = .084$, 95% CI [-.0001, .169] (Pearson $r = .084$) and failed to reach significance. The last time the estimate was roughly at the 1948 level was in 2006 when $r_z = .224$, 95% CI [.177, .270] (Pearson $r = .220$); however, between 2007 and 2018 the level of association declined steadily (see Figure 2).

Figure 2

Association Between Conservatism/Liberalism and Closed-Mindedness Across 18 Countries (Except the United States) (1948-2018)



The curvilinear estimate did not appear to differ significantly between social or economic measures of conservatism ($b = .0003$, 95% CI $[-.0001, .0006]$). However, in spite of the significant curvilinear trend for social conservatism (reported above), inspection of the quadratic term for economic conservatism revealed it to be non-significant ($b = -.001$, 95% CI $[-.012, .010]$). As readily apparent in Figure 2, the economic conservatism's concave trajectory over time was quite different, suggesting the interaction effect failed to reach conventional levels of statistical significance because of the paucity of available data. Regarding economic conservatism's association with closed-mindedness, in 1959 the average z -score correlation was $r_z = .094$, 95% CI $[-.234, .421]$ (Pearson $r = .094$), in 1977 was $r_z = .030$, 95% CI $[-.114, .174]$ (Pearson $r = .030$), and in 2015 jumped to $r_z = .169$, 95% CI $[.009, .328]$ (Pearson $r = .167$).

Cognitive Correlates of Attitudinal Measures of Ideology

We applied the same approach as applied to the measures of self-reported political ideology to the correlates of our attitudinal measures, RWA and SDO. Again, we provide separate analyses for the U.S. and the rest of the world, simply because the U.S. was again the single largest source of data. Tests of curvilinear trends were performed as well, but are only reported for non-U.S. data. In the U.S., curvilinear trends did not contribute to any model estimates and were excluded from analyses accordingly.

RWA

U.S. Analysis – Correlations between measures of closed-mindedness and RWA were available from 1995-2018. The Year variable used in this model was centered on its mean ($M = 2009$). The average z -coefficient across all years of available data was $r_z = .221$, 95% CI $[.211, .231]$ (Pearson $r = .217$). This model revealed significant heterogeneity $Q(df = 88) = 1125.06$, $p < .0001$. The inclusion of a linear and curvilinear trend as moderators in our model did reduce heterogeneity, $Q(df = 86) = 1105.67$, $p < .0001$, and this reduction was due in part to the inclusion of the moderator variables, $Q(df = 2) = 19.39$, $p < .0001$. In keeping with this observation, there was evidence of a linear change in the association over time ($b = .002$, 95% CI $[.0004, .004]$) and evidence of a curvilinear change ($b = .0006$, 95% CI $[.0003, .001]$). In 1995, the z -coefficient was at its peak, $r_z = .295$, 95% CI $[.236, .354]$ (Pearson $r = .287$). The association slightly decreased in 2009, the mean year of data collection, $r_z = .198$, 95% CI $[.183, .195]$ (Pearson $r = .195$). In 2019, the association nearly reached its peak correlation, $r_z = .284$, 95% CI $[.254, .315]$ (Pearson $r = .277$).

International Analysis (Without U.S.) — Outside of the U.S., correlations between closed-mindedness and RWA were available from 1987-2017. The year variable used in our model was centered on its mean ($M = 1996$), which also happened to be the weakest point of the association between RWA and closed-mindedness for this dataset. Across all years, the average z -coefficient was $r_z = .262$, 95% CI [.249 .275] (Pearson $r = .261$). Heterogeneity was determined to be meaningfully high for this estimate $Q(df = 89) = 1,468.41$, $p < .001$. The inclusion of a linear and curvilinear trend as moderators reduced heterogeneity, $Q(df = 87) = 1,444.52$, $p < .001$; indeed, the inclusion of moderators appeared to contribute to this reduction $Q(df = 2) = 23.90$, $p < .001$. The model suggested a linear change in the association between closed-mindedness and RWA ($b = .0045$, 95% CI [.002, .006]), but no evidence of a curvilinear change ($b = -.0001$, 95% CI [-.0004, .0001]). The association was small in 1987 ($r_z = .124$, 95% CI [.039 .209]; Pearson $r = .123$), then subsequently increased into 2006 ($r_z = .262$, 95% CI [.244 .280]; Pearson $r = .258$), and into 2017 increased in strength and reached its peak association ($r_z = .293$, 95% CI [.264 .322]; Pearson $r = .285$).

SDO

U.S. Analysis — Correlations between closed-mindedness and SDO were available from 1998-2018. Year of data collection was centered on 2011, the mean year of the available data. Across all years of available data, the average z -coefficient was $r_z = .097$, 95% CI [.085, .108] (Pearson $r = .097$). As before, this model revealed high levels of heterogeneity, $Q(df = 45) = 430.25$, $p < .0001$. Including a linear trend in the model reduced heterogeneity, $Q(df = 44) = 426.11$, $p < .0001$. The reduced heterogeneity was due to the inclusion of a linear moderator, $Q(df = 1) = 4.14$, $p < .0001$. Results suggested a linear increase in the association between SDO and closed-mindedness, $b = .002$, 95% CI [.0001, .0047]. In 1998, the z -coefficient was estimated at $r_z = .069$, 95% CI [.039 .098] (Pearson $r = .069$), with an increase into 2011 ($r_z = .100$, 95% CI [.088 .112]; Pearson $r = .100$) and subsequently into 2018 ($r_z = .117$, 95% CI [.094 .140]; Pearson $r = .116$).

International Analysis (Without U.S.) — Internationally, correlations were collected from 1996-2017. The Year variable was centered on 2008, the mean year of data collection. The average z -coefficient between closed-mindedness and SDO was $r_z = .143$, 95% CI [.125, .160] (Pearson $r = .142$) across all years of data collection. Again, there was a high level of heterogeneity, $Q(df = 51) = 198.54$, $p < .001$, which was not improved by the inclusion of a linear trend as a moderator, $Q(df = 46) = 198.01$, $p < .001$, which was non-significant, $b = .001$, 95% CI [-.002, .004], suggesting no change in the association over time. This corresponds to a non-significant increase from 1996 ($r_z = .131$, 95% CI [.095 .167]; Pearson $r = .130$), 2008 ($r_z = .143$, 95% CI [.126 .161]; Pearson $r = .142$), and 2017 ($r_z = .152$, 95% CI [.121 .184]; Pearson $r = .151$).

Discussion

Our meta-analytic findings indicate that the association between conservatism/liberalism and closed-mindedness has changed over time, such that it decreased in linear and non-linear ways from 1948 to 2019. In our U.S. subset, self-described socially liberal and self-described socially conservative individuals appear to have become more similar over time, as indicated by a decreasing correlation between conservatism and closed-mindedness. Note, however, that the correlation is still statistically reliable and positive, indicating a continued tendency for conservatives to be more closed-minded even when the strength of the association varies over time.

This finding supports the hypothesis of a weakening association, which argues that the rising strength of liberalism and rhetoric calling for change among conservative elites might be contributing to a weakening association over time. Our findings do not support the competing hypothesis that any increase in political polarization over time is paralleled by an increase in the association between closed-mindedness and conservatism. In other words, even though several scholars have documented an increasing polarization of U.S. society (e.g., Abramowitz & Saunders, 2005, 2008; Baldassarri & Gelman, 2008; Graham & Valdesolo, 2016), and this may imply an increased recognition of the substantive differences between liberalism and conservatism among the public, conservative identifiers do not appear to have

become more closed-minded over time relative to their liberal counterparts. The association has effectively decreased over the period we observed.

Instead, our findings are more likely the results of the increasing dominance of liberal ideals and changes in political discourse among conservative leaders that might not appeal to people with a closed-minded orientation. We note early on that people with a closed-minded cognitive style prefer familiar and dominant norms of society and prefer to avoid change in general (Berenbaum et al., 2008; Frenkel-Brunswik, 1949a, 1949b; Kruglanski, 1989; Webster & Kruglanski, 1994). National surveys continue to suggest that liberal ideologues are increasing in number (Saad, 2019) and many liberal ideals once considered deviant are becoming commonplace (Kellman & Swanson, 2017; Pew Research Center, 2017; Quinnipiac University Poll, 2017). Whereas social messages regarding social values once overwhelmingly favored conservative ideals, messages regarding liberal ideals may have increased in volume, and finding social circles where liberal ideals are the norm might have become easier. As a result, liberal ideals are no longer the source of psychological uncertainty they once were. Many of their ideals are now aimed at maintaining policies and values that have become commonplace, and thereby no longer require such a high degree of open-mindedness to endorse (at least not as high as has previously been the case).

Echoing these changes, conservative leaders in the U.S. have become increasingly vocal with their concerns regarding the changing social landscape. Conservatives now put forth change agendas aimed at reinvigorating social policy and values that once dominated (e.g., Azevedo et al., 2017; Gingrich et al., 1994; Margolis, 2020). In a related way, under the influence of various political movements, the meaning of conservatism may have shifted from merely maintaining the status quo to pursuing social change. This might appear initially incompatible with the idea of conservatism being committed to upholding traditional values. However, conservatives may feel that society has changed in ways that deviate from traditional values, requiring a movement to re-establish or create political change to uphold these conventional norms. Thus, while remaining committed to traditional values, conservative political messages may nevertheless be more invested in directional social change than they have been in the past. As a result of its emphasis on social change, conservatism might have become less appealing to certain cognitive motives, like closed-mindedness.

Note that our findings for conservatism-liberalism contrast with our findings obtained with regard to RWA and SDO: Whereas we did observe a linear decline in the association between closed-mindedness and self-described conservatism in the U.S., there was a simultaneous *increase* in the association between closed-mindedness and both RWA and SDO. The latter pattern is generally consistent with our polarization hypothesis, namely, the idea that increases in the divisions in the political landscapes, especially in the U.S., should have produced an alignment between individual dispositions toward closed-mindedness and ideological beliefs. Our findings for RWA and SDO seem to support this idea, even when findings for symbolic self-description as conservative or liberal do not.

This, however, seems to produce a contradiction. Both RWA and SDO are known correlates of conservatism-liberalism (e.g., Crowson et al., 2005; Sidanius et al., 1996), although there is research that occasionally treated them as *de facto* measures of the same dimension (e.g., Jost et al., 2003).⁶ Regardless, a critical difference between any symbolic self-placement on a conservatism-liberalism dimension (i.e. political identification) and the assessment of RWA and SDO is that the latter is based on attitudinal measures, that is, the endorsement or rejection of specific evaluative beliefs. By contrast, self-placements are much more flexible in terms of the specific beliefs and ideas on which individuals base any self-descriptions as “liberal” or “conservative.” We speculate that the increasing prevalence of liberal values may have prompted a stricter alignment between closed-mindedness and the types of beliefs captured by the RWA and SDO constructs. In an increasingly liberal society, attitudes even among right-leaning individuals regarding the endorsement of beliefs such as opposition to premarital sex (RWA), or opposition to group equality (SDO) might have declined. The consequence might have been that the continued endorsement of these very specific beliefs among

6) Along with other scholars, we view the use of RWA and SDO as measures of conservatism to be a conceptual error. Conservatism-liberalism is akin to the traditional left-right dimension, although not necessarily identical to it. By contrast, authoritarianism can exist on the left or the right, even the concept of left-wing authoritarianism has received wide-spread attention only recently (e.g., Conway et al., 2018; Conway & McFarland, 2019; Costello et al., 2022; van Hiel et al., 2006). RWA is also not empirically identical to conservatism (e.g., Crowson et al., 2005). Both RWA and SDO have been treated as correlates of conservatism (e.g., Sidanius & Pratto, 1993), and often reflect some tendencies of liberalism-conservatism, even when they remain conceptually and empirically distinct (e.g., Wilson & Sibley, 2013). Moreover, even when they are correlated, RWA and SDO are themselves distinct enough to defy their use as measures of the same underlying construct (e.g., Duckitt, 2001; Kimmelmeier, 2015b; Sinn & Hayes, 2018).

some conservatives is tied to a relatively high level of closed-mindedness. Even as closed-mindedness might have decreased overall among conservatives (especially relative to liberals), a subgroup of conservatives, presumably high in closed-mindedness might continue to endorse them, especially if they are embedded in social networks where such beliefs dominate (cf. Bakshy et al., 2015; Motyl et al., 2014). Simultaneously, the specific beliefs captured by the SDO and RWA scales may have become less central for people's self-descriptions as either conservative or liberal. Therefore, the correlation between closed-mindedness and RWA and SDO might have *increased*, while at the same time the correlation with self-descriptions as conservative or liberal might have *decreased*. Unfortunately, the present meta-analytic data do not allow us to submit this tentative account to an empirical examination. Such a test would require, among other things, an examination of long-term changes in SDO and RWA levels, rather than merely their correlations with closed-mindedness, as well as their correlation with self-placements in terms of liberalism-conservatism. We also hasten to add that the period for which data were available for SDO and RWA may not have been long enough to capture the same long-term trends as was the case for political self-descriptions. This is largely a function of SDO measures not being available before the 1990s, and the RWA measure not being available before the 1980s.

Notably, findings based on data from outside the U.S. were quite different. Outside the U.S. the association between closed-mindedness and social conservatism varied over time in a *curvilinear* fashion, such that it increased from the late 1940s to the mid-1970s, only to decline again into the 21st century. It is difficult to interpret this combined international analysis since the nationality of samples in the early part of the examination period (when the curve was on the upswing) may have differed from the nationality of samples in the latter part (when the curve was on the descent). To examine this possibility, we counted how many countries contributed samples to our international data set before 1985, the beginning of a period without any data, and after 1992, the end of this period. We found that, whereas before 1985 data came from only five countries (Australia, Germany, New Zealand, Sweden, U.K.), only two countries (Germany, U.K.) contributed data both before 1985 and after 1992, with 11 countries having provided data only for the latter period.⁷ In other words, we cannot exclude the possibility that the curvilinear trend we discerned in our international data reflects the different compositions of our samples during different periods.⁸ However, the present data do at least point to the possibility that changes similar to those observed for our U.S. data may have also occurred elsewhere in the world.

Our results for U.S. and non-U.S. data were also somewhat different for measures of RWA and SDO. In the U.S., we observed a curvilinear increase in the association between RWA and closed-mindedness. Internationally, there was support for a linear increase. Notably, the difference in the correlations was largest at the earliest point for which data was collected (1995 for the U.S., and 1987 internationally). In addition, whereas in the U.S. there was evidence of a linear increase in the association between SDO and closed-mindedness, no change emerged for our international data. Again, we cannot exclude that the observed change merely reflects an imbalance of the data from different countries. As with any investigation of the association between conservatism and closed-mindedness, the hope is that, over time, additional data will become available, which allows us to investigate such changes over time in countries other than the U.S. At the very minimum, the observed patterns (i.e. over-time decline for symbolic self-placements in the U.S., but an increase for RWA; curvilinear over-time changes for symbolic self-placements in our international data, paired with an increase for RWA) point to the possible existence of distinct causal processes that do shape the association between closed-mindedness and measures of symbolic (or self-report measures) of political orientation, on the one hand, and attitudinal measures of ideology, on the other hand.

Lastly, the current findings partially support underlying differences between economic and social conservatism and their association with closed-mindedness. Whereas we observed temporal changes in the association between social conservatism and closed-mindedness, at least in the U.S., comparable changes in the association between economic conservatism and closed-mindedness were never observed, neither in our U.S. data nor our international data.

7) Separate analyses over time for Germany and the U.K. were not carried out because Germany only contributed 12 pre-1985 data points, and a single post-1992 data point, with the corresponding numbers for the U.K. being 24 and 6.

8) Because of the 1985-1992 gap in available data, Appendix C (Supplementary Materials) reports separate analyses for pre-1985 and post-1992 data.

Limitations

Like any empirical study, our meta-analysis suffers from various limitations. The file-drawer problem (Rosenthal, 1979), that is, the issue of inaccessible research, is always a challenge to any research synthesis, simply because the omission of existing studies may distort the conclusions of any meta-analysis. This is only a serious problem to the extent that existing research from different periods was available to us unequally. For instance, if we did not have access to all or most older studies, whereas we had much more complete access to recent studies, our estimates of trends over time could be biased. We cannot know whether this occurred in the present investigation. However, there is little reason to believe that publication bias was more of a problem during some periods and less of a problem during others. Furthermore, past research differentiates between measures of closed-mindedness that are self-reported versus behaviorally measured. van Hiel et al. (2016) show that self-reported measures of cognitive style more strongly relate to right-wing political attitudes compared to behavioral measures of cognitive style. Because our analyses are based exclusively on self-reported measures of closed-mindedness, the results may need to be interpreted with caution. In other words, the linear and curvilinear changes in the relationships studied here may be due to the self-reported nature of the measures used; behavioral measures of closed-mindedness might result in weaker changes or no changes at all.

A thornier issue is the comparatively low availability of data in the mid-1980s in the association between closed-mindedness and conservative identities. We submit that research on closed-mindedness and political orientation did not seem to be particularly popular during this period as we had little trouble securing data from before and after the 1980s. We speculate that one reason for the paucity of data may be that the 1980s saw the emergence of a new construct, Right-Wing Authoritarianism (Altemeyer, 1981), with many researchers publishing research on the correlates of RWA rather than the correlates of liberalism-conservatism. RWA is correlated with conservatism but cannot by itself serve as an indicator of conservatism.

Conclusion

Previous assumptions about the link between conservatism and closed-mindedness must be treated with caution. Our findings do not contradict the notion, for instance, that closed-minded cognitive styles dispose individuals to gravitate more toward conservatism over liberalism (e.g. Block & Block, 2006). Nevertheless, we show that any link between the two may be variable over time. This suggests that there are likely social processes that moderate the extent to which political leanings map onto styles of reasoning and thought. Future research must elucidate the characteristics of these processes which connect individual personality with ideology.

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Supplementary Materials

The Supplementary Materials include all the Appendices referenced throughout the article. Appendix A contains the citations of the articles, books, and datasets used to produce our results. We also reported additional results in Appendix B, which includes the same analyses we report in our results section but reflects the two combined datasets (U.S. and International). Because we had a gap in our data between 1985-1992, Appendix C reports separate analyses for pre-1985 and post-1992 data (for access see [Index of Supplementary Materials](#) below).

Index of Supplementary Materials

Acosta, J., & Kemmelmeier, M. (2022). *Supplementary materials to "The changing association between political ideology and closed-mindedness: Left and right have become more alike"* [Appendices]. *PsychOpen GOLD*. <https://doi.org/10.23668/psycharchives.8218>

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