The role of cognitive rigidity in political ideologies: theory, evidence, and future directions
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A contentious debate in political psychology has centred on the role of cognitive rigidity in shaping individuals’ political ideologies and worldviews. Early theories in the 1950s posited that strict ideological doctrines may tend to attract individuals with dispositions towards mental rigidity. This question has persisted: Does psychological rigidity foster a tendency towards ideological extremism? This review evaluates the empirical landscape with respect to the rigidity-of-the-extreme and the rigidity-of-the-right hypotheses and offers conceptual and methodological recommendations for future research avenues. The evidence suggests that cognitive rigidity is linked to ideological extremism, partisanship, and dogmatism across political and non-political ideologies. Advances in the measurement of ideological extremity and cognitive rigidity will facilitate further elucidation regarding how exactly the two hypotheses may be reconciled and why they have been historically placed in a potentially false competition. This synthesis suggests that a scientifically rigorous understanding of the cognitive roots of ideological thinking may be essential for developing effective antidotes to intolerance and intergroup hostility.

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Since the 1950s when this hypothesis was first articulated, political psychologists have elaborated two main interpretations. The first, famously called the rigidity-of-the-right hypothesis, suggested that individuals on the political right are characterized by heightened cognitive and perceptual rigidity [1,3,4,5,6]. The second, labelled the ideological extremity hypothesis (or sometimes, the rigidity-of-the-extreme), posited that rigidity was in fact associated with ideological extremism on both the political right and the political left (as well as other non-political ideologies), such that individuals on the extreme left may also be characterized by psychological rigidity [6–11]. Theoretically and empirically, these two hypotheses have been pitted against each other throughout the history of political psychology. Nonetheless, recent research indicates that perhaps the two can in fact be reconciled and constructively integrated.
the structure of political ideology, Settle et al. [59] identified that “partisanship is typically evaluated along two dimensions—the strength of reported partisan attachment and the direction of that attachment” (p. 601). From this perspective, the rigidity-of-the-right hypothesis is concerned primarily with partisan direction while the ideological extremity hypothesis focuses on the cognitive origins of partisan intensity or extremity, that is, the strength of a person’s partisan identity and attachment [12]. Consequently, in order to mitigate between these hypotheses, it is essential to adopt measurement tools that directly and separately tap into partisan direction and ideological extremity such that the elusive rigidity-of-the-left can also become manifest if it exists.

In the early days of political psychology, there were inadequate means of rigorously defining, operationalizing, and measuring cognitive rigidity. Modern cognitive psychology and the advent of technological advances in cognitive testing are now filling in these gaps. The neuropsychological literature presently defines cognitive rigidity as the inability to adapt to novel or changing environments and a difficulty to switch between modes of thinking [13]. It has been illustrated that individuals differ in their cognitive rigidity [14,15], and so it is possible to quantify the extent to which individuals tend to persist with previously established rules, mental heuristics, or behavioural patterns using neuropsychological tasks [16]. In these tasks, performance is measured via participants’ accuracy rates, reaction times, or the number and variety of provided responses to open-ended problems. These cognitive methodologies differ markedly from alternative tools in social psychology used to measure psychological dispositions, such as self-report questionnaires, which can often confound social desirability and self-awareness biases. Given the different measurement approaches, self-report questionnaires that have typically been used to quantify inflexibility are likely to tap into a different set of psychological processes associated with self-perceived need for certainty, closure, and stability (i.e. conscious motivations) or social orientations towards empathy or tolerance rather than implicit cognitive dispositions in terms of the individual deals with changing environments or ambiguous stimuli (see [17**] for a discussion on this). It is therefore essential to evaluate the state of the empirical evidence with sensitivity towards the methodologies employed to operationalize cognitive rigidity and flexibility.

**Empirical evidence**

The empirical landscape reflects two primary lines of research that address the relationship between cognitive rigidity and political ideologies: (1) evidence in favour of the rigidity-of-the-right hypothesis, and (2) evidence in favour of the ideological extremity hypothesis. The rigidity-of-the-right hypothesis has been the main focus of empirical studies and meta-analyses conducted over the past 15 years. These studies tend to operationalize right-wing political attitudes on a 7-point or 9-point Likert scale with the end points ‘strongly liberal’ and ‘strongly conservative’ on either end, or by administering variants of the fascism F-scale inspired by Adorno and colleagues’ *The Authoritarian Personality* (1950). The findings have demonstrated that right-wing political attitudes are positively correlated with psychological rigidity (e.g. [18*]; for meta-analyses see: [3,4,19,2**20]), with large and significant effect sizes [5**]. The hypothesis is especially corroborated when rigidity is quantified with self-report questionnaires rather than behavioural measures [2**].

Indeed, when new studies have employed behavioural paradigms that quantify cognitive inflexibility in accordance with the neuropsychological literature, a more nuanced picture has emerged in support of the ideological extremity hypothesis. These cognitively oriented studies have acknowledged the need to measure ideological extremity directly and appropriately. Past research has often relied on scales of political conservatism as a proxy for extremism (by considering those who self-report as ‘strongly liberal’ and ‘strongly conservative’ as ‘extreme’; e.g. [21,22]). This is potentially misleading because it can confound partisan direction with extremity, dogmatism, or allegiance to established doctrines; for instance, a self-professed ‘strongly liberal’ participant may be ‘extreme’ or could simply possess liberal views without necessarily being partisan or radical.

In a recent study of over 700 US citizens, Zmigrod et al. [17**] measured the strength of partisan identities using a continuous pictorial measure which allowed participants to indicate the level of identity fusion between their personal identities and the two prevailing political parties (Democratic and Republican Parties). Using three independent behavioural measures of cognitive rigidity from the neuropsychological literature, the analyses revealed a clear inverted-U shaped relationship between partisan intensity and flexibility: participants on the extreme left and extreme right displayed reduced cognitive flexibility on these three tests relative to moderates and those with only weak personal attachments to the political parties (see Figure 1). Consequently, when partisan strength is measured directly, rather than through measures that were designed to quantify political conservatism, it is possible to observe the elusive ‘rigidity-of-the-left’.

The main findings from Zmigrod et al.’s [17] study suggest that strong partisan intensity is related to reduced cognitive flexibility, regardless of the political party’s doctrine and partisan direction. This is consistent with research in other ideological domains demonstrating that objectively assessed cognitive inflexibility is related to greater ideological thinking in the realms of nationalism [18*], religiosity [58], extremist attitudes [24], and general dogmatism [23]. Across these studies, flexibility was
specifically implicated as a cognitive correlate of ideological attitudes, as opposed to other cognitive processes such as fluency, originality, or detail elaboration.

These studies expose additional subtleties to the ideological extremity hypothesis. For instance, in the context of religion, higher frequency of engagement with ideological rituals and institutions was linked to cognitive inflexibility amongst believers [58]. This raises valuable questions about causality: Does participation in ideological institutions shape cognitive flexibility? Or does cognitive inflexibility predispose individuals to engage with ideologies in a stronger and more passionate way? Additionally, in a separate study [24], cognitive rigidity was implicated in greater willingness to harm others and self-sacrifice in the name of an ideological group. Heightened conviction in one’s willingness to die for an ideological group was related to reduced flexibility on these cognitive tasks, illustrating that mental inflexibility may facilitate a tendency towards extremist views in contexts that are not overtly political but rather domain-general.

This set of studies illustrates the importance of quantifying ideological extremity and the strength of ideological identities in a rigorous fashion, and expanding the scope of analysis beyond the left-right political divide. Cognitive inflexibility may lend itself towards ideological extremity across multiple types of ideologies, supporting the ideological extremity hypothesis. The cognitively rigid mind may be more susceptible to the strictness, clarity, and categorical worldview which many doctrines espouse, while the cognitive flexible mind may be more likely to process socio-political arguments in a nuanced, non-categorical way that tolerates the ambiguities of social challenges (which ideological dogmas and movements rarely fully embody).

**Methodological challenges and future research avenues**

So how should we reconcile the evidence in favour of the rigidity-of-the-right and the ideological extremity hypotheses? There are two methodological axes that need to be addressed: (1) how researchers quantify cognitive flexibility and (2) how they operationalize ideology. Firstly, as noted above, political psychology has often measured cognitive flexibility and rigidity with self-report questionnaires rather than established cognitive tests, whereby the former possesses multiple limitations such as social desirability and self-awareness biases (for review see Ref. [25]). Different political communities may value

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**Figure 1**

Evidence in favour of the rigidity-of-the-extreme in a large sample (N = 743) across three measures of cognitive flexibility. Figure depicts the results of interrupted regression results. Political partisanship is operationalized as the amount of identity fusion with the Democratic Party (negative values) and Republican Party (positive values). The shaded area reflects nine confidence intervals. Reprinted with permission from Zmigrod et al. [17]*. RAT = Remote Associates Test. AUS = Alternative Uses Test (Flexibility index). WCST = Wisconsin Card Sorting Test.
flexibility and persistence to different degrees and so self-reports may be susceptible to these social biases. Indeed, it has been demonstrated that there are stable folk theories about the flexibility and rigidity of different political groups: Lasseter and Neel [26*] found that liberals are consistently perceived as more flexible than conservatives. Consequently, perceptions about one’s own and other political groups may shape how self-reports of flexibility are completed. Notably, Lasseter and Neel [26*] also found that greater ideological extremity was also associated with heightened perceived fixedness, showing that people do perceive a rigidity-of-the-extreme effect. Behavioural measures of rigidity will therefore allow researchers to de-confound self-reported perceptions and cognitive dispositions. Secondly, the studies above highlight that the operationalization and measurement of ideology influences the nature of the empirical findings. Relying solely on where participants indicate they lie on a spectrum of ‘strongly liberal’ to ‘strongly conservative’ is likely to tap into the content of their beliefs but not necessarily into how extremely these beliefs and identities are held. It is therefore essential to develop research designs that address both direction and intensity of political attitudes in order to allow the rigidity-of-the-extreme to surface clearly. Indeed, outside of the literature on cognitive rigidity, extremity effects are increasingly evident across a multitude of social and psychological domains (e.g. [27–30]; for a valuable discussion see Refs. [31,32]).

The emerging picture of the relationship between cognitive rigidity and ideological identities raises several future research directions. Longitudinal and experimental manipulation studies are necessary in order to address the question of causality — does ideological engagement facilitate cognitive inflexibility or is inflexibility a risk factor independently of environmental influences and ideological experiences? As noted above, the robustness of this line of inquiry is contingent on researchers’ willingness to develop methods to study ideological rigidity and fundamentalism in all their possible forms. Cross-cultural research designs and a systematic study of heterogeneous ideological movements are therefore necessary for future mitigation of these hypotheses (e.g. [33,34*]). New efforts to develop measures of left-wing authoritarianism [35,36] and prejudice [37–39] constitute a valuable step in de-confounding ideological extremity and conservatism.

From the cognitive methodology perspective, the studies discussed here are limited to particular subsets of cognitive tests, and so it will be valuable for future research to examine a broader range of cognitive flexibility tests such as task-switching paradigms and probabilistic reversal learning tests in order to generate a comprehensive picture of the facets of mental flexibility that are most relevant to ideology. Additionally, while the studies above have illustrated the specificity of flexibility — rather than general cognition [17*,24] — in shaping ideological worldviews, it will be important to clearly delineate the role of other relevant cognitive and perceptual processes as risk or resilience factors in the adoption of ideological worldviews. Researchers have considered the role of intuitive versus analytical cognitive style [40,41], cognitive sophistication [42], cognitive simplicity and complexity [43,44,45*,60]), cognitive ability [46,47], emotional abilities [61], logical reasoning [48], cognitive control [49–51], metacognition [52], and perceptual caution and evidence accumulation processes [53]. How do these tendencies and abilities interact with cognitive rigidity? Adopting a computational approach, in which the underlying cognitive computations are analysed, parameterized, and extracted will help political psychology develop greater explanatory power and depth [54*]. Indeed, Bayesian perspectives on the emergence of partisan bias may yield fruitful results about the origins of ideological hostility [55,56]. There is undoubtedly a large set of cognitive traits which may shape adoption of ideological worldviews and so there is a need to consider how rigidity relates and interacts with these other cognitive functions and processes.

**Conclusion**

At the infancy of political psychology in the 1940s and 1950s, social scientists already imagined that strict ethnocentric doctrines may tend to attract individuals with dispositions towards rigidity. Empirical advances in the 21st century have corroborated and added substantial nuance to these early theories. Recent research has shown that domain-general cognitive rigidity is positively related to ideological attitudes across a range of ideologies, including the political right, the political left, and even religion, nationalism, dogmatism, and intergroup attitudes. To navigate the complex terrain of plausible relationships between cognitive rigidity and political ideologies, scientists posited two primary competing hypotheses: the rigidity-of-the-right [3,5*] and the rigidity-of-the-extreme [8–11]. New findings now suggest that there can be a rigidity-of-the-right as well as rigidity-of-the-extreme, and the extent to which these become manifest in empirical studies depends on what features of political ideology are emphasized and how rigidity is measured. Future research will help to develop means of studying extremity in ideologies that are not necessarily right-wing in content but still possess dogmatic ideological features; this will facilitate more robust testing of the two hypotheses and conceptual integration.

At the end of her landmark paper, “Intolerance of Ambiguity as an Emotional and Perceptual Personality Variable” published 70 years ago in 1949, the pioneering psychologist Else Frenkel-Brunswik concludes that:
“There is more than an empirical affinity between the strength of hostility . . . and of rigid stereotyping, on the one hand, and the intolerance of ambiguity, on the other. There is a similar affinity between the orientation toward love . . . on the one hand, and a general flexibility on the other. The struggle between these two orientations is basic to our civilization, its individual members display these two patterns in varying proportions and changing configurations” ([57], p. 141).

The research summarized here speaks to Frenkel-Brunswik’s words in multiple ways. From an empirical perspective, it indeed appears that mental rigidity and intolerance of ambiguity are linked to intergroup hostility and ideological extremism, and that cognitive flexibility is associated with tolerance and acceptance of dissimilar others. From a societal perspective, acknowledging the essential tension between the rigidity-ideology and flexibility-tolerance dimensions as well as the fact that these are constantly in struggle within the individual and across history should inspire hope. Why hope? Because it is exactly in the plasticity and malleability of these orientations — and the study of their nature — that we can imagine and implement positive change to build more tolerant, loving, and creative societies.

Conflict of interest statement
Nothing declared.

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