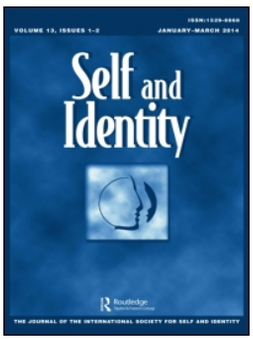

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Intellectual humility and openness to the opposing view

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ABSTRACT

Strong disagreements have stymied today's political discourse. We investigate *intellectual humility* – recognizing the limits of one's knowledge and appreciating others' intellectual strengths – as one factor that can make disagreements more constructive. In Studies 1 and 2, participants with higher intellectual humility were more open to learning about the opposition's views during imagined disagreements. In Study 3, those with higher intellectual humility exposed themselves to a greater proportion of opposing political perspectives. In Study 4, making salient a growth mindset of intelligence boosted intellectual humility, and, in turn, openness to opposing views. Results suggest that intellectual humility is associated with openness during disagreement, and that a growth mindset of intelligence may increase intellectual humility. Implications for current political polarization are discussed.

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Humility; open-mindedness; growth mindset; politics; disagreement

> I confess that there are several parts of this Constitution which I do not at present approve, but … I cannot help expressing a wish that every member of the Convention who may still have objections to it, would with me, on this occasion doubt a little of his own infallibility – and, to make manifest our unanimity, put his name to this instrument.
>
> – Benjamin Franklin

In 1787, with the eyes of the world upon them, delegates gathered in Philadelphia to reach consensus on a United States Constitution. There were many issues that deeply divided them, but Benjamin Franklin, in the speech cited above, asked his fellow delegates to accept the fallibility of their own opinions, to trust the collective wisdom in the room, and to reach an agreement for the greater good (Webb, 2012). Today's political discourse is characterized by similarly strong disagreements, but too often lacks the self-scrutiny and respect for other positions that Franklin sought to foster. Indeed, congressional gridlock has stymied productivity and cut in half the number of substantive bills passed by Congress (Desilver, 2014). Much of the electorate seems similarly unwilling to grant any validity to opposing views (Pew Research Center, 2016a).

However, disagreements can also play a constructive role. They can optimize decision-making by minimizing "groupthink" – the process by which people reach a premature and misguided consensus (Janis, 1982). Resolving them can sometimes even increase

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feelings of closeness between conflicting parties (McCullough et al., 1998; Overall, Sibley, & Travaglia, 2010). When might this happen? Research suggests that disagreements are most fruitful when each person tries to understand the other's position (de Wied, Branje, & Meeus, 2007; Kahn & Lawhorne, 2003; McCullough et al., 1998). Indeed, experts in conflict resolution often instruct people to do this very thing by asking questions and listening to the other side (Stone, Patton, & Heen, 2010).

Here we ask: What determines whether people will be open to learning about the opposing view? We propose a key role for *intellectual humility* and define it as a willingness to recognize the limits of one's knowledge and appreciate others' intellectual strengths. Past work suggests that people are particularly closed-minded to contrary perspectives when they feel defensive about their competence (Tjosvold, Johnson, & Fabrey, 1980), or are highly motivated to perceive themselves as "right" or superior in their knowledge (Vaknin, 2001). People high in intellectual humility might feel less motivated to defend their correctness and intellectual superiority because they are more comfortable acknowledging their intellectual fallibility. We therefore predict that intellectual humility will be associated with openness to learning about opposing perspectives, even during disagreements about highly charged topics.

Conceptualizing intellectual humility

Several conceptualizations of intellectual humility have recently emerged in the research literature. Intellectual humility has been described as the "disinclination to regard a belief as true just because it's one's own" (Gregg & Mahadevan, 2014, p. 8), as having "insights about the limits of one's knowledge" (McElroy et al., 2014), as "a nonthreatening awareness of one's intellectual fallibility" (Krumrei-Mancuso & Rouse, 2016, p. 2), as "the degree to which people recognize their beliefs might be wrong" (Leary et al., 2017, p. 1), and as "a virtuous mean lying somewhere between the vice[s] of intellectual arrogance … and intellectual diffidence" (Samuelson et al., 2014, p. 1). In general, these definitions agree that intellectual humility involves being aware of one's intellectual fallibility.

Our conceptualization of intellectual humility includes this awareness, and adds a willingness to appreciate others' intellectual strengths. Without this other-directed component, acknowledging the limitations of one's knowledge still has the potential to manifest in a form of intellectual superiority. For example, a person might recognize that her understanding of an issue is limited and conclude that this means that no one has the capacity to understand it. Likewise, someone may think that because he does not know something, others must not know it either. What is needed for intellectual humility, then, is both an acknowledgement of one's partial understanding and an appreciation for the knowledge that others can possess.[1] In support of this conceptualization, a rich theoretical literature suggests that general humility includes both an accurate awareness of self and an appreciation of others (Davis & Hook, 2014; Emmons, 1999; Owens, Johnson, & Mitchell, 2013; Tangney, 2000; Wright, Nadelhoffer, Ross, & Sinnott-Armstrong, 2017), and many humility measures include an interpersonal component (see Davis & Hook, 2014 for a review).

Regarding its place in a nomological network of humility constructs, many scholars consider intellectual humility to be a sub-domain of General Humility[2] (Davis & Hook, 2014; Davis et al., 2016; Gregg & Mahadevan, 2014; Hopkin, Hoyle, & Toner, 2014). Although general humility involves having an accurate awareness of self and others across multiple contexts,

intellectual humility is a specific type of humility focused on the intellectual domain. In support of this view, intellectual humility is more predictive than general humility of need for cognition, openness to experience, and objectivism, all dispositions that primarily concern intellectual activities (Davis et al., 2016).

Intellectual humility and barriers to openness during disagreements

During many of our daily encounters, we are exposed to perspectives that are in direct opposition to our own and therefore result in intellectual disagreement. When confronted with an intellectual disagreement, people are motivated to see themselves as knowledgeable and their point of view as "the right one" (Ross & Ward, 1996; Taber & Lodge, 2006). This motivation can lead people to attribute disagreements to a dissenter's stupidity or misunderstanding, rather than to the potential legitimacy of their opposing views (Ross & Ward, 1996). Unfortunately, this undermines the value of opposing perspectives and closes people off to learning about them. For example, people who feel a strong need to defend their intellectual competence or superiority derogate opposing perspectives (and the people holding them) and exhibit greater closed-mindedness to these contrasting views (Tjosvold et al., 1980; Vaknin, 2001).

We propose that people who are high in intellectual humility might be less closed off to opposing perspectives because they are more willing to admit their intellectual fallibility and see intellectual merit in others' ideas. Compared to those who are low in intellectual humility, we anticipate that those higher in intellectual humility will make more respectful attributions for why someone holds opposing views (e.g., because the issues being discussed are complex), and will be more open to learning about the perspectives of others, even if those perspectives are in direct opposition to their own.

Empirical research on intellectual humility is just emerging, but past work suggests that it might be associated with openness to learning in school and on the job (MacPherson, 2015; Owens et al., 2013; Wineburg, 2001). However, learning an academic subject or a new skill is quite different than being willing to learn about the opposing view during a disagreement. Disagreements, especially when they involve near and dear sociopolitical issues, can arouse strong emotions and defenses, making people more motivated to confirm their own opinions than to learn about the other side (Taber & Lodge, 2006). Although *wise reasoning* – a composite of researcher-coded intellectual humility and dialectical thinking – was associated with partisan undergraduates' interest in joining a bipartisan political group (Kross & Grossmann, 2012), and although those with higher intellectual humility may be more accepting of those with different religious beliefs, and of politicians who change their views – sometimes called "flip-flopping" (Leary et al., 2017), we know of no research that directly examines the relation between intellectual humility and openness to opposing views. We therefore designed the current research to investigate this possible link.

Fostering intellectual humility

Most extant research on intellectual humility conceptualizes it as a characteristic that ought to be relatively stable, and promote similar behaviors across contexts. Some research supports this conceptualization. For example, Krumrei-Mancuso and Rouse (2016) found 1 and 3 month stabilities of intellectual humility to be .75 and .70, respectively. However, even the

most well-established traits exhibit both continuity and change (Roberts & Mroczek, 2008; Roberts, Wood, & Smith, 2005), and do not always produce the same behavior across situations (Fleeson, 2004). Accordingly, manifestations of intellectual humility can differ with respect to specific beliefs and attitudes (Hoyle, Davisson, Diebels, & Leary, 2016), and with respect to how personally relevant the information being evaluated is (Leary et al., 2017). Wise reasoning, one facet of which is intellectual humility, is also variable across contexts (Grossmann, 2017; Grossmann, Gerlach, & Denissen, 2016). Moreover, characteristics that are similar to intellectual humility and considered relatively stable, such as openness to experience, can be fostered with interventions (e.g., see Jackson, Hill, Payne, Roberts & Stine-Morrow, 2012).

We therefore expect that although intellectual humility exhibits some degree of stability within individuals, it may also be shaped by external and internal factors. We anticipate that one way of enhancing intellectual humility is to reduce people's motivation to defend their intellectual correctness and superiority. One possible way of reducing this motivation is to make salient the belief that people can develop their intelligence (a *Growth Mindset of Intelligence*; Dweck, 2000). We reason that acknowledging your intellectual limitations and listening to opposing perspectives should be less threatening, and the motivation against doing so less strong, if you believe that you can improve your intelligence by developing your knowledge. By contrast, acknowledging your intellectual limitations should be more difficult, and the motivation against doing so stronger, if you believe that doing so may label you as someone with low fixed intelligence. If these predictions are correct, this would identify a growth mindset of intelligence as one psychological lever for fostering greater intellectual humility and corresponding adaptive responses. We test this possibility in the current research.

Overview of studies

We conducted four studies to test our hypothesis that intellectual humility is associated with greater openness to opposing perspectives. In Study 1, we examined whether intellectual humility was positively associated with college students' openness to learning about an opposing view during imagined classroom disagreements. In Study 2, we tested whether intellectual humility was positively associated with openness during imagined disagreements about personally important sociopolitical issues. In Study 3, we examined whether intellectual humility was positively associated with openness to reading about the opposing sociopolitical position. Finally, in Study 4, we tested whether we could experimentally boost intellectual humility by making salient a growth mindset of intelligence, which promotes a non-defensive orientation toward one's intellectual abilities. We also tested whether this nudge in intellectual humility would, in turn, predict greater openness to the opposing view. That is, we tested a mediation model where fostering a growth mindset of intelligence would indirectly increase openness to the opposing perspective via intellectual humility.

Study 1

In Study 1 we asked: Do those who report having more intellectual humility show more interest in learning about the opposing view during imagined classroom disagreements? We also included a number of other personality measures to test whether intellectual

humility predicted openness to opposing perspectives over and above a variety of theoretically related constructs.

Method

Participants

We recruited 181 students attending a community college in Northern California (M_{age} = 23.67, SD = 7.71, range = 18 to 59; 130 women, 49 men, 2 unspecified).

Materials and procedure

Intellectual humility (IH)

To assess intellectual humility, we developed a 9-item self-report scale that included six positively-worded (e.g., "I am willing to admit it if I don't know something") and three negatively-worded (e.g., "I feel uncomfortable when someone points out one of my intellectual shortcomings") items (see Table 1 for full scale). The IH scale had a 1 factor structure when we modeled method effects of the negatively worded items (see the exploratory and confirmatory factor analyses in the Supplementary Materials for results). Thus, we averaged the 9 items in the IH scale (reverse-scoring the three negatively-worded items) to create a unidimensional scale of IH (α = .67). Across all four studies the scale yielded an acceptable average internal consistency of α = .74. Please refer to Supplementary Materials for all information regarding the development of this IH scale, including its relation to socially desirable responding.

Personality measures

Participants also completed measures that we suspect are empirically related to IH to examine whether IH predicted responses to disagreement over and above these other constructs. A White Paper identified these measures (e.g., Need for Cognition; Narcissism) as probable correlates of IH (Samuelson, Church, Jarvinen, & Paulus, 2012), and other researchers have assessed similar constructs when exploring intellectual humility's place in a nomological network of constructs (e.g., see Leary et al., 2017). These measures, sample items, alphas, number of items, predicted associations with IH, and key conceptual differences from IH are summarized in Table 2.

To investigate the possibility that the IH scale might be erroneously tapping a low view of oneself or one's intellectual abilities, we also assessed Self-Esteem, 1-item; (Robins, Hendin,

Table 1. Intellectual humility scale items.

1	I am willing to admit it if I don't know something
2	I like to compliment others on their intellectual strengths
3	I try to reflect on my weaknesses in order to develop my intelligence
4	I actively seek feedback on my ideas, even if it is critical
5	I acknowledge when someone knows more than me about a certain subject
6	If someone doesn't understand my idea, it's probably because they aren't smart enough to get it (R)
7	I sometimes marvel at the intellectual abilities of other people
8	I feel uncomfortable when someone points out one of my intellectual shortcomings (R)
9	I don't like it when someone points out an intellectual mistake that I made (R)

Note: All items rated from 1–7, 1 = *strongly disagree*, 7 = *strongly agree*.

Table 2. Intellectual Humility in relation to validation constructs.

Constructs	Definition & sample item	Range	Number of items & alpha	Predicted relation to IH	Key differences from IH
Need for closure	A person's desire for a firm answer to questions and an aversion toward ambiguity "I dislike questions that could be answered in many different ways" Webster and Kruglanski (1994)	1–7	15 items Study 1 α = .85 Study 2 α = .85	Positively related	Although a person's need for cognitive closure may sabotage IH, absence of need for closure does not necessarily lead to presence of IH
Narcissism	Having a grandiose view of self, sense of superiority, self-absorption and sense of entitlement "I can make anybody believe anything I want them to" Ames, Rose, and Anderson (2006)*	1–7	16 items Study 1 α = .80 Study 2 α = .77	Negatively related	IH is not merely the lack of self-absorption or superiority that we would expect from someone low in narcissism. IH also captures recognition of intellectual limitations and appreciation of others
Openness to experience	A tendency to be a curious, imaginative, and independent thinker who is amenable to new ideas, appreciates art, novelty and adventure "I am curious about many different things" John, Donahue, and Kentle (1991)	1–7	4 items Study 1 α = .61 Study 2 α = .77	Positively related	Openness to experience emphasizes one's preference for novelty. As such, it does not capture the defining components of IH
Need for cognition	The tendency to enjoy and engage in thinking "Thinking is not my idea of fun" (R) Cacioppo and Petty (1982)	1–7	18 items Study 1 α = .91 Study 2 α = .93	Negatively related	A person high in IH would likely exhibit a high need for cognition, but the latter does not capture the core elements of IH of acknowledging one's knowledge limitations and others' intellectual strengths
Modesty	Letting one's accomplishments speak for themselves, not seeking the spotlight; not regarding oneself as more special than one is "I don't brag about my accomplishments" Park, Peterson, and Seligman (2004)	1–7	10 items Study 2 α = .79	Positively related	Modesty differs from IH in its focus on social awareness and not drawing too much attention to oneself. The central features of IH concern how one thinks about their own and others' knowledge and intelligence
General humility	Having an accurate view of one's abilities and limitations, appreciation of others' abilities, sense of personal finiteness "In the broader scheme of things, what I will accomplish in the world is small" Bollinger (2010)	1–7	25 items Study 1 α = .68	Positively related	General humility is a broader humility construct than IH. It involves having an accurate view of one's abilities and limitations and a general sense of personal finiteness. By contrast, IH is focused only on the intellectual domain
Epistemic curiosity	The drive to know "I am interested in discovering how things work" Litman and Spielberger (2003)	1–7	10 items Study 1 α = .89	Positively related	Epistemic curiosity does not necessarily indicate that one acknowledges the limits of his or her knowledge, or value others' intellectual strengths
Growth mindset of intelligence	Tending to believe that intelligence is malleable and can be developed "No matter who you are, you can significantly change your intelligence level" Dweck (2000)	1–7	8 items Study 1 α = .94 Study 2 α = .92	Positively related	Believing that intelligence is malleable is not the same as acknowledging the limits of one's knowledge, or valuing the intellectual strengths of others

*For Study 1, we adapted Ames, Rose, and Anderson (2006) forced-choice measure into a Likert response scale. Research suggests that Likert response adaptations of valid narcissism scales are themselves valid, and are highly correlated with forced-choice scales (r = .97; Barelds & Dijkstra, 2010).

& Trzesniewski, 2001), and Confidence in One's Intelligence, 1 item. We did not assess any additional constructs in this study beyond what is reported here.

Responses to disagreement

Participants then read three scenarios of classroom disagreements (see Appendix of Study Materials in the Supplementary Materials for all measures). For each scenario, participants rated attributions for why their classmate would disagree with them, two of which were respectful (e.g., "because the essay topic is complex and warrants different opinions about it"), and three of which were disrespectful (e.g., "because they are not as intelligent as I am"); 1 = *not at all the reason* to 7 = *definitely the reason*. The disrespectful attributions were reverse-scored and averaged with the respectful attributions to create an index of respectful attributions for disagreement, $\alpha = .90$.

Next, participants imagined that the dissenter engaged them in a discussion about the disagreement outside of class. Participants rated how likely they would be to respond with openness on 9 items (e.g., "I would try to understand their perspective about the reading," "Listen to their reasoning for why they hold their opinion"; 1 = *extremely unlikely* to 7 = *extremely likely*). Items were averaged to create an openness composite, $\alpha = .89$. Participants then answered a demographics questionnaire.

Results

IH was related to the personality measures largely as expected (see Table 3 for all correlations, means, and standard deviations). Specifically, IH was positively associated with Need for Cognition, Openness to Experience, and Epistemic Curiosity, suggesting that it taps an open orientation toward thinking and learning. IH was also positively associated with a Growth Mindset of Intelligence, a finding that supports our prediction that fostering a growth mindset might increase IH (see Study 4). Although in the predicted direction, IH was not significantly related to Need for Cognitive Closure or Narcissism. IH was not associated with Self-Esteem or Confidence in Intelligence and thus was not tapping a low self-concept or a lack of intellectual confidence.

To examine our hypothesis that those who reported having higher IH would respond with greater openness to learning about the opposing view, we first tested the bivariate correlations. We saw strong positive associations between IH and respectful attributions for disagreement, $r = .40$, $p < .01$, and open-minded responses, $r = .48$, $p < .01$. Those with higher IH were more likely to attribute disagreements to the complexity of the issues being discussed, and were more open to learning about the opposing view. These dependent variables were also associated with many of the personality variables that we assessed. Thus, we conducted a regression analysis controlling for the personality measures to examine whether intellectual humility could explain *unique* variance in these outcomes when controlling for the constellation of related characteristics. Over and above the variance predicted by these other factors, IH still predicted respectful attributions, $B = .23$, SE = .10, $t(166) = 2.33$, $p = .021$, 95% CI [.04, .43], and openness, $B = .23$, SE = .07, $t(166) = 3.15$, $p = .002$, 95% CI [.09, .37].

Discussion

When faced with disagreement scenarios, participants who were higher in intellectual humility were more respectful of and more interested in trying to learn about opposing

Table 3. Study 1 correlations, means and standard deviations.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Intellectual humility	1														
2	Growth mindset	.233**	1													
3	Narcissism	−.03	−.02	1												
4	General humility	.419**	.260**	−.14	1											
5	Agreeableness	.347**	.288**	−.06	.314**	1										
6	Conscientious-ness	.304**	.222**	.173*	.290**	.353**	1									
7	Openness to experience	.262**	.256**	.172*	.333**	.177*	.281**	1								
8	Extraversion	.10	.13	.426**	.08	.214**	.170*	.03	1							
9	Emotional stability	.161*	−.06	−.10	−.155*	−.212**	−.297**	.07	−.278**	1						
10	Need for cognition	.260**	.177*	.00	.358**	.05	.260**	.441**	.157*	−.201**	1					
11	Need for closure	−.05	−.12	.376**	−.151*	−.267**	.12	.04	−.07	.337**	−.11	1				
12	Self esteem	.10	.06	.480**	.07	.08	.355**	.174*	.360**	−.395**	.158*	.11	1			
13	Confidence	.14	.155*	.431**	.214**	.11	.327**	.232**	.281**	−.369**	.320**	.03	.670**	1		
14	Respectful attributions	.401**	.378**	−.226**	.318**	.461**	.275**	.331**	−.10	−.01	.161*	−.04	−.04	.00	1	
15	Openness in disagree-ment	.481**	.304**	−.243**	.445**	.411**	.309**	.358**	−.14	.00	.317**	−.08	−.04	.07	.744**	1
	M (SD)	4.88 (.71)	5.14 (1.30)	4.30 (.84)	4.67 (.55)	5.24 (.97)	5.31 (.98)	5.36 (1.00)	4.22 (1.38)	4.08 (1.31)	4.31 (.96)	4.43 (.89)	4.34 (1.64)	4.73 (1.44)	5.24 (1.03)	4.85 (.79)

*$p < .05$; **$p < .01$.

perspectives. Notably, these associations could not be explained by many related constructs, even general humility. The specificity of intellectual humility as a construct, in contrast to the more general personality measures that we assessed, may account for its unique predictive power when explaining openness during intellectual disagreements.

Although the results of Study 1 provided initial support for our hypothesis, the nature of the classroom scenarios might have prevented participants from feeling emotionally invested in these disagreements. In Study 2, we took a step toward addressing this limitation by having participants imagine a disagreement about a personally important sociopolitical issue, for which they would have a stronger motivation to assert their correctness by derogating and being closed off to the opposing view.

Study 2

It is not uncommon to discover in conversation that a relative, colleague, or even romantic partner has a view that is opposite to ours on an important issue. How do we respond in this situation? Do we listen to this person and try to learn about their perspective? Or do we ignore, ridicule, or attack them? Here, participants selected a sociopolitical topic they were passionate about and then indicated how they would respond to a person who disagreed with them on this issue. We predicted that intellectual humility would be associated with openness to learning about the opposition's perspective, even here when the disagreement was over an important, emotionally evocative topic.

Method

Participants

We recruited 188 American adults (M_{age} = 32.84, SD = 11.65, range = 18–69; 109 women and 78 men, 1 unspecified) from the online panel Amazon Mechanical Turk (Buhrmester, Kwang, & Gosling, 2011; Paolacci & Chandler, 2014). Participants received a small monetary compensation for participating.

Materials and procedure

IH and personality measures

In one online session, participants completed measures of IH (α = .74), additional personality constructs (see Table 2), and questionnaires assessing Self-Esteem (10 items; α = .91; Rosenberg, 1965), and Confidence in Intelligence (3 items; α = .77; Dweck, Chiu, & Hong, 1995).

Responses to disagreement

Next, participants read about five contentious issues (e.g., gun control; same-sex marriage) and indicated their position on the issue (pro or anti). After choosing a position on each issue, they rated four attributions for why someone might disagree with them about that issue (e.g., because the issue is complex and warrants different opinions). Attributions across issues were combined to create a respectful attribution composite, α = .81. Participants also rated how personally important each issue was to them (1 = *not at all*, 7 = *extremely*).

Participants then chose the one issue out of the five provided that was most important to them. They were asked to imagine discussing this issue with a person who endorsed the opposite view, and rated 8 items similar to those used in Study 1 about how likely they would be to respond to this person with openness, $\alpha = .64$. Finally, participants answered demographic questions.

Results

As expected, IH was again positively associated with personality measures tapping an openness to thinking and learning, including Need for Cognition, and Openness to Experience, and negatively associated with Need for Closure and Narcissism (see Table 4). This study also replicated the association between a Growth Mindset of Intelligence and IH, providing additional support for the prediction we will test in Study 4. IH was positively associated with Modesty and Self-Esteem, but was not significantly related to Confidence in Intelligence, demonstrating again that the IH scale did not assess a low self-concept.

Participants rated their most important issue as being very important to them, $M = 5.98$, $SD = 1.27$. Yet, although these issues were of great importance, IH was still associated with more respectful attributions for the disagreement, $r = .34$, $p < .01$, and greater openness to learning about the opposing perspective, $r = .33$, $p < .01$. As in Study 1, responses to disagreement were also associated with some of the personality constructs that we assessed. Thus, we repeated the regression analyses done in Study 1 to test whether IH explained variance in the dependent variables over and above the other factors. Controlling for all of the personality measures weakened the association between IH and respectful attributions, $B = .13$, $SE = .08$, $t(174) = 1.67$, $p = .097$, 95% CI [–.02, .29], but this association remained significant when controlling for each personality construct independently, all $ps < .05$ (see Table 5 in the Supplementary Materials for partial correlations). As in Study 1, IH predicted openness over and above all of the validation variables, $B = .21$, $SE = .09$, $t(173) = 2.29$, $p = .023$, 95% CI [.03, .39].

Discussion

Study 2 provides another glimpse into how those higher in intellectual humility might react to a disagreement, this time about a personally important issue. Far from being defensive, dismissive, or derogatory, those higher in intellectual humility reported being more interested in learning about the other side's perspective. These findings were robust, remaining significant when controlling for a number of related personality constructs, again suggesting the unique value of intellectual humility in predicting individuals' responses to intellectual disagreements. These findings are also notable given how important the issues addressed in this study were to participants.

Given the results from Studies 1 and 2, we wondered whether the behavior of those high in intellectual humility would mirror their questionnaire responses. Thus, in Study 3 we examined participants' actual behavior when they were given the opportunity to learn about opposing opinions.

Study 3

The internet, television, and social media have made a multitude of perspectives accessible. Greater access offers an opportunity to think more critically about our own views by allowing

Table 4. Study 2 correlations, means and standard deviations.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Intellectual humility	1														
2	Growth mindset	.358**	1													
3	Narcissism	−.197**	−.191**	1												
4	Agreeableness	.406**	.322**	−.334**	1											
5	Conscientiousness	.253**	.192**	−.137	.416**	1										
6	Openness to experience	.404**	.339**	−.009	.165*	.097	1									
7	Extraversion	.184*	.027	.374**	.161*	.110	.127	1								
8	Emotional stability	.311**	.190**	.178*	.247**	.411**	.163*	.380**	1							
9	Need for cognition	.406**	.334**	.034	.148*	.156*	.632**	.123	.249**	1						
10	Need for closure	−.176*	−.236**	−.028	−.089	.140	−.244**	−.141	−.276**	−.375**	1					
11	Modesty	.310**	.164*	−.557**	.467**	.361**	.114	−.257**	.065	.102	.096	1				
12	Self esteem	.228**	.228**	.114	.344**	.469**	.103	.321**	.549**	.203**	−.138	.160*	1			
13	Confidence	.111	.041	.240**	.018	.175*	.179*	.158*	.373**	.312**	−.036	−.089	.404**	1		
14	Respectful attributions	.339**	.315**	−.348**	.248**	.100	.342**	−.099	.056	.254**	−.217**	.332**	.127	−.065	1	
15	Openness in disagreement	.327**	.180*	−.231**	.280**	.126	.104	.054	.104	.148*	−.108	.346**	.179*	−.064	.388**	1
	M (SD)	4.79 (.86)	4.90 (1.40)	1.28 (.21)	5.14 (1.06)	5.22 (1.04)	5.52 (1.11)	3.67 (1.43)	4.31 (1.33)	4.72 (1.07)	4.36 (.94)	4.95 (.94)	5.01 (1.21)	1.80 (.32)	4.84 (.85)	4.36 (.91)

*$p < .05$; **$p < .01$.

Table 5. Study 3 correlations, means and standard deviations.

		1	2	3	4	5	6	7	8	9	10
1	Intellectual humility	1									
2	Growth mindset	.420**	1								
3	Learning goals	.439**	.318**	1							
4	Political ideology	−.025	−.018	−.060	1						
5	Issue knowledge	.307**	.046	.205**	.015	1					
6	Issue attitude strength	.120	.064	.091	−.044	.269**	1				
7	Political engagement	.260**	.193*	.314**	−.124	.344**	.196*	1			
8	Raw opposing reasons	.060	.049	.111	−.074	−.025	.080	.118	1		
9	Proportion of opposing reasons read	.288**	.190	.143	−.004	.020	.086	.110	.385**	1	
10	Opposing minus matching reasons read	.164*	.068	.072	−.011	−.043	.133	.044	.479**	.733**	1
	M (SD)	5.07 (.81)	4.84 (1.59)	5.80 (1.14)	3.67 (1.70)	60.72 (23.33)	81.31 (20.61)	4.53 (1.51)	1.46 (2.30)	.52 (.30)	.22 (1.54)

*$p < .05$; **$p < .01$.

us, if we choose, to learn about the views of those who disagree with us. In Study 3, we tested whether those higher in intellectual humility would take greater advantage of an opportunity to learn about the opposing perspective. We gave participants a chance to read other people's reasons for holding a position that was the same as or opposite to their own on a sociopolitical issue. We predicted that those higher in intellectual humility would seek information about the opposing view to a greater extent than those lower in intellectual humility.

Method

Participants

We recruited 169 American adults from Amazon Mechanical Turk (M_{age} = 33.14, SD = 11.71, Range 18–72; 74 women, 88 men, 7 unspecified). Participants were compensated a small monetary amount for participating.

Materials and procedure

IH and other predictor measures

Participants completed measures of IH, α = .74, Growth Mindset of Intelligence (4 items; α = .92; (Dweck, 2000), and Learning Goals (3 items; α = .91; (Grant & Dweck, 2003).

Behavioral measure of openness to learning about opposing view

Participants then read reasons about either gun control or capital punishment. We counterbalanced assignment to issues to ensure that results were not driven by a specific issue (Hoyle et al., 2016).

Participants indicated a pro or anti stance on the issue. Participants then rated how much they favored capital punishment [or more gun control] (0 = *completely oppose* to 100 = *completely favor*); this item was recoded so that higher values indicated stronger attitudes. Participants also reported how much they knew about the issue (0 = *nothing* to 100 = *everything*).

Next, participants were given an opportunity to read reasons supporting their own view and the opposing view that had ostensibly been written by a sample of participants who were US citizens. Participants were told they could read as many reasons as they wanted, and that each link would lead to a unique reason. Links to various reasons were presented on one webpage, counterbalanced so that half of the participants saw the 7 "pro" links on top, followed by the 7 "anti" links, and the other half of participants saw the reverse order. When a link was clicked, participants saw a reason for a particular position. Reasons were written by us and were matched for length (see Appendix in the Supplementary Materials for all reasons). Throughout, participants could either advance to the next part of the study or read more reasons. Participants were only advanced to the next part of the study when they chose to move on or when all 14 reasons had been read.

Next, participants rated their interest in learning more about the issue. They also rated their attitude strength, and their issue knowledge a second time. At the end of the study, participants reported their level of political engagement, political ideology, and answered demographic questions.

Results

As in Studies 1 and 2, IH was positively associated with having more of a growth mindset of intelligence, $r = .42$, $p < .01$. Consistent with their general propensity for thinking and learning, IH was also associated with having stronger learning goals, $r = .44$, $p < .01$ (see Table 5).

Political issues

There were no significant differences between the issues in attitude strength, $t(163) = 1.80$, $p = .074$, or issue knowledge, $t(164) = 1.04$, $p = .30$. Thus, we combined responses across issues for the remaining analyses. On average, participants held strong opinions about gun control and capital punishment, $M = 81.31$, SD = 20.61, and had a moderate amount of baseline knowledge about the issues, $M = 60.72$, SD = 23.33.

IH and reasons read

Although participants read a similar number of opposing reasons (reasons that were opposite their own view) ($M = 1.46$, SD = 2.30) and matching ones (reasons that matched their own view) ($M = 1.23$, SD = 2.06), nearly half of participants ($n = 81$) read no reasons. Because we did not know why these participants chose not to read any reasons (e.g., efficiency; not interested), we conducted analyses both including and excluding the non-readers.

To test whether those higher in IH took greater advantage of an opportunity to learn about the opposing view, we calculated the proportion of opposing reasons read for each participant by dividing the number of opposing reasons read by the total number of reasons read: $\frac{\text{opposing reasons}}{\text{opposing reasons+matching reasons}}$. This proportion has been used in past research to assess bias in information-seeking (Taber & Lodge, 2006), and allows us to control for variability in each participant's willingness to spend time reading both types of reasons. By using this proportion, we are capturing a preference for spending more of one's time learning about the opposing view.

IH was significantly associated with a greater proportion of opposing reasons read, $r = .29$, $p = .007$, indicating that those higher in IH read a larger share of opposing than matching reasons relative to those lower in IH. We reasoned that individuals' baseline attitude strength, issue knowledge, political ideology and level of political engagement might have shaped their willingness to read reasons. Thus, we controlled for these covariates in a regression analysis. Controlling for these measures did not eliminate the association between IH and the proportion of opposing reasons read, $B = .11$, SE = .05, $t(79) = 2.16$, $p = .034$, 95% CI [.01, .20].

Because we were not able to include those who read no reasons using the proportion score (as it is impossible to divide by zero), we also calculated a more conservative openness index that allowed us to include the non-readers in analyses. For this index we subtracted the number of matching reasons read from the number of opposing reasons read. A higher score indicated exposing oneself to more opposing than matching positions. Again, IH was significantly associated with this openness index when including those who read no reasons, $r = .16$, $p = .033$, and when excluding them, $r = .25$, $p = .017$. These associations remained significant when controlling for the aforementioned measures both when including non-readers, $B = .33$, SE = .16, $t(157) = 2.07$, $p = .041$, 95% CI = [.02, .65], and when excluding them, $B = .77$, SE = .34, $t(806) = 2.29$, $p = .025$, 95% CI [.10, 1.44].

When we examined the bivariate correlation between IH and reasons, IH was not associated with total opposing reasons read when including non-readers, $r = .06$, $p = .44$, or excluding them from analyses, $r = .11$, $p = .29$. Thus, the effects of IH on openness only emerged

when we used measures that controlled for participants' overall willingness to spend time reading reasons, be they opposing or matching.

Additional analyses

On average, attitude strength and issue knowledge did not significantly change during the study and the amount of change was not related to IH, all *p*s > .30. However, participants higher in IH were more interested in learning more about the issues at the end of the study, $r = .19$, $p = .017$.

Discussion

In Study 3 the results clearly showed that those higher in intellectual humility read a greater proportion (and higher number) of opposing vs. matching reasons than those lower in intellectual humility. This effect only emerged when we controlled for participants' willingness to spend time reading reasons by calculating proportion and difference score measures, suggesting that the relation between IH and willingness to seek-out the opposing perspective may be moderated by attentional factors.

A possible alternative explanation for our primary finding is that participants higher in intellectual humility read more opposing than matching reasons to mentally derogate the opposition's perspective. Although we cannot rule out this possibility, we consider it unlikely given the findings from Studies 1 and 2 where intellectual humility was correlated with greater interested in learning about the opposing view. Moreover, if participants were lambasting the opposition while reading, the high IH individuals might have developed even stronger attitudes about their own position after exposure to the opposite view, as combatting the opposition has had this effect in past research (Taber & Lodge, 2006). We did not find this effect in the current study. In fact, those higher in IH had greater interest in learning more about the issues relative to those lower in IH, which supports the notion that intellectual humility undergirds a persistent motivation to learn.

Given the findings from Studies 1–3 suggesting that those higher in intellectual humility are more open to learning about the opposing view, we wondered how intellectual humility might be fostered. In Study 4, we tested whether we could enhance intellectual humility by making salient a growth mindset of intelligence.

Study 4

If intellectual humility can promote openness to opposing views, are there ways to increase it? Considerable research suggests that people's mindsets of intelligence might be a likely candidate for promoting intellectual humility. A growth mindset of intelligence – the belief that one can change and develop one's intelligence – fosters many qualities thought to be associated with intellectual humility, including greater motivation to learn (Blackwell, Trzesniewski, & Dweck, 2007), less defensiveness (Nussbaum & Dweck, 2008), and a more accurate awareness of one's knowledge and abilities (Ehrlinger, Mitchum, & Dweck, 2016). By contrast, a fixed mindset of intelligence – the belief that intelligence is unchangeable – might sabotage intellectual humility by increasing self-focus and defensiveness (Mueller & Dweck, 1998; Nussbaum & Dweck, 2008). We therefore predicted that activating a growth mindset would promote a non-defensive orientation toward one's intellectual abilities and

reduce motivation to view one's self as undeniably correct, thereby allowing one to admit greater intellectual fallibility and appreciate others' intellectual strengths in the form of intellectual humility. We predicted that this boost in intellectual humility would, in turn, boost participants' openness in response to disagreements, a mediation model that we test in the current study. Notably, although we anticipated that activating a growth mindset would promote a non-defensiveness that would result in higher intellectual humility scores, we did not believe that participants' levels of intellectual humility would be permanently changed by this growth mindset manipulation. Rather, we expected the growth mindset manipulation to temporarily foster a humble orientation toward one's own and others' intelligence, which would suggest a potential psychological lever for longer-lasting changes.

Method

Participants

We recruited 104 community college students. Three participants were excluded from analyses: One because of suspicion about the experimental manipulation, and two because they submitted identical survey responses.[3] This left 101 participants (41 women, 48 men, 12 unspecified).

Materials and procedure

Growth and fixed mindset conditions

In one online session, participants were randomly assigned to read an article with evidence for either a growth or fixed view of intelligence. The growth and fixed articles were ostensibly published in a well-known magazine, were matched for length and content, and were adapted from articles used in past studies (e.g., Nussbaum & Dweck, 2008). The key message of the growth article was that intelligence can be developed and that of the fixed article was that intelligence is a static trait. As an attention check, we asked participants to report the article's main idea.

Success and failure conditions

We also experimentally varied experiences of success and failure to explore how the relationship between mindsets of intelligence and intellectual humility might change when people encounter an intellectual success or failure, the latter being a highly threatening situation for a person with a fixed mindset. After completing questions about the article, participants began a seemingly separate study on spatial reasoning and attitudes. Participants completed seven difficult spatial reasoning problems selected from practice dental school admissions tests. Past research shows it is difficult to know whether one has answered these problems correctly or incorrectly, making both success and failure feedback equally plausible (Nussbaum & Dweck, 2008). Once participants submitted answers, the computer provided either predetermined success (86th percentile) or failure feedback (46th percentile).

The success and failure conditions did not affect IH, $t(99) = .70$, $p = .49$, or responses to disagreement, $ps > .16$, and no interactions between intelligence mindset and feedback conditions emerged, all $ps > .60$. Because experiencing success or failure did not affect the outcomes, we focus on reporting the effect of mindsets of intelligence on intellectual

humility across feedback conditions for all analyses, though we include the success and failure condition as an independent variable in all analyses reported below.

IH and other measures

Next, participants completed measures of IH ($\alpha = .79$), self-esteem ($\alpha = .86$, Rosenberg, 1965), confidence in intelligence, ($\alpha = .69$, Dweck et al., 1995), and the same responses to classroom disagreement used in Study 1, including respectful attributions ($\alpha = .88$) and openness to the opposing view ($\alpha = .89$). Participants were then fully debriefed about the study, and received course credit for participating.

Results

All participants except four correctly reported the main idea of the article. Results did not change whether including or excluding these participants. To be conservative, we include these participants in the analyses.

As predicted, participants in the growth mindset condition had significantly higher IH, $M = 5.09$, SD = .71, 95% CI [4.95, 5.23], than those in the fixed mindset condition, $M = 4.77$, SD = .75, 95% CI [4.62, 4.92], $t(98) = 2.16$, $p = .028$, $d = .44$. Participants in the growth mindset condition also made significantly more respectful attributions for a disagreement, $M = 5.65$, SD = .87, 95% CI [5.48, 5.82] than did those in the fixed mindset condition, $M = 5.30$, SD = .86, 95% CI [5.13, 5.47], $t(98) = 1.97$, $p = .04$, $d = .40$, and were marginally more open to learning from the opposing view, $M = 5.13$, SD = .73, 95% CI [4.97, 5.27], than those in the fixed mindset condition, $M = 4.84$, SD = .69, 95% CI [4.70, 4.98], $t(98) = 1.96$, $p = .053$, $d = .41$(see Figure 1).

We next examined whether IH mediated the effect of mindsets of intelligence on responses to disagreement (see Figure 2). We ran two separate tests of mediation: One for respectful attributions, and one for open-minded responses. Although the effect of mindset condition on openness was only marginally significant, we tested indirect effects on both respectful attributions and openness because significance of individual paths from *X* to *Y* (in our case, mindset condition to openness) is not needed to determine whether there is a significant indirect effect of *X* on *Y* via a specified mediator (Hayes & Rockwood, in press). Bias-corrected bootstrap mediation models with 5000 bootstrap re-samples supported the role of IH in mediating the effect of mindset of intelligence condition on both respectful attributions (indirect effect = .17, SE = .09, 95% CI [.02, .38]) and openness (indirect effect = .16, SE = .08, 95% CI [.02, .35]).

Discussion

Study 4 provides some evidence that making salient different mindsets of intelligence has the potential to shape participants' intellectual humility and their corresponding responses to disagreement. This study suggests that intellectual humility can be at least temporarily enhanced, and points to a growth mindset as a set of beliefs that seems capable of doing so. Although the mindset induction only marginally increased openness to learning about the opposing view, it is possible that we failed to detect a significant effect because this study was slightly underpowered ($d = .50$, $\alpha = .05$, $1 - \beta = .71$; one-tailed $1 - \beta = .80$, power analysis conducted in G*Power, Faul, Erdfelder, Lang, & Buchner, 2007). Additional research is needed to examine these effects with a larger sample. However, the associations between

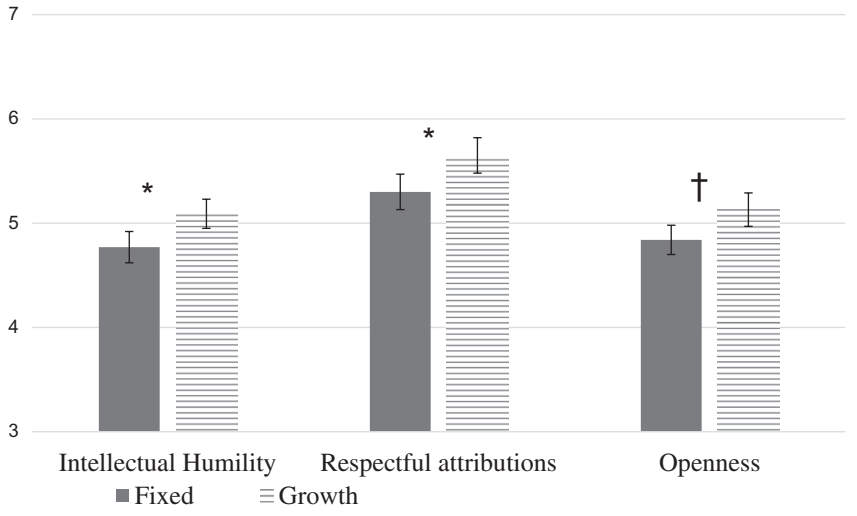

Figure 1. Effect of mindset condition (fixed vs. growth) on intellectual humility, respectful attributions, and openness in Study 4.
Notes: Error bars represent 95% confidence intervals. *$p < .05$, †$p < .10$.

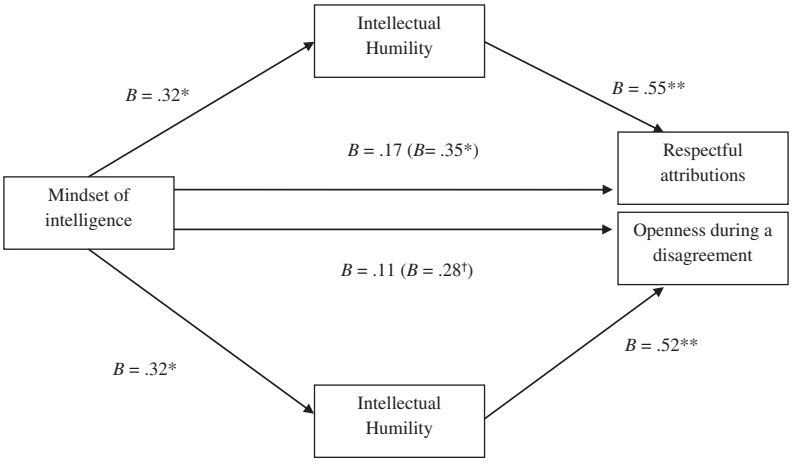

Figure 2. Indirect effects of mindsets of intelligence on respectful attributions and openness during a disagreement through intellectual humility.
Notes: Fixed mindset coded as 0; growth mindset coded as 1. Unstandardized coefficients are reported. The parenthetical numbers indicate coefficients before including the mediator. **$p < .01$; *$p < .05$; †$p < .10$.

intellectual humility and openness to learning about the opposing view were robust, replicating the findings from Studies 1–3. In accordance with our theory, there was also a significant indirect effect of mindsets of intelligence on openness and respectful attributions, mediated by intellectual humility. Overall, these results suggest that with a growth mindset of intelligence, people can feel comfortable acknowledging what they don't yet understand and appreciating others' intellectual strengths.

General discussion

Many political disagreements seem intractable and destructive. Research suggests that these disagreements could become more constructive if disagreeing parties would hear out those from the opposing side (Kahn & Lawhorne, 2003; McCullough et al., 1998; de Wied et al., 2007). But listening to the opposition is not easy to do. Across four studies, we found that intellectual humility was consistently linked with greater respect for and openness to the opposing view.

We consider two alternative explanations for the findings we observed. One possibility is that the connection between intellectual humility and openness was driven by people's reluctance to hold strong opinions about issues. This explanation is not supported by the data. Those higher in intellectual humility did not differ from others in the strength of their political views. A second possibility is that low self-esteem or low confidence in one's intelligence were responsible for the observed associations. Again, we find no evidence of this. Despite being aware of the limits to their knowledge, those higher in intellectual humility did not have less confidence or lower self-esteem relative to less intellectually humble participants.

On the whole, our research expands understanding of the consequences of intellectual humility and contributes to a growing literature documenting the benefits of humility in its many forms, including increased tolerance (Hopkin et al., 2014), forgiveness (Lavelock et al., 2014), generosity (Exline & Hill, 2012), physical health (Krause, 2010), helpfulness (LaBouff, Rowatt, Johnson, Tsang, & Willerton, 2012), academic achievement (Rowatt et al., 2006), and effective leadership (McElroy et al., 2014; Ou et al., 2014; Owens et al., 2013). This work also identifies a potential source of intellectual humility. In Studies 1–3, we found consistent correlational evidence that those higher in intellectual humility had more of a growth mindset of intelligence, and Study 4 suggested a potential causal link between mindset of intelligence and intellectual humility. These findings shed light on how we might foster intellectual humility and its behavioral consequences.

Limitations

The current research also has limitations. First, we assessed participants' responses to disagreement through self-report in several studies. Self-report ratings, though often predictive of actual behavior, are vulnerable to reporting biases (Duckworth & Yeager, 2015). Because all forms of measurement have deficiencies (see Duckworth & Yeager, 2015 for a discussion), it is best to assess outcomes in more than one way and test for replication across complementary methods. Accordingly, we used a (non-self-report) behavioral measure in Study 3, obtaining the same substantive results as the studies that used the self-report measures, adding some robustness to the results. Because there are other important considerations with regard to measuring intellectual humility, we provide a thorough discussion of how we assess intellectual humility and the strengths and limitations of our approach in the supplementary materials.

Another limitation is that we sample exclusively from the United States, and our samples are not nationally representative. Thus, we do not know if these results would replicate in different cultural and political contexts, or with a fully representative sample of Americans. We also only examined two disagreement contexts (school and socio-political issues) and, thus, do not know if these findings would hold in alternative contexts.

We did not assess every possible correlate or moderating factor in this research. For example, we did not assess overlap between intellectual humility and wisdom or wise reasoning, a construct that by many accounts includes intellectual humility and other components (Grossmann, 2017; Grossmann & Kross, 2014). Future research should therefore test overlap with this likely correlate. We also did not measure or evoke political party identification. We note, however, that controlling for political ideology (degree of conservatism vs. liberalism) did not change our substantive findings. Also, the socio-political issues used in Studies 2 and 3 were strongly partisan (e.g., same-sex marriage, global warming, gun control, capital punishment), suggesting that intellectual humility may have benefits even despite strong inter-party animus. Future research should investigate this matter more directly.

Implications for political polarization

Despite these limitations, research on intellectual humility is highly relevant and warrants further study given the current political climate in the United States. Some evidence suggests that Americans are increasingly politically polarized, as the issue positions of Democrats and Republicans have become more consistently liberal and conservative, respectively, than they were about a decade ago (Gentzkow, 2016; Pew Research Center, 2014). Thus, members of the opposing parties have fewer issue positions in common, making disagreements all the more likely. Although we do not know much about how these disagreements play out in everyday interactions, one study found that 59% of those who discussed political disagreements on Facebook thought the experiences were "stressful and frustrating" (Pew Research Center, 2016b). Further, partisanship seems to be increasingly hostile and hard to bridge. Partisanship elicits negative implicit and explicit evaluations, and low trust towards the opposing party (Iyengar & Westwood, 2015). This partisan hostility has consequences that extend beyond politics. For example, political affiliation is a strong predictor of online dating decisions, marriage across party lines is extremely rare in the US, and parents have become more disapproving of their children marrying someone from the opposite political party (Huber & Malhotra, 2017; Iyengar, Gaurav, & Yphtach, 2012; Rosenfeld, Thomas, & Falcon, 2011).

If we hope to have cross-cutting dialogue, tools for managing these increasingly inevitable and hostile disagreements in a constructive way are urgently needed. Based on the current research, intellectual humility shows promise in making such disagreements more productive. Our findings suggest that intellectual humility increases the possibility of more engagement, respectfulness, and possibly even satisfaction and learning during such interactions.

Future directions

Our work also generates a number of intriguing questions for future investigation on intellectual humility. One important avenue is to further explore *how* individuals become intellectually humble. Our research takes an initial step towards addressing this question, though our studies took place over a short period of time and only looked at one possible antecedent. Future studies should therefore identify and test other possible antecedents, and collect longitudinal data. Future research should also pinpoint the psychological mechanisms through which intellectual humility operates. One possibility is that intellectual humility boosts openness by shaping emotional processes such as down-regulation of emotion (Gross, 2015), or differentiated emotion (Grossmann et al., 2016). Future research could test

these possibilities. Finally, the current findings call for more research on intellectual humility in contexts where people are apt to disagree, such as the workplace. Intellectual humility may even be especially valuable for successful work collaborations, as people are more likely to work in mixed-gender and mixed-ethnicity environments (Burns, Barton, & Kerby, 2012), making the likelihood of encountering different views more probable.

Conclusion

Intellectual disagreements are inevitable, but entering into such disagreements with an openness to learning about the other side promises to make them more productive. Although research documents people's tendency to eschew the opposing view (Taber & Lodge, 2006), our findings suggest that some people respond differently. Rather than shutting out the other side, those with higher intellectual humility seem to open themselves up to learning about contrasting perspectives. Promoting intellectual humility may thus offer one path to making disagreements more constructive, and our research suggests that teaching people a malleable view of intelligence may be one promising way to foster intellectual humility and its associated benefits.

Notes

1. We believe there are strong conceptual reasons to include both the self- and other-directed items in intellectual humility. Yet, we also investigated this matter empirically, separating the self- and other-directed items of our scale and re-running analyses to examine whether one component or the other was driving the effects. The general pattern of results remained the same when using only the self-directed items or only the other-directed items (e.g., both subscales significantly correlate with openness during disagreements in Studies 1–4), but the results were strongest when the full scale was used. This suggests that neither the self- nor other- directed items alone were responsible for our effects, but that they produced the strongest results together. We also note that the self- and other-directed items positively loaded on the same factor in exploratory and confirmatory factor analyses (see the Supplementary Materials), suggesting that they go together empirically. Full results from these analyses are available upon request.
2. General Humility is distinct from the personality dimension Honesty-Humility, which encompasses a person's tendency to avoid fraud or corruption and greed, and to display modesty and sincerity (Ashton, Lee, & de Vries, 2014).
3. The effect of the experimental manipulation on intellectual humility remains statistically significant when these participants are included in analyses, $p = .04$.

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