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Intellectual humility and between-party animus: Implications for affective polarization in two community samples

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ABSTRACT

The extent to which individual differences in personality traits and cognitive styles diminish affective polarization (AP) is largely unknown. We address this gap by examining whether intellectual humility (IH) buffers against AP. We examined the associations between domain-general and domain-specific measures of IH, on the one hand, and AP, on the other, in two community samples. Measures of IH were robustly negatively associated with AP. Moreover, IH significantly incremented measures of allied constructs, including general humility, in the statistical prediction of AP. There was some evidence that IH buffered the relationships between strong political belief and AP. Future research is needed to clarify whether IH is sufficient to protect against AP in the presence of ideological extremity.

1. Introduction

In the current sociopolitical climate in the United States, there is a profound lack of respect, open-mindedness, and humility in across-the-aisle dialogue. Furthermore, this political polarization appears to be burgeoning in the American electorate (Druckman & Levendusky, 2019). Owing in part to increased party sorting, meaning that most Republicans are ideologically conservative and most Democrats are ideologically liberal, identity and ideology have become closely aligned, contributing to same-party loyalty and political polarization (Abramowitz & Saunders, 2006). Across-the-aisle conversations are often marked by antagonism, closed-mindedness to other viewpoints, and undue certainty.

Political polarization comprises two interrelated, albeit separable, components, namely affective polarization (AP) and ideological polarization (IP; Iyengar, Lelkes, Levendusky, Malhotra, & Westwood, 2019). AP refers to the tendency to perceive the opposing party as immoral and unlikable; IP, in contrast, operates at the level of policies and reflects the distance between partisans on specific issues and beliefs (Iyengar et al., 2019; Mason, 2015). Although most scholars agree that AP has recently increased, political science researchers disagree on the extent to which this trend extends to IP (Abramowitz & Saunders, 2008; Fiorina & Abrams, 2008). These debates notwithstanding, AP and IP are closely connected, and AP can probably contribute to increased IP, and vice-versa (Lelkes, 2018; Webster & Abramowitz, 2017).

Further, research indicates that AP has substantially increased since the 1970s, and these changes are due not to people feeling more favorable toward their own party but rather to people feeling more negative toward the opposite party (Iyengar et al., 2019; Iyengar, Sood, & Lelkes, 2012; Pew Research Center, 2017). Indeed, Americans now feel more negatively toward those in the opposite party than they do toward individuals of different races (e.g., African-American versus Caucasian individuals) and religions (e.g., Catholic versus Protestant individuals; Iyengar et al., 2012). Dovetailing with these findings, Americans have grown increasingly averse to the notion of their child marrying someone from the opposite political party, with 33%-50% of partisans feeling distressed by this idea (Iyengar et al., 2012). The deep and growing partisan divide exists not only among the most politically educated and engaged populations, but also among the population at large, although the divide may be largest in those who are the most politically knowledgeable (Kalmoe, 2020; Webster & Abramowitz, 2017). Survey data suggest that a sizeable minority of individuals perceive the opposing side as evil (~40% of Republicans and Democrats) and indicated that outgroup party members should be treated like non-human animals (~20% of Republicans and Democrats; Kalmoe & Mason, 2019).

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Still, our understanding of AP has been constrained by the fact that most research has focused on the relations between political variables (e.g., political engagement) and polarization, with scant research focusing on AP's dispositional causes and correlates. Thus, the extent to which stable individual differences in personality traits and cognitive styles foster or diminish AP is largely unknown. In the present study, we address this gap by examining how one poorly understood but recently researched individual difference variable, namely, intellectual humility (IH), may buffer against AP in its varied manifestations.

1.1. Intellectual humility

Although scholars have yet to reach a consensus has on the precise definition of IH, the elusive construct is often conceptualized as a metacognitive disposition marked by the recognition that one's beliefs may be fallible, accompanied by an appropriate attentiveness to limitations in the evidentiary basis for one's beliefs (e.g., Haggard et al., 2018). Accordingly, some researchers contend that IH "fundamentally reflects people's private assessments of their beliefs" (Leary et al., 2017, p. 793), and, as such, is primarily intrapersonal in nature. Consistent with these accounts, there is evidence that IH is related to individual differences in metacognitive abilities, such as enhanced recognition memory and intelligence (Danovitch, Fisher, Schroder, Hambrick, & Moser, 2019; Deffler, Leary, & Hoyle, 2016; Zmigrod, Zmigrod, Rentfrow, & Robbins, 2019). Although researchers adopting an intrapersonal approach to IH acknowledge that this construct bears important implications for interpersonal behaviors, they do not regard interpersonal qualities as part-and-parcel of it. For instance, Leary et al. (2017) sought to develop a self-report measure of IH that was independent from potential behavioral outcomes of IH, such as navigating disagreements respectfully. They adopted a more circumspect definition of IH focused almost exclusively on metacognitive processes.

In contrast with intrapersonal accounts of IH, some regard IH as "fundamentally relational in nature" (McElroy et al., 2014; p. 20). According to this and allied perspectives, IH comprises an ability to negotiate fairly, the capacity to be non-defensive in the face of disagreement, and a low concern for one's epistemic status relative to others. These researchers emphasize the interpersonal import of IH and tend to conceptualize it "as a trait that helps people predict how they will be treated by a target person" (McElroy et al., 2014; p. 20). These accounts of IH dovetail with the concept of *relational humility*, the propensity to be other-oriented as opposed to self-focused while also holding an accurate view of the self (Davis et al., 2010).

Still others conceptualize IH as a blend of intra- and interpersonal qualities (Alfano et al., 2017; Krumrei-Mancuso & Rouse, 2016; Porter & Schumann, 2018), positing that IH reflects qualities such as a willingness to consider new evidence, respond to disagreement without hostility, and take responsibility for one's limitations (Haggard et al., 2018). For instance, the *Comprehensive IH Scale* (Krumrei-Mancuso & Rouse, 2016) contains two subdimensions reflecting introspection, namely being willing to revise one's viewpoints and lacking intellectual overconfidence, and it also comprises two subdimensions reflecting interpersonal qualities, namely being able to interact with those on the opposite side non-defensively and respectfully.

Contributing to IH's definitional opacity, the nature and extent of IH's situational specificity remain unclear. Research suggests that IH is a relatively stable disposition over the course of a few months (Krumrei-Mancuso & Rouse, 2016). Moreover, features of IH, including an accurate self-assessment of one's knowledge coupled with an interpersonal readiness to ask questions when knowledge is lacking, can be reliably assessed in young children, suggesting that IH may be trait-like in nature (ages 6–8; Danovitch et al., 2019). Research also indicates, however, that IH can be manipulated, at least in the short-term (Porter & Schumann, 2018; Porter, Schumann, Selmeczy, & Trzesniewski, 2020), which is consistent with scholars who theorize that IH comprises both state and trait qualities. These scholars contend that even those who score highly on dispositional IH may hold beliefs that they are unlikely or unwilling to revise (Hoyle, Davisson, Diebels, & Leary, 2016). They maintain that IH can be reliably assessed in the context of a particular domain (e.g., politics) or issue (e.g., gun control). Accordingly, it may be preferable to assess IH at the level of a specific domain or individual belief in complement with domain-general measures; this approach might be used to detect individuals who score highly on a domain-general measure of IH but score low on a domain-specific measure of IH. For instance, some people may hold certain political views with great conviction, leading them to be less willing to consider alternative viewpoints and thus potentially contributing to lower self-reported politics-specific IH. Although these fractionations can occur, namely that one scores highly on a domain-general measure of IH but low on a domain-specific measure, these measures tend to be moderately to highly correlated at the group-level of analysis (*rs* ranging from 0.24 to 0.63; Hoyle et al., 2016).

1.2. Intellectual humility and affective polarization

Based on both intrapersonal and interpersonal accounts, IH should be related to reduced dogmatism, disrespect toward those with differing viewpoints, and overconfidence in one's beliefs. Thus, IH should temper AP given that AP is linked with partisan hostility and undue certainty in one's political opinions. Moreover, IH may be associated with reduced IP, as IH may temper ideological extremism at large. In the domain of religion, for instance, a plethora of studies indicate that IH is related to increased tolerance, forgiveness of those with opposing views, and decreased extremism (Hook et al., 2014; Hook et al., 2015; Hopkin, Hoyle, & Toner, 2014; Zhang et al., 2015). If IH comprises traits such as open-mindedness and respectfulness, then it should buffer against AP and IP. Indeed, IH is particularly important in domains characterized by strong commitment, as IH may propel individuals to seek truth rather than to defensively maintain their positions at all costs (e.g., Haggard et al., 2018; Hoyle et al., 2016).

Some research has examined the associations between IH and open-mindedness in the political domain. One study indicated that individuals high in IH were less likely to pejoratively characterize a politician as a "flip-flopper" for revising a viewpoint during an election (Leary et al., 2017). IH is also associated with characterizing political disagreements with individuals of the opposing party as respectful differences in opinion, even if the topics (e.g., capital punishment) were rated as "extremely important" to the participants; additionally, participants higher in IH were more open to the opposing perspective, and these associations remained statistically significant even after controlling for allied dispositions such as need for cognition and openness to experience (Porter & Schumann, 2018). In a recent study, political humility, measured as IH specifically about one's political views, was positively associated with identifying potential negative characteristics of one's own political perspective and positively associated with identifying potential positive characteristics of the opposing political perspective (Hodge, Hook, Van Tongeren, Davis, & McElroy-Heltzel, 2020). Dovetailing with these findings, self-reported political humility was associated with more forgiveness toward a political opponent who was hurtful in a political conflict; political humility also buffered against political commitment, which was associated with less forgiveness at the zero-order level of analysis, in statistically predicting forgiveness (Hodge, Mosher, et al., 2020). Taken

together, these results indicate that IH may be associated with both reduced IP and AP, perhaps vis-à-vis increased perspective-taking and respect.

On balance, the nomological networks of IH and political polarization overlap in several potentially informative areas. Research suggests that IH is positively associated with several cognitive styles, such as need for cognition, epistemic curiosity, and open-mindedness (Krumrei-Mancuso & Rouse, 2016; Porter & Schumann, 2018), that may in turn buffer against political polarization. On balance, IH is negatively associated with constructs reflecting needs for epistemic certainty, such as close-mindedness, need for closure, and dogmatism (Leary et al., 2017). Recent research also indicates that IH is associated with increased cognitive flexibility, and these correlations were primarily driven by the open-mindedness and respectfulness subdimensions of IH (Zmigrod et al., 2019). Constructs related to close-mindedness and cognitive inflexibility positively relate to political extremism on both the political left and right (e.g., van Prooijen & Krouwel, 2017). Relatedly, people perceive individuals who are politically extreme on both the political left and right as inflexible and fixed in their thinking (Lassetter & Neel, 2019). IH is also moderately positively associated with cognitive and affective empathy and the motivational value of benevolence; although these results are correlational, they suggest that IH may contribute to reduced polarization through increased empathic understanding toward those with opposing viewpoints (Krumrei-Mancuso, 2017). Additionally, IH is robustly positively associated with certain general personality traits, including honesty-humility, agreeableness, openness to experience, and conscientiousness (Krumrei-Mancuso & Rouse, 2016; Leary et al., 2017), that collectively may reduce risk for AP. Agreeableness, for example, was recently found to be negatively associated with AP in 5000 American community members, as agreeableness comprises features such as patience and forgivingness (Webster, 2018).

Nevertheless, research examining the links between IH and political polarization is in its infancy. Only one published study has examined the associations between IH and AP, which investigated levels of IH in conjunction with sociopolitical beliefs among American community members (Krumrei-Mancuso & Newman, 2020). The authors administered one widely used index of AP, a bipolar feeling thermometer assessing participants' warmth versus coldness toward Republicans and Democrats. The associations between IH and the feeling thermometer indices were negligible, and the authors interpreted these null relationships as indicating that IH was "not predictive of favoring one political party over the other" (p. 13). The authors controlled for numerous demographic variables, including political identification, as well as social desirability (which tends to be positively associated with agreeableness; Graziano & Tobin, 2001), potentially resulting in statistical overcontrol, and they did not report the direct (i.e., zero-order) relationships. When using self-report measures of heterogenous constructs, and IH is arguably heterogenous according to some scholars, it can be challenging to interpret results in terms of the original construct after controlling for relevant covariates. The nomological networks of heterogeneous constructs can change markedly after controlling for covariates, and it is not always clear whether the changes are substantively meaningful, bear on the original construct, and/or are primarily methodological in nature (e.g., statistical suppression; Lynam, Hoyle, & Newman, 2006). Thus, although it is important to assess whether the association between IH and AP remains robust after accounting for potentially important statistical confounds, understanding zero-order relations between IH and AP is at least equally important. To further probe the relationships between IH and political party favoritism, the authors examined whether IH buffered against the relationship between party identification and the feeling thermometer indices. They reported a statistically significant, albeit small, interaction between IH and party identification, such that relation between party identification and political party favoritism was attenuated in the presence of high IH (Krumrei-Mancuso & Newman, 2020). The authors argued that this interaction suggests that IH is associated with reduced AP.

In a recent study which has not been published as of this writing, Nadelhoffer and colleagues (2020) examined the zero-order correlations between domain-general and domain-specific IH, on the one hand, and indices of AP (e.g., difference score on feeling thermometer measures and a measure of partisan animosity), on the other, in two Mechanical Turk (MTurk) samples (*Ns* were 275 and 318). Domain-general IH was weakly negatively or negligibly associated with AP whereas domain-specific IH (politics, climate change, and immigration) was significantly negatively associated with AP. The authors speculated that domain-general IH may be insufficient in buffering against AP; nevertheless, they proposed that IH in the domain of politics may reduce the likelihood of AP via enhancing perceptions of political opponents as humble. Given the moderate to large correlations between measures of domain-specific and domain-general IH (Hoyle et al., 2016), it is perhaps surprising that only domain-specific IH manifested significant correlations with AP, so independent replication efforts are needed.

Additionally, Stanley, Sinclair, and Seli (2020) investigated the associations between domain-general IH and perceptions of (a) intelligence and (b) morality in those who hold opposing political positions. Across most assessed topics, IH was moderately associated with more favorable perceptions of political opponents' levels of intelligence and morality. Moreover, IH was associated with an increased willingness to be friends with people who hold opposing political views. Their results generalized to an ecologically valid paradigm using social media posts from a potential political opponent. Specifically, higher IH was associated with more favorable perceptions of the political opponent and a greater willingness to "friend" said individual on social media. Results across studies remained robust after controlling for demographic variables and political affiliation, and results were consistent across contentious (e.g., abortion) and less contentious (e.g., standardized testing in schools) topics. Their results indicate that IH is likely to be associated with decreased partisan hostility and AP broadly.

1.3. Current investigation

Although research has made important inroads in the relationship between IH and AP, there are important gaps in the literature that warrant empirical scrutiny. First, research examining the relationships between IH and partisan hostility in its varied manifestations is mixed. Some studies suggest that IH does not account for significant variance in AP after controlling for demographic and conceptual covariates (e.g., Krumrei-Mancuso & Newman, 2020) whereas others suggest that it does (e.g., Stanley et al., 2020). Moreover, the extent to which AP is associated with both domain-general and domain-specific IH is murky. The generalizability of IH's potential buffering effect against AP is also unclear. Studies have found that domain-specific IH protects against partisan hostility in the presence of risk factors for AP (Hodge, Mosher, et al., 2020; Krumrei-Mancuso & Newman, 2020), but whether these results generalize to domain-general measures remains unknown.

Further, no study on AP has simultaneously assessed multiple conceptualizations of IH. To that end, whether intrapersonal vs. interpersonal features of IH manifest differing or divergent relations with AP is unknown. By using multiple measures of IH rooted in diverse conceptualizations, we intend to statistically pit them against each other and ascertain whether one theoretical perspective is a more robust predictor of AP than others. For instance, if

measures assessing both intrapersonal and interpersonal aspects of IH are stronger negative correlates of AP than measures assessing the intrapersonal features in isolation, this finding may suggest that the intrapersonal features alone are not sufficient in reducing risk for AP. It is also important to evaluate whether domain-specific IH more strongly predicts AP than does domain-general IH. Although our studies are correlational, and necessarily do not directly address intervention-related questions, they may shed light on next steps for longitudinal research in this domain. For instance, if domain-specific IH accounts for more variance in AP than does domain-general IH, then efforts to increase IH and reduce AP may be most fruitful when focusing on situational IH. In sum, the "core" features of IH are still unclear, and the nomological network of IH may vary across measures in terms of the magnitude of statistical effects with theoretically related constructs. To these ends, our study was characterized by four broad aims.

1.3.1. Aim 1. Examining the zero-order correlations among multiple measures of IH and AP

The direct relationships between IH and AP and their generalizability across measures requires clarification. Thus, we used multiple measures of both IH and AP to examine the robustness of our results and elucidate whether certain conceptualizations of IH best predict AP compared with others. Based on research indicating that IH is associated with open-mindedness in the political domain and reduced partisan hostility (e.g., Stanley et al., 2020), we predicted that IH and AP would be moderately negatively associated. Our analyses comparing measures of IH in the statistical prediction of AP were exploratory.

1.3.2. Aim 2. Examining the zero-order correlations between IH and belief strength

In accordance with research suggesting that AP can increase ideological polarization (IP) and vice-versa, we investigated the associations between IH and IP. In addition, some research suggests that AP is most pronounced in those who hold the strongest political beliefs (Bougher, 2017). Therefore, we also examined the associations between IH and political belief strength. Scant research has examined the associations between IH and political belief strength, although preliminary research suggests that domain-specific IH is related to reduced political commitment (Hodge, Hook, et al., 2020; Hodge, Mosher, et al., 2020). Given that no research has assessed the associations between IH and political belief strength *per se,* these analyses were exploratory. Our analyses comparing measures of IH in the statistical prediction of belief strength were also exploratory.

1.3.3. Aim 3. Clarifying the specificity of these associations to IH

Previous research on IH and AP has not included measures of allied dispositions, such as general personality traits, so it is unclear whether the associations are specific to IH as opposed to related individual differences constructs. Accordingly, we examined the incremental validity of IH above-and-beyond general personality traits, dogmatism, and political belief strength in the statistical prediction of AP. As described earlier, IH is robustly linked with certain general personality traits (e.g., Davis et al., 2016; McElroy et al., 2014). Moreover, some scholars contend that IH is separable from general humility and other broadband personality traits, and research suggests that IH statistically increments general humility in predicting constructs such as open-minded thinking (Davis et al., 2016; Van Tongeren, Davis, Hook, & Witvliet, 2019). Given that certain personality traits, such as agreeableness (e.g., Webster, 2018), are also linked with AP, it will be important to clarify to what extent IH relates to AP after controlling for general personality traits. On balance, IH manifests large negative correlations with dogmatism (e.g., Leary et al., 2017) whereas dogmatism is positively linked with AP and political polarization broadly (e.g., Rollwage, Zmigrod, de-Wit, Dolan, & Fleming, 2019). As such, research is needed to clarify whether IH accounts for substantive variance in AP after controlling for IH's shared variance with dogmatism (reversed), and these analyses may further shed light on IH's definitional core. Finally, given suppositions that IH may be particularly important in the context of strong beliefs (e.g., Hoyle et al., 2016), we also controlled for political belief strength in the relationships between IH and AP. We hypothesized that IH would significantly increment measures of allied constructs in the statistical prediction of AP. Additionally, in order to replicate and extend existing research in this domain (Krumrei-Mancuso & Newman, 2020), we controlled for potentially important demographic confounds in the associations between IH and AP, including age, gender, educational attainment, income, race, and political identification.

1.3.4. Aim 4. Investigating whether IH statistically buffers against AP in the presence of strong political belief

We investigated the potential protective effects of IH in the presence of strong political belief. Consistent with existing research (Hodge, Mosher, et al., 2020; Krumrei-Mancuso & Newman, 2020), we hypothesized that IH would significantly protect against AP in the presence of strong political belief. Our analyses regarding the extent to which different measures and dimensions of IH protect against AP were exploratory.

2. Method

2.1. Participants

Participants were recruited using Amazon's Mechanical Turk (MTurk), a crowdsourcing platform through which community members participate in studies for monetary compensation. We intentionally recruited more than 400 participants to be have sufficient power to detect a medium effect size and conduct multiple tests (see Gignac & Szodorai, 2016). To address potential data quality concerns (Chmielewski & Kucker, 2019), participants were excluded (a) if they did not "click" the minimum number of times required on the consent page (e.g., 4 clicks were required on the consent page in order to go to the next page of the survey), (b) failed the attention check, (c) provided responses on open-ended or voting behavior questions that were highly illogical or improbable (e.g., a 27-year-old reportedly voted 60 times), and/or (c) manifested overly similar or inconsistent responses on the HEXACO PI-R (e.g., answering "4" across items, including reverse-coded items; Barends & de Vries, 2019). The attention check in the study asked participants to accurately track the perspective of a brief argument that either was in favor of or against a certain topic (e.g., stricter gun control). Participants were asked in a forced-choice question whether the author "agreed" or "disagreed" with the topic; participants failed this attention check if they selected the wrong answer. These methods were collectively used to screen out aberrant, inconsistent, or otherwise unusual patterns of responding. In addition, data from participants with missing cases on the IH and/or AP measures were removed, as we intended to fit confirmatory factor models to these measures.

2.1.1. Sample 1

The first sample ($N = 440$; $M_{age} = 39.54$, $SD_{age} = 12.29$) was primarily college-educated (39.5%), female (56.6%), and white (81.6%). The remainder of the sample was African-American (10.0%), Hispanic (5.5%), and Asian (4.8%). Most participants identified as Democratic (43.0%), followed by Republican (25.5%) and independent (24.1%). Regarding religious affiliation, most

identified as Christian (48.9%) followed by Agnostic (21.4) and Atheist (14.5%). Most participants earned an average annual income of $30,000-$39,999 (12.7%), followed by $60,000-$69,999 (12.3%) and $50-$59,999 (11.8%). Participants were compensated $5.25, and they were informed that it would take approximately 100 min to complete the survey on average. Participants were provided with 5 h total to complete the HIT, and they were informed of this time limit in the online consent document. Average time spent on the survey was approximately 96 min.

2.1.2. Sample 2

The second sample ($N = 405$; $M_{age} = 38.85$, $SD_{age} = 11.20$) was primarily college-educated (37.3%), female (52.8%), and white (74.3%). The remainder of the sample was African-American (16.5%), Hispanic (13.6%), and Asian (4.9%). Most participants identified as Democratic (39.0%), followed by Republican (30.3%) and independent (21.7%). Regarding religious affiliation, most identified as Christian (58.0%) followed by Atheist (16.3%) and Agnostic (15.8%). Most participants earned an average annual income of $40,000–$49,999 (13.8%), followed by $60–$69,999 (13.1%) and $50,000–$59,999 (12.8%). Participants were compensated $6.50, and they were informed that it would take approximately 60–75 min to complete the survey on average. Again, participants were provided with 5 h total to complete the HIT. Average time spent on the survey was approximately 98 min.

2.2. Measures

Participants completed an online battery of self-report measures.[1] Internal consistencies and descriptive statistics for each measure are presented in Table 1.

2.2.1. Intellectual Humility (IH)

Participants in both samples completed three self-report measures of IH: The *Comprehensive Intellectual Humility Scale* (CIHS; Krumrei-Mancuso & Rouse, 2016), *Leary Intellectual Humility Scale* (LIHS; Leary et al., 2017), and *Specific Intellectual Humility Scale* (SIHS; Hoyle et al., 2016). The CIHS is a 22-item self-report scale that measures four intercorrelated but separable dimensions of IH: Independence of Intellect and Ego, Openness to Revising One's Viewpoint, Respect for Others' Viewpoints, and Lack of Intellectual Overconfidence. Hierarchical factor analyses suggest that these four subdimensions load onto a general factor of IH (Krumrei-Mancuso & Rouse, 2016). Participants rated their agreement with each item on a 1 (*strongly disagree*) to 5 (*strongly agree*) Likert-type scale. The LIHS is a 6-item self-report measure of the metacognitive features of IH that yields a total score. Participants rated their agreement with each item on a 1 (*strongly disagree*) to 5 (*strongly agree*) Likert-type scale. Finally, the SIHS is a 9-item self-report measure of IH in a specific domain. In this study, we assessed participants' IH in the domain of politics. Participants rated their agreement with each item on a 1 (*not at all like me*) to 5 (*very much like me*) Likert-type scale.

2.2.2. Political identity

Participants in both samples selected the political party with which they most closely identify from a list of options (e.g., Republican, Democratic); they also had the option to write in their political party or indicate that they did not identify with any political party. In Sample 2, those who identified as independent were directed to a multiple-choice question: "Generally speaking, do you usually think of yourself as closer to a Republican or Democrat, if you had to choose?". Participants selected their answer from the following options: Republican (31.4%), Democrat (37.1%), Could not choose either (31.4%). Participants in both samples also indicated the extent to which they identified as liberal versus conservative on a 1 (*extremely liberal*) to 7 (*extremely conservative*) scale.

2.2.3. Affective Polarization (AP)

In both samples, participants rated the level of anger, contempt, disgust, and distress they experience when imagining an individual from the opposing party on a 0% (*not at all*) to 100% (*extremely*) scale; in Sample 2, participants also rated their level of fear (see Iyengar et al., 2019). These feeling thermometer items were positively intercorrelated (Sample 1 inter-item *rs* ranged from 0.82 to 0.88; Sample 2 inter-item *rs* ranged from 0.55 to 0.84). In both samples, participants indicated how upset, angry, and disgusted they would feel if a close family member married someone who belongs to the opposite political party on a 1 (*not at all to right*) to 7 (*extremely*) scale (Iyengar et al., 2012); in the second sample, participants additionally indicated their level of contempt and fear on the same scale. These feeling thermometer items were also positively intercorrelated (Sample 1 inter-item *rs* were all 0.86; Sample 2 inter-item *rs* ranged from 0.69 to 0.90).

In Sample 2, participants completed additional measures of AP, and participants were sorted into conditions based on their self-identified political party (participants who self-identified as belonging to the Republican party were sorted into rating perceptions of the Democratic party, and vice-versa). Participants completed a measure of moral disengagement (Kalmoe & Mason, 2019) on which they rated how immoral and threatening members of the opposite party are to the nation. The scale comprises 10-items, and participants rated their agreement with each item on a 1 (*completely disagree*) to 7 (*completely agree*) Likert-type scale. Participants also completed a measure of political adjectives to describe the average member of the opposite political party on a 1 (*not at all well*) to 7 (*extremely well*) Likert-type scale (see Sonnad, 2014; Supplemental Materials 1). The measure comprised 30-items, with 25 items reflecting insults (e.g., scum) and 5 items reflecting compliments (e.g., intelligent). Items were randomized to buffer against potential ordering effects. After reverse-coding the complementary adjectives, however, not all items were positively intercorrelated in both Republicans and Democrats. Thus, we removed the 5 items reflecting compliments, and the intercorrelations among the 25 insult items were subsequently positive in both Republicans and Democrats (Republican inter-item *rs* ranged from 0.25 to 0.89; Democrat inter-item *rs* ranged from 0.22 to 0.91).

2.2.4. Ideological polarization

Participants were asked if they had ever voted for a candidate in a different political party (selected "yes" or "no"); in addition, they indicated how much money it would take for them to vote for a candidate in a different political party now on a 1 (*$1 to 100*) to 15 (*no amount of money would persuade me*) Likert-type scale. In both samples, participants indicated how certain they were of their political beliefs and how strongly they hold their political beliefs on a 0% (*not at all*) to 100% (*extremely*) scale; in Sample 2, participants also rated how strongly they held their social and economic political beliefs on the same scale.

In Sample 2, participants rated how much they differ from the Republican and Democratic parties on a 1 (*essentially the same*) to 10 (*completely different*) Likert-type scale. The perceived distance from the Republican party and the Democratic party were standardized (inter-item $r = -0.60$), and the absolute value of the difference between these ratings was computed. Participants completed an adapted 20-item measure of their belief in certain

[1] Other individual differences measures (e.g., personality disorder traits) and cognitive/critical-thinking measures (e.g., an online intelligence test) were included in this dataset, but they were not analyzed as a part of this report. Results using these measures will be described elsewhere. This study was not pre-registered.

Table 1
Internal consistency statistics and descriptive statistics for study constructs.

	Cronbach's alpha		Mean (SD)	
	S1	S2	S1	S2
1. CIHS*	0.91	0.90	83.06 (12.95)	81.01 (12.71)
2. CIHS Ind. Int. Ego*	0.90	0.90	19.10 (4.81)	18.69 (4.83)
3. CIHS Open. Revise*	0.89	0.88	19.95 (3.75)	19.73 (3.75)
4. CIHS Resp. Other*	0.88	0.84	24.51 (4.08)	24.04 (4.04)
5. CIHS Lack Int. Over. *	0.83	0.83	19.50 (4.71)	18.55 (4.89)
2. LIHS*	0.89	0.84	23.47 (4.48)	31.59 (4.10)
3. SIHS*	0.92	0.90	31.73 (8.10)	31.59 (7.67)
4. AP Opposite*	0.96	0.92	162.49 (118.65)	201.75 (133.35)
5. AP Marriage*	0.95	0.95	6.47 (4.57)	10.99 (7.38)
6. Pol. Adj. Rep.[b]	–	0.97	–	91.93 (40.92)
7. Pol. Adj. Dem.[a]	–	0.98	–	95.10 (41.04)
8. Moral Dis. Rep.[b]	–	0.90	–	33.81 (13.60)
9. Moral Dis. Dem.[a]	–	0.91	–	36.21 (14.89)
10. Pol. Issues Rep.	–	0.87	–	126.17 (45.00)
11. Pol. Issues Dem.	–	0.79	–	160.14 (27.39)
12. HEXACO H	0.87	0.80	57.54 (11.83)	3.54 (0.77)
13. HEXACO E	0.86	0.80	51.56 (11.23)	3.17 (0.77)
14. HEXACO X	0.90	0.84	50.30 (12.15)	3.15 (0.82)
15. HEXACO A	0.88	0.81	50.49 (11.01)	3.31 (0.74)
16. HEXACO C	0.88	0.81	61.15 (10.29)	3.84 (0.67)
17. HEXACO O	0.85	0.79	56.66 (11.08)	3.59 (0.73)
18. Dogmatism	0.94	0.92	91.98 (31.27)	92.34 (25.86)
19. Vote Opposite	–	–	41.00% Yes; 59.00% No	45.70% Yes; 54.30% No
20. Vote Money	–	–	9.92 (5.15)	9.36 (5.07)
21. SBS	–	–	–	76.43 (20.95)
22. EBS	–	–	–	73.85 (20.12)
23. Pol. Bel. Strength	–	–	72.33 (24.29)	75.75 (20.59)
24. Pol. Certainty	–	–	74.62 (22.63)	75.58 (20.46)
25. Diff. Party	–	–	–	1.53 (0.92)
26. Diff. Pol. Issue	–	–	–	7.97 (6.83)

Note. Bold = $p<.001$, italicized = $p < .01$, *=$p < .05$. CIHS = Comprehensive Intellectual Humility Scale; Ind. Int. Ego = Independence of Intellect and Ego; Open. Revise = Openness to Revising One's Viewpoints; Resp. Other = Respect for Others' Viewpoints; Lack Int. Over. = Lack of Intellectual Overconfidence; LIHS = Leary Intellectual Humility Scale; SIHS = Specific Intellectual Humility Scale; AP Opposite = Affective Polarization Opposite Composite; AP Marriage = Affective Polarization Marriage Composite; Pol. Adj. Rep. = Ratings of political adjectives about Republicans; Pol. Adj. Dem. = Ratings of political adjectives about Democrats; Moral Dis. Rep. = Moral Disengagement Scale ratings of Republicans; Moral Dis. Dem. = Moral Disengagement Scale ratings of Democrats; Pol. Iss. Rep. = Ratings of Political Issues consistent with conservative beliefs; Pol. Iss. Dem. = Ratings of Political Issues consistent with liberal beliefs; HEXACO = HEXACO Personality Inventory-Revised, H = Honesty-Humility, E = Emotionality, X = Extraversion, A = Agreeableness, C = Conscientiousness, O = Openness; Vote Opposite = Vote for Opposite Party in Past; Vote Money = How much money to vote for the opposite party now?; SBS = Social political belief strength; EBS = Economic political belief strength; Pol. Bel. Strength = Political belief strength; Pol. Certainty = Political certainty; Diff. Party = Absolute value of the difference between how similar one is to the Republican Party versus the Democratic Party; Diff. Pol. Issues = Absolute value of the difference between Republican-consistent issues and Democratic-consistent issues.

[a] $n = 161$.

[b] $n = 201$.

* The means for these constructs are at the manifest-level of analysis, given that all means of the latent factors are necessarily zero.

political issues on which they indicated their level of agreement with each issue statement on a 1 (*strongly disagree*) to 6 (*strongly agree*) Likert-type scale (Supplemental Materials 2; Pew Research Center, 2014). All items were randomized. Right-leaning items were standardized and summed ("Republican-consistent"; inter-item *rs* ranged from 0.03 to 0.61); similarly, left-leaning items were standardized and summed ("Democratic-consistent"; inter-item *rs* ranged from 0.10 to 0.59). The absolute value of the difference between Republican-consistent issues and Democratic-consistent issues (r = -0.40) was computed. Lower scores reflect less political polarization.

2.2.5. General personality

Participants in Sample 1 completed the 100-item HEXACO PI-R (Lee & Ashton, 2018), a self-report inventory of general personality that uses a 1 (*strongly disagree*) to 5 (*strongly agree*) Likert-type scale. The HEXACO measures 24 facet-level personality trait scales that converge on six broad domains: Honesty-Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, and Openness to Experience. In Sample 2, participants completed the 60-item version of the HEXACO PI-R (Ashton & Lee, 2009).

2.2.6. Dogmatism

Participants in both samples completed the DOG Scale (Altemeyer, 2002), a 22-item self-report index of unjustified certainty in one's beliefs that is measured on a −4 (*false*) to 4 (*true*) Likert-type scale.

2.2.7. Demographic covariates

Based on previous research (Danovitch et al., 2019; Haggard et al., 2018; Krumrei-Mancuso & Newman, 2020; Krumrei-Mancuso et al., 2020; Zmigrod et al., 2019), we controlled for the following covariates in secondary analyses: race, Hispanic ethnicity, religious identification, political ideology, education, age, and income. All response options and descriptive statistics for these variables are presented in Supplemental Table 1.

2.3. Data analytic plan

We conducted confirmatory factor analyses (CFA) of IH and AP measures to (a) evaluate their structural validity (Hussey & Hughes, 2020) and (b) avoid the strict and often implicit model constraints associated with sum scoring (McNeish & Wolf, 2020).

Given that we aimed to compare the IH measures' differential relations with AP, we did not seek to identify a cross-measure IH latent variable (e.g., by fitting a model that has all IH measures load onto one factor). All factor analyses were conducted in R with the *lavaan* package (Rosseel, 2012). For all IH measures, we used the weighted least square mean and variance adjusted (WLSMV) estimator (Beauducel & Herzberg, 2006). For the AP feeling thermometers, however, we used the robust ML estimator, as the AP scores are continuous and normally distributed (all skew and kurtosis statistics were < 2 in both samples). CFA results are available online (https://osf.io/x9s68/files/) and a full description of the results is presented in Supplemental Materials 3. Factor scores for the best-fitting models were saved using regression-based estimation.

Regarding the CIHS, we tested the following 2 models: (a) the four CIHS subdimensions with no higher-order IH factor and (b) the four CIHS subdimensions with a higher-order IH factor (Krumrei-Mancuso & Rouse, 2016). The model without the higher-order IH factor fit adequately (sample 1: TLI = 0.90; RMSEA = 0.04; $\chi^2 = 369.26$, $df = 203$, $p < .001$; sample 2: TLI = 0.92; RMSEA = 0.05; $\chi^2 = 369.24$, $df = 203$, $p < .001$) in both samples. Moreover, the addition of the higher-order IH factor did not result in a statistically significant improvement in model fit compared with the model without the higher-order factor (sample 1: $\Delta\chi^2 = 18.81$, $p < .001$; sample 2: $\Delta\chi^2 = 22.95$, $p < .001$). Nevertheless, in order to replicate and extend existing research (Krumrei-Mancuso & Rouse, 2016), we conducted our analyses with the CIHS subdimensions from the four-factor model in addition to the higher-order factor score from the higher-order model.

As in Leary et al. (2017) study, we fit a one-factor CFA model to the LIHS, which demonstrated good fit in Sample 1 (TLI = 0.97; RMSEA = 0.04; $\chi^2 = 15.86$, $df = 9$, $p = .07$) and adequate fit in Sample 2 (TLI = 0.93; RMSEA = 0.07, $\chi^2 = 25.02$, $df = 9$, $p < .01$). Similarly, following previous research (Hoyle et al., 2016), we fit a one-factor CFA model to the SIHS (Hoyle et al., 2016). Fit indices for the one-factor SIHS model ranged from poor to marginal (sample 1: TLI = 0.83; RMSEA = 0.10; $\chi^2 = 150.68$, $df = 27$, $p < .001$; sample 2: TLI = 0.88; RMSEA = 0.09; $\chi^2 = 112.51$, $df = 27$, $p < .001$). Although the fit statistics tended to fall below or exceed their respective cutoffs for good model fit (e.g., Finch & French, 2015; MacCallum, Browne, & Sugawara, 1996), simulation studies suggest that there is insufficient empirical support for relying on universal and fixed cutoff values of fit statistics to assess adequate model fit (Chen, Curran, Bollen, Kirby, & Paxton, 2008; McNeish, An, & Hancock, 2017). Moreover, the one-factor CFA in the original measurement development paper for the SIHS yielded similar fit statistics (e.g., RMSEAs ranged from 0.08 to 0.14; Hoyle et al., 2016). Thus, we proceeded with the factor scores from the one-factor CFA of the SIHS.[2]

Regarding the AP feeling thermometers, we first fit a model with two oblique factors, which respectively comprised indicators for feelings towards the opposite party (AP Opposite) and feelings towards inter-party marriage (AP Marriage). This model demonstrated adequate fit (sample 1: TLI = 0.98; RMSEA = 0.06; $\chi^2 = 35.49$, $df = 13$, $p < .001$; sample 2: TLI = 0.94; RMSEA = 0.11; $\chi^2 = 72.66$, $df = 13$, $p < .001$). Still, the two factors were highly correlated (*rs* = 0.64 and 0.65), so we collapsed them into a single factor and fit a one-factor model, which fit poorly (sample 1: TLI = 0.57; RMSEA = 0.29; $\chi^2 = 521.55$, $df = 14$, $p < .001$; sample 2: TLI = 0.50; RMSEA = 0.30; $\chi^2 = 530.06$, $df = 14$, $p < .001$). Thus, we saved the factor scores from the two-factor AP feeling thermometer model, yielding estimates for the AP Opposite and AP Marriage factors.

Regarding the political adjectives and moral disengagement measures, we collapsed across Republicans and Democrats. We tested a one-factor CFA model using robust ML estimation for both measures separately (Kalmoe & Mason, 2019). To determine whether it was appropriate to collapse across political party, we examined whether the one-factor CFA model was invariant across Republicans and Democrats. We tested model invariance iteratively (Finch & French, 2015). Full model invariance and measurement invariance were not achieved for the political adjectives measure or the moral disengagement measure ($\Delta\chi^2$ ranged from 31.00 to 1203.90, *ps* < 0.001; ΔCFIs ranged from 0.01 to 0.10). Hence, we concluded that the factor structures of the political adjectives and moral disengagement measures were not invariant across Republicans ($N = 164$) and Democrats ($N = 215$). We assessed scores on these measures separately in Republicans and Democrats at the manifest-level, as the sample sizes were lower than most benchmarks for adequate sample size in CFA (e.g., Bandalos & Finney, 2010).

To examine whether the magnitude of the correlations between IH and AP differed significantly across measures of IH, Steiger's test of the difference between dependent correlations was employed and, consistent with our *a priori* hypotheses, evaluated using one-tailed *p*-values (Lee & Preacher, 2013). To reduce the number of tests conducted, we used the CIHS Total factor score rather than testing each CIHS dimension separately. In addition, to address the extent to which the associations between IH and AP were specific to IH, we used hierarchical linear regression in which the covariate of interest (e.g., political belief strength) was entered into the first step of the regression and the IH factor score (e.g., the LIHS) was entered into the second step. We also examined whether IH protects against AP in the presence of risk factors (e.g., political certainty). These analyses were conducted with the SPSS PROCESS macro (Hayes, 2018) and parameters were estimated based on 5,000 bootstrapped samples.

3. Results

All effect sizes are interpreted according to Gignac and Szodorai (2016) effect size guidelines for individual differences researchers. Intercorrelations among constructs are in Supplemental Tables 2–5. Data files are available online (https://osf.io/x9s68/files/).

3.1. Associations between IH and AP

Correlations between IH and AP are presented in Table 2 (see Supplemental Materials 4 for a description of the results in which each CIHS dimension was entered simultaneously in the first step of the regression).[3,4] Consistent with our hypotheses, IH manifested significant, negative correlations with both AP composites. The CIHS higher-order factor (which will heretofore be referred to as "CIHS Total"), the LIHS, and the SIHS manifested large negative correlations with the AP composites. Regarding the CIHS dimensions, Independence of Intellect and Ego, Respect, and Lack of Intellectual Overconfidence also manifested large negative correlations with the AP

[2] We also conducted exploratory factor analyses (EFA) of the SIHS in Sample 1 to investigate the possibility that the SIHS is multidimensional. The parallel analysis indicated that 3 factors should be extracted whereas the scree plot suggested that 1 factor should be extracted. We tested 1-, 2-, and 3-factor models using principal axis factoring and oblimin rotation in *R* with the *lavaan* package. In the 2- and 3-factor models, 7 of the 9 items loaded above 0.35 onto the first factor, and the two factors were highly correlated (*r*=0.71). In the 3-factor solution, only two items loaded onto the third factor, indicating that the model was likely overextracted.

[3] We also conducted sensitivity analyses including only Republicans and Democrats, as there is not an opposing political party *per se* for independents and other political parties (e.g., Green party). The results between IH and AP were largely unchanged in both samples when including only Republicans and Democrats. Thus, to maximize statistical power, we retained all participants in our analyses.

[4] See Supplemental Table 7 for the correlations between IH and the individual AP feeling thermometers.

Table 2
Correlations between IH and political constructs.

	CIHS Higher-Order		CIHS Ind. Int. Ego		CIHS Openness		CIHS Respect		CIHS Lack Int. Overconf.		LIHS		SIHS	
	S1	S2									S1	S2	S1	S2
AP Opposite	**−0.28**	**−0.33**	**−0.29**	**−0.41**	*−0.14*	*−0.14*	**−0.25**	**−0.26**	**−0.30**	**−0.32**	**−0.25**	**−0.22**	**−0.44**	**−0.31**
AP Marriage	**−0.34**	**−0.49**	**−0.30**	**−0.47**	*−0.18*	**−0.24**	**−0.33**	**−0.44**	**−0.27**	**−0.42**	**−0.28**	**−0.27**	**−0.39**	**−0.31**
Political Adjectives – Republican[b]	**–**	**−0.32**	**–**	**−0.26**	**–**	−0.12*	**–**	**−0.30**	**–**	**−0.33**	**–**	**−0.23**	**–**	**−0.38**
Political Adjectives – Democratic[a]	**–**	**−0.47**	**–**	**−0.42**	**–**	*−0.27*	**–**	**−0.38**	**–**	**−0.51**	**–**	**−0.30**	**–**	**−0.35**
Moral Disengagement – Republican[b]	**–**	**−0.43**	**–**	**−0.35**	**–**	*−0.23*	**–**	**−0.38**	**–**	**−0.40**	**–**	**−0.36**	**–**	**−0.49**
Moral Disengagement – Democratic[a]	–	**−0.51**	–	**−0.51**	–	**−0.30**	–	**−0.41**	–	**−0.54**	–	**−0.33**	–	**−0.30**
Opposite Vote	*.14*[c]	**0.20**	0.09	0.04	*.15*[c]	**0.20**	*.14*[c]	**0.20**	0.06	*.13*[c]	**0.19**	**0.19**	**0.17**	**0.19**
Opposite Vote Money	0.03	0.05	0.05	*.16*[d]	−0.01	−0.01	0.04	0.00	0.02	0.10	−0.03	−.07[d]	*−0.15*	**−0.19**
Social Belief Strength	–	0.07	–	−0.05	–	*0.15*	–	0.09	–	−0.04	–	0.10	–	−0.10*
Economic Belief Strength	**–**	−0.01	**–**	0.02	**–**	0.01	**–**	0.02	**–**	*−0.13*	**–**	−0.04	**–**	**−0.32**
General Political Belief Strength	0.05	0.00	0.04	−0.04	0.12*	0.06	0.06	0.04	−0.11*	*−0.13*	−0.02	−0.01	**−0.28**	**−0.27**
Political Certainty	−0.02	−0.05	−0.01	−0.02	0.07	0.01	0.00	−0.01	**−0.19**	**−0.25**	−0.12*	−0.08	**−0.40**	**−0.37**
Perceived Diff. B/t Political Parties	**–**	−0.11*	–	−0.01	**–**	*−0.16*	**–**	−0.10*	**–**	−0.09	**–**	**−0.25**	**–**	**−0.35**
Diff. B/t Political Issue Ratings	**–**	0.05	**–**	**0.20**	**–**	0.05	**–**	−0.02	**–**	0.06	**–**	−0.03	**–**	**−0.27**

Note. Bold = p<.001, italicized = p < .01, *=p < .05. CIHS = Comprehensive Intellectual Humility Scale, Ind. Int. Ego = Independence of Intellect and Ego, Openness = Openness to Revising One's Viewpoint, Respect = Respect for Others' Viewpoints, Lack Int. Overconf. = Lack of Intellectual Overconfidence; LIHS = Leary Intellectual Humility Scale; SIHS = Specific Intellectual Humility Scale.

[a] n = 161.

[b] n = 201.

[c] Denotes correlations that were no longer statistically significant after excluding participants who were unwilling to accept any amount of money for voting for someone in the opposite political party.

[d] Denotes correlations that became statistically significant after excluding participants who were unwilling to accept any amount of money for voting for someone in the opposite political party.

composites. In contrast, the correlations between CIHS Openness and the AP composites were small to medium, although still statistically significant and negative. In Sample 2, IH also manifested significant negative correlations with (a) the political adjective composites and (b) the moral disengagement composites in both Democrats and Republicans. The correlations between IH, on the one hand, and the political adjective and moral disengagement composites, on the other, tended to be medium to large, although the correlation between CIHS Openness and the political adjectives composite in Democrats was small.

We next examined whether the magnitude of the correlations between IH and AP differed significantly across measures of IH. To reduce the number of tests conducted, we used the CIHS Total factor score rather than testing each CIHS dimension separately. In Sample 1, the SIHS manifested larger correlations with AP Opposite compared with both the CIHS and LIHS (*Z*s were 3.75 and 4.73, respectively, *p*s < 0.001). The SIHS also manifested a larger negative correlation with AP Marriage compared with the LIHS (Z = 2.95, p < .01). The CIHS manifested larger correlations with AP Marriage compared with the LIHS (Z = 1.78, respectively, p < .05). In Sample 2, the CIHS tended to manifest the largest correlations with AP compared with the LIHS (*Z*s ranged from 2.94 [AP Opposite] to 6.23 [AP Marriage], *p*s < 0.01), although there were no significant differences between the CIHS and LIHS for the political adjectives and moral disengagement composites in Democrats. The SIHS also manifested significantly larger correlations with AP Opposite compared with the LIHS (Z = 2.06, p < .05). Moreover, the SIHS manifested significantly larger correlations with the political adjective and moral disengagement composites in Democrats compared with the LIHS (*Z*s were 2.27 and 2.10, *p*s < 0.05). The CIHS tended to manifest the largest correlations with AP compared with the SIHS (*Z*s ranged from 1.99 [political adjective composite in Republicans] to 3.92 [AP Marriage], *p*s < 0.05); there were no significant differences between the CIHS and SIHS for (a) the political adjective and moral disengagement composites in Democrats and (b) AP Opposite.[5]

3.2. Associations between IH and ideological polarization

In both samples, composite IH scores (CIHS Total, LIHS, and SIHS) manifested significant small to medium positive correlations with having ever voted for a candidate in the opposite political party. Regarding the CIHS dimensions, Independence of Intellect and Ego was not significantly associated with having ever voted for a candidate in the opposite political party across samples, and Lack of Intellectual Overconfidence was only significantly associated, albeit weakly, in Sample 2. CIHS Openness and Respect, however, were consistently significantly associated with having ever voted for a candidate in the opposite political party, and the correlations were small to medium. CIHS Total, the CIHS dimensions, and the LIHS tended to not be significantly associated with the amount of money it would take to now vote for someone in the opposite party. The only significant correlation was between CIHS Openness and the monetary variable in Sample 2; in contrast with hypotheses, CIHS Openness was significantly, but weakly, *positively* associated with the amount of money it would take to now vote for someone in the opposite party. Consistent with hypotheses, the SIHS manifested significant, negative associations with the monetary variable that were small to medium.[6]

Most correlations between IH and (a) general political belief strength and (b) political certainty were statistically negligible across samples and measures. In Sample 1, CIHS Openness manifested a significant, positive correlation with general political belief strength that was small; in contrast, the SIHS and CIHS Lack of Intellectual Overconfidence were significantly negatively associated with general political belief strength across samples. Regarding political certainty, CIHS Lack of Intellectual Overconfidence and the SIHS manifested moderate to large negative correlations with political certainty that were statistically significant in both sam-

[5] For subsidiary analyses examining potential political differences in the relationships between IH and AP, see Supplemental Materials 5. Mean-level differences in study constructs between Republicans and Democrats are also presented in Supplemental Materials 5.

[6] These correlations were also examined in participants who were willing to accept any amount of money to vote for the opposite party. The results were largely unchanged in terms of effect size, and we denote the results that were no longer statistically significant or gained statistical significance in Table 2. Controlling for annual household income also did not change these correlations in terms of effect size or statistical significance in both samples.

ples. Additionally, in Sample 1, the LIHS manifested a small, negative correlation with political certainty that was significant.

CIHS Total, the LIHS, and the SIHS were significantly associated with perceiving a smaller difference between oneself, on the one hand, and the Republican and Democratic parties, on the other. The CIHS dimensions of Openness and Respect also manifested significant, albeit weak, associations with perceiving a smaller difference between oneself, on the one hand, and the Republican and Democratic parties, on the other whereas the remaining CIHS dimensions manifested negligible relations. Measures of IH tended to be negligibly associated with the difference between belief in Republican-consistent issues and Democratic-consistent issues. Only the SIHS manifested a significant correlation with a smaller difference between belief in Republican-consistent issues and Democratic-consistent issues. In contrast, CIHS Independence of Intellect and Ego was moderately associated with a larger difference between belief in Republican-consistent issues and Democratic-consistent issues.[7]

3.3. Specificity of IH's associations with AP

The correlations between general personality traits and dogmatism, on the one hand, and indices of AP, on the other are presented in Supplemental Table 9. To address the extent to which these associations were specific to IH, we examined the incremental validity of IH above-and-beyond (a) personality traits (entered individually in the multiple regression and finally entered simultaneously in the same step of the regression), (b) dogmatism (reversed), (c) political belief strength, (d) political certainty, and (e) demographics in statistically predicting the AP composites (for the correlations between IH and covariates, see Supplemental Table 6). The output of these analyses is available online (https://osf.io/x9s68/files/). Given the number of analyses conducted, we focus on the broad pattern of results.

By and large, measures of IH significantly incremented covariates in statistically predicting AP across both samples (average ΔR^2 values ranged from 0.01 [CIHS Openness, AP Opposite in Sample 2] to 0.20 [CIHS Total, AP Marriage in Sample 2]). In both samples, CIHS Total in addition to the CIHS dimensions of Lack of Intellectual Overconfidence, Respect, and Independence of Intellect and Ego consistently accounted for a significant percentage of the variance in AP (average ΔR^2 values ranged from 0.05 [Respect, AP Opposite in Sample 2] to 0.20 [CIHS Total, AP Marriage in Sample 2]). In contrast, CIHS Openness did not significantly relate to AP after controlling for dogmatism (reversed) in both samples. Moreover, CIHS Openness was not significantly related to AP Opposite after controlling for agreeableness and all of the HEXACO personality traits in Sample 2. CIHS Openness accounted for a significant proportion of the variance in AP above-and-beyond other covariates in both samples (average ΔR^2 values were 0.01 [AP Opposite, Sample 2] and 0.04 [AP Marriage, Sample 2]). Similar to CIHS Openness, the LIHS tended to not be significantly associated with AP after controlling for dogmatism (reversed) in both samples, although it was significantly associated with AP Marriage after controlling for dogmatism (reversed) in Sample 1. Across covariates the LIHS accounted for an average 3.7% (AP Opposite, Sample 2) to 7.2% (AP Marriage, Sample 1) of the variance in AP. Finally, the SIHS accounted for an average 8.5% to 12.8% of the variance in AP Opposite (Sample 2) and AP Marriage (Sample 1), respectively.[8]

3.4. Does IH statistically protect against AP in the presence of risk Factors?

We examined whether IH protects against AP Opposite and AP Marriage in the presence of strong political belief and certainty. In Sample 2, we additionally examined whether IH protects against AP in the presence of strong economic and social political beliefs. In Sample 1, out of 28 statistical interactions examined, 9 were statistically significant (32%). Of the 9 significant interactions, all indicated that the relationships between political belief strength and political certainty, on the one hand, and AP, on the other, decreased as scores on IH measures increased. CIHS Total and the SIHS both significantly moderated the relationships between political certainty, on the one hand, and AP Opposite (CIHS: $\Delta R^2 = 0.01$; SIHS: $\Delta R^2 = 0.01$) and AP Marriage on the other (CIHS: $\Delta R^2 = 0.01$; SIHS: $\Delta R^2 = 0.01$). In addition, CIHS Independence of Intellect and Ego ($\Delta R^2 = 0.01$), CIHS Respect ($\Delta R^2 = 0.01$), and CIHS Lack of Intellectual Overconfidence ($\Delta R^2 = 0.01$) moderated the association between political certainty and AP Opposite. CIHS Respect ($\Delta R^2 = 0.02$) and CIHS Lack of Intellectual Overconfidence ($\Delta R^2 = 0.01$) also moderated the association between political certainty and AP Marriage.

In Sample 2, out of 56 interactions, 7 were statistically significant (12.5%). Of the 7 significant interactions 6 were in the expected direction, indicating that IH statistically buffered against AP in the presence of strong political belief or certainty. CIHS Total and CIHS Respect statistically buffered the associations between (a) political conviction, (b) political certainty, and (c) economic belief strength, and the AP Marriage composite (ΔR^2 values were all 0.01). In contrast, CIHS Independence of Intellect and Ego statistically potentiated the relationship between social belief strength and the AP Opposite composite; at higher levels of CIHS Independence of Intellect and Ego, the relationship between social belief strength and AP Opposite increased ($\Delta R^2 = 0.01$). Across both samples, the LIHS and CIHS Openness did not significantly moderate the relationships between indices of political belief strength and political certainty, on the one hand, and AP, on the other.

4. Discussion

The present investigation provides the most comprehensive examination of the associations between IH and AP. Our results indicate that both domain-general and domain-specific measures of IH are robustly negatively associated with AP, even after controlling for general personality traits and political belief strength. Although our analyses were variable-centered, rather than person-centered, they suggest that intellectually humble individuals are less likely than other individuals to perceive themselves as different from members of the opposite political party and dislike ideological opponents. Our results also suggest that measures of IH that assess both metacognitive and interpersonal features predict AP better than do measures that assess solely metacognitive features. Several conceptual definitions of AP describe it as a heterogeneous construct, reflecting a tendency to dogmatically adhere to one's political beliefs in conjunction with disliking those who hold opposing views (e.g., Iyengar et al., 2019). Hence, the intrap-

[7] The correlations between IH and (a) voting for someone in the opposite party, (b) the amount of money it would take to now vote for someone in the opposite party, (c) the difference between Republican-consistent and Democratic-consistent political issues, and (d) the perceived difference between oneself and Republicans and Democrats were largely unchanged when controlling for general political belief strength in both samples, with two exceptions. In Sample 2, the correlations between CIHS Lack of Intellectual Overconfidence and (a) the amount of money it would take to now vote for someone in the opposite party and (b) the difference between Republican-consistent and Democratic-consistent political issues were significant and positive after controlling for general political belief strength.

[8] In secondary analyses, we also examined the incremental validity of covariates above-and-beyond measures of IH. Across both samples, covariates predicted an average 1.2% [CIHS Independence of Intellect and Ego, Sample 2] to 7.2% [CIHS Lack of Intellectual Overconfidence, Sample 1] of the variance in the AP composites above-and-beyond IH. These results are available from the first-author upon request.

ersonal features of IH, such as open-mindedness, may reduce risk only for certain aspects of AP, namely the features of AP linked with rigidity and belief certainty. The combination of intrapersonal and interpersonal features (e.g., respectfulness) of IH, however, may reduce risk for AP broadly, as they contribute to decreased belief certainty *and* decreased hostility.

We found mixed evidence that domain-specific IH is a better predictor of low AP than domain-general IH. Domain-specific IH tended to outperform measures of IH focused on metacognitive traits exclusively. These results raise the intriguing possibility that open-mindedness regarding one's political views, rather than open-mindedness broadly, best predicts low AP. Nevertheless, domain-specific IH did not consistently outperform domain-general measures of IH assessing both intrapersonal and relational traits, and, indeed, in one sample, the latter were more robust negative correlates of AP than domain-specific IH. These results suggest that AP is neither uniquely related to domain-specific IH nor is it necessarily best predicted by it.

Consistent with the negative correlations between IH and AP, both interpersonal and intrapersonal features of IH tended to manifest associations with reduced political polarization, including voting for candidates in the opposing political party and perceiving less of a difference between oneself and the Republican and Democratic parties. The correlations between IH and political belief strength, however, were inconsistent across measures of IH. Domain-specific IH and the propensity to lack intellectual overconfidence were negatively associated with both political belief strength and certainty. Some scholars contend that IH should not be equated with belief diffidence or low concern for one's beliefs (Whitcomb, Battaly, Baehr, & Howard-Snyder, 2015). From this perspective, IH would not be expected to correlate negatively with belief strength, as an individual can simultaneously hold strong beliefs and be intellectually humble. Hence, the significant negative correlations between IH and political belief strength raise the possibility that IH measures are capturing political indifference rather than IH *per se*. Nevertheless, as political belief strength and IH were both assessed using self-report measures, this relationship could be explained by a lurking third variable, such as a tendency to view one's self and one's beliefs in a favorable light.

Another consideration is that most definitions of IH describe intellectually humble individuals as people who appropriately attend to the limitations of their beliefs. Perhaps individuals who are intellectually humble regarding their political beliefs can more accurately reflect on the evidentiary basis for these beliefs, and areas in which they possess insufficient knowledge, and may accordingly hold their political beliefs with less conviction. Nevertheless, we found scattered evidence that open-mindedness and the tendency to separate one's ego from one's intellect were positively related to indices of political belief strength, raising the possibility that certain dimensions of IH contribute to increased political conviction. Still, most other measures and dimensions of IH tended to manifest negligible associations with political belief strength and certainty, suggesting that they are relatively independent from each other.

Results from previous studies investigating whether the relationships between IH and partisan hostility remain robust after controlling for individual difference constructs are mixed (e.g., Krumrei-Mancuso & Newman, 2020; Stanley et al., 2020). In the present study, however, IH was significantly negatively associated with AP after controlling for general personality, political conviction, dogmatism, and demographic variables. Both domain-general and domain-specific measures of IH significantly predicted AP above-and-beyond covariates, although the amount of additional variance above-and-beyond dogmatism tended to be low. This finding suggests that clarifying the distinction between IH and (reversed) dogmatism in the prediction of external criteria, perhaps through utilizing SEM-based approaches (e.g., Westfall & Yarkoni, 2016), should be a priority in future research.

Previous research indicated that IH may protect against AP in the presence of risk factors, such as same-party favoritism (Krumrei-Mancuso & Newman, 2020). We found preliminary evidence that IH buffered against AP in the presence of strong political belief and certainty: Of 84 interactions across samples, 15 (18%) were significant and indicated that IH statistically protects against AP. Nevertheless, of these, only 2 replicated across samples, raising questions regarding the robustness of the effects. Patterns of non-significant results were, in contrast, consistent across samples. More specifically, IH measures reflecting primarily open-mindedness did not significantly moderate the relationships between political belief strength and AP. Similar to the direct relationships between IH and AP, these results suggest that the intrapersonal aspects of IH in isolation do not protect against AP in the presence of political conviction.

The present study was characterized by strengths that distinguish it from existing research, including our multi-method assessment of both AP and IH. Nonetheless, it was also characterized by limitations that warrant consideration in future research. First, we relied on self-report measures to assess individual difference constructs and political variables, rendering our findings at least partially susceptible to mono-method bias. We expect our findings to generalize to other self-report measures of study constructs. Based on our results, however, we cannot confidently conclude that they will generalize to real-world behaviors, informant-reports, or experimental designs. Although there are no valid behavioral measures of IH to date, research indicates that people may rely on certain behaviors to infer another individual's level of IH when discussing political topics (Meagher, Leman, Heidenga, Ringquist, & Rowatt, 2020). In future research, it may be fruitful to investigate linkages between AP and behaviorally observed IH. Dovetailing with these conjectures, informant-reports of IH may be useful in future research on AP (Rodriguez et al., 2019). In addition, studies should utilize behavioral or implicit measures of AP to ascertain the generalizability of our findings across paradigms (Iyengar & Westwood, 2015).

Moreover, we relied on MTurk to recruit community participants, and future replication efforts should examine the associations between IH and AP using other recruitment strategies. This limitation notwithstanding, MTurk studies examining constructs such as political ideology and moral values have yielded similar results as those found in studies using other online data collection methods and face-to-face interviews (Clifford, Jewell, & Waggoner, 2015; Huff & Tingley, 2015). Thus, we infer that our results would generalize to community samples irrespective of recruitment strategy, but it is unclear whether and how these results would generalize to other samples, such as college samples, that are younger and potentially more politically constrained (e.g., more liberal). Relatedly, MTurk samples tend to be more racially diverse than samples recruited from colleges and universities, but they are still not representative of the American population (see Buhrmester, Talaifar, & Gosling, 2018); thus, our results may not generalize to (a) less racially diverse samples and (b) nationally representative samples.

4.1. Conclusions

Although results from the present study do not speak to the validity of different measures of IH, they suggest that measures ascribing to narrow definitions of IH focused on its metacognitive traits are less robust predictors of AP than are measures that also encompass interpersonal traits. Moreover, our results indicate that AP is associated with both domain-general and domain-specific IH, and domain-specific IH did not necessarily outperform measures of

domain-general IH in the statistical prediction of AP. After accounting for the shared variance between IH and allied dispositional constructs and demographic variables, IH still significantly negatively predicted AP, although there were important exceptions when accounting for dogmatism (reversed) in these relationships. Results suggested that IH statistically buffers against AP in the presence of risk factors, but effects tended to be small and few replicated across samples. Because our study was cross-sectional, we cannot generate formal conclusions regarding temporal precedence in the associations between IH and AP. Future research is needed to examine the development of IH and AP and potential cognitive and affective mechanisms underpinning their linkage. In addition, IH is associated with tolerance and forgiveness toward individuals holding differing religious views (Hook et al., 2015, 2017), and may bear implications for religious polarization and allied constructs, such as prejudice. Research should investigate whether our findings generalize to other domains of ideological extremism.

Author contributions

The first-author was responsible for all analyses and the writing of this manuscript. The second-author collected the data and assisted with data analyses. The third-author was heavily involved in the conceptual design of this study in addition to editing the writing. The fourth-author was also involved in the conceptualization of this project and provided expertise on political science and affective polarization in the writing of the manuscript. Finally, the last-author is the senior PI on this project and was responsible for overseeing all stages of this project.

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Open practices

We have made the raw data files for these two studies publicly available. The SPSS syntax files for these studies are available from the first-author upon request. Output files are available online and R Markdown files are also available (https://osf.io/x9s68/files/).

Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jrp.2020.103992.

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