Intellectual Humility: Consequences for learning, and a potential source

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Intellectual Humility: Consequences for learning, and a potential source

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ABSTRACT

Intellectual humility is regarded as highly important by leaders in business, education, public service, and other fields. Yet, despite its apparent importance, there is little empirical research on this intellectual virtue. Three studies presented here investigated the consequences of intellectual humility for learning in school, and tested a potential source of intellectual humility: people's beliefs about the malleability of intelligence. Studies 1 and 2 investigated the relation between intellectual humility, as assessed by a self-report scale, and outcomes that are relevant for learning in school. College and high school students higher in intellectual humility had a stronger motivation to learn, and used a number of adaptive study strategies more readily than those who were lower in intellectual humility. High school students higher in intellectual humility also earned higher grades in math, suggesting that increases in intellectual humility may pay off in terms of actual achievement and learning. In Study 3 we tested a possible source of intellectual humility. We predicted that a *growth mindset of intelligence* – believing that intelligence is a malleable trait that can be developed – would enhance intellectual humility relative to a *fixed mindset of intelligence* – believing that intelligence is a static trait. To test this prediction, we used an experimental procedure to temporarily induce either a fixed or a growth mindset of intelligence. As predicted, participants in the growth mindset condition had significantly higher intellectual humility than those in the fixed mindset condition. Increases in intellectual humility also increased students' openness to learning from the opposing view during a disagreement. Findings suggest teaching students that intelligence is malleable may be one way to cultivate intellectual humility and its consequences.

There is a surge of interest among researchers and educators in the value of various character strengths for learning (e.g., Tough, 2012; Seider, 2012). Burgeoning research on youth purpose, grit, self-control, and academic mindsets indicates that these factors can benefit achievement in school and learning in powerful ways (Duckworth & Seligman, 2005; Duckworth, Peterson, Matthews & Kelly, 2007; Dweck, 1999; Yeager, Henderson, Paunesku, Walton, Spitzer, D'Mello & Duckworth, 2014). The current paper is situated within this larger context of research on character strengths and focuses on one particular attribute: intellectual humility (IH), conceptualized here as acknowledging the partial nature of one's understanding and valuing others' intellectual contributions. In this research, we test our predictions that intellectual humility may help students to be good learners, and that one way to cultivate intellectual humility is to teach students that intelligence is a malleable trait that can be developed.

Why might intellectual humility matter for learning? We suggest that students high in intellectual humility -- who are aware of the partiality of their knowledge -- may be more motivated to expand what they know and more persistent in using a number of learning strategies to do so. By contrast, those low in intellectual humility may perceive their knowledge as being more complete than it is. Thus, they may be less interested in expanding what they know and perhaps more interested in demonstrating what they feel they already understand.

Although empirical research on intellectual humility is only just beginning to emerge, past work in philosophy and education provides some support for our predictions that intellectual humility may benefit learning. Most philosophers who write about intellectual humility consider it an intellectual virtue[1] – a characteristic of a good learner (e.g., see Baehr, 2012; Paul, 2000;

[1]It is worth noting that not all philosophers agree on this point. For example Nietzsche considered humility a trait promoted by the mediocre to keep superior individuals from realizing their potential (Damon & Colby, 2015).

Roberts and Wood, 2003; Spiegel, 2012; Samuelson, Church, Jarvinen & Paulus, 2012). Philosophical scholarship suggests that intellectual humility might contribute to learning in several ways. For one, IH may support motivation to learn. The recognition that one's knowledge is partial might inspire interest, curiosity and a desire to increase knowledge (Baehr, 2012). Along the same lines, IH may free one to focus on learning, instead of on striving to look smart (Roberts and Wood, 2003). If so, we might expect intellectual humility to predict students' learning goals – the extent to which students are motivated to learn and master material.

Moreover, intellectual humility may foster study habits recognized by education scholars as promoting learning. For example, it may encourage metacognitive reflection - monitoring of one's knowledge and understanding (Richert, 2002; King & Kitchener, 2004). Students low in intellectual humility may not use metacognition reflection much during the learning process because they may feel their current knowledge is sufficient. If they do reflect on their understanding, they may draw inaccurate conclusions assuming that they know more than they actually do. By contrast, students high in intellectual humility may reflect on their knowledge and understanding more often. They may also gain more from the reflection process given their willingness to acknowledge what they don't know.

Intellectual humility might also foster more persistent and effortful engagement in school. An intellectually arrogant student might disengage from a class if she feels she already knows all that is being taught, or if the class challenges her knowledge or intellectual status too much. By contrast an intellectually humble student, who is aware that there is always more to learn, might be more persistently effortful in engaging in school and trying to learn more.

The three studies presented here tested our predictions about intellectual humility and learning outcomes, and investigated a potential source of intellectual humility: students' beliefs

about the malleability of intelligence. Studies 1 and 2 investigated the relation between intellectual humility, as assessed by a self-report scale, and achievement goals, learning strategies and grades among college and high school students. Study 3 investigated beliefs about intelligence as a potential source of intellectual humility.

Study 1

In Study 1, we examined the associations between intellectual humility and achievement goals and learning strategies among college undergraduates.

Methods

Participants. Sixty-six students attending Stanford University were recruited through the psychology department credit pool (18-32 years old, M_{age} = 19.25 *SD* = 2.07). Forty-two percent of participants were male, 41% were white, 6% were Black, 21% were Asian, 10% were Hispanic, 3% were Native American, 14% were mixed ethnicity and 5% were other race.

Procedures and measures. Participants completed an online survey in a location that was convenient for them. The survey took approximately 30 minutes and participants received course credit for their participation. For the following measures, all items were rated on Likert scales rated from 1 to 7.

Intellectual humility. The survey assessed Intellectual Humility (9 items, α = .67). The intellectual humility scale had items that tapped participants' willingness to acknowledge the partial nature of their own knowledge (e.g., "I am willing to admit it if I don't know something"; "I acknowledge when someone knows more than me about a certain subject"; "I actively seek feedback on my ideas, even if it is critical") and their recognition of others' intelligence (e.g., "I sometimes marvel at the intellectual abilities of other people"; "I like to compliment others on their intellectual strengths").

Achievement goals. The survey also assessed achievement goals with the Achievement Goal Inventory (Grant & Dweck, 2003). The Achievement Goal Inventory assessed four goal subtypes: learning goals[2] (6 items, α = .91, "In my classes I focus on developing my abilities and acquiring new ones"), normative ability goals (3 items, α = .92, "It is very important to me to prove that I am more intelligent than other students."), normative outcomes goals[3] (3 items, α = .89, "It is very important to me to do well in my courses compared to others."), and ability goals (3 items, α = .85, "It is important to me to confirm my intelligence through my school work").

Learning strategies. Learning strategies were assessed with a subset of the Motivated Strategies for Learning Questionnaire (MSLQ) (Duncan & McKeachie, 2010; see also Artino, 2005). The MSLQ is a well-established questionnaire that can be used in part, or in full, and whose subscales have predicted school achievement in past research (see Artino, 2005 for a review). A subset of items was chosen to assess 2 learning strategies: Metacognitive Self-regulation (8-items, α = .73, "I ask myself questions to make sure I understand the material I have been studying in my classes"), and Effort Regulation (4-items, α = .78, "I work hard to do well in my classes even if I don't like what we are doing").

Results

There were no differences in intellectual humility by participants' gender, or age, (all *p*s > .05).

[2] As in Grant and Dweck (2003), learning goals is a composite of learning and challenge goal items. In this study these six items could not be distinguished in a factor analysis and the scree plot indicated a one-factor solution. All item loadings > .72.

[3] Grant and Dweck (2003) made a composite of all normative goal items. In this study, the factor structure of the normative goals was less clear. Scree plot indicated a two-factor structure. Normative outcome and normative ability goals loaded on two separate factors using principal axis factoring analysis with varimax rotation (factor loadings > .7, non-construct items factor loading < .3 except for one cross loading item which loaded at .50 on the non-construct factor). Outcome and ability goals were less distinct in a factor analysis using promax rotation (the lowest loading for a non-construct item was .49, but construct items loaded very highly (all loadings > .82). Here, we separate normative outcome and normative ability goals. However, conducting analysis with a comprehensive composite of all normative goal items does not change results – the correlation between IH and comprehensive composite of normative goals $r = -.27$, $p < .05$.

As predicted, participants higher in intellectual humility had higher learning goals, r = .42, p <.001. In addition, those with higher intellectual humility had lower normative ability goals, r = - .43, p <.001. IH was not associated with ability goals or normative outcome goals. Intellectual humility was also positively associated with Metacognitive Self-Regulation, r = .34, p <.01, and with Effort Regulation, r = .24, p = .05. The associations between intellectual humility and achievement goals and study strategies were not substantially weakened when controlling for the demographic measures in the study, all ps < .054.

Discussion

Study 1 provided initial support for our hypothesis that intellectual humility is associated with adaptive learning outcomes. College students who were higher in intellectual humility had stronger learning goals, and were significantly less motivated to try and look smarter than their peers. Highly intellectually humble students were also more likely to use meta-cognitive learning strategies when studying, and were more effortful in their school work.

Given the promising findings from Study 1, in Study 2 we expanded our investigation to examine whether the associations between intellectual humility and learning outcomes would replicate among a sample of high school students. In Study 2, we also examined the associations between intellectual humility and students' actual grades in math.

Study 2

Method

Participants. 88 students attending a public high school in the greater Kansas City area were recruited for this study (14 – 16 years old, M = 14.52, SD = .57). Students were freshmen (89%) and sophomores taking Algebra II or Integrated Math I from the same teacher. Forty-three

percent of participants were male, 86% were white, 8 % were Hispanic, 3% were Black, 2% were Asian and 1% was other race. Seventy percent of participants' parents had a college degree.

The students attended a high performing high school, with 99% of the student body scoring at or above the Kansas state mathematics standard in 2013 (80% of students state-wide met or exceeded this standard). The high school had a fairly homogenous racial composition, with 86% White students. About 10% of students in the school were classified by the state as economically disadvantaged.

Procedures and measures. Students were surveyed in December of 2013. Surveys took approximately 15 minutes to complete. All self-report survey items were rated on 7-point Likert-type scales.

Intellectual humility. The survey assessed intellectual humility (6-items, $\alpha = .63$)[4].

Achievement goals. A subset of items from the Achievement Goal Inventory were used to assess the following achievement goals[5]: learning goals (4-items, $\alpha = .85$, "I seek out classes that I will find challenging."), normative ability goals (2-items, $\alpha = .91$, "It is very important to me to prove that I am more intelligent than other students."), normative outcomes goals (2-items, $\alpha = .83$, "It is very important to me to do well in my courses compared to others."), and ability goals (2-items, $\alpha = .78$, "It is important to me to confirm my intelligence through my school work").

Motivation and learning strategies. As in Study 1, the following learning strategies were assessed with the Motivated Strategies for Learning Questionnaire: meta-cognitive self-

[4] Exploratory factor analysis of the 9-item intellectual humility scale suggested that the three reverse-coded items did not load on the same factor as the 6 positive indicator items of the intellectual humility scale. When these reverse-coded items were removed from the scale, the internal consistency increased from .55 to .63. We note that the findings in Study 1 are largely unchanged when using the 6 item intellectual humility scale instead, though the association with effort regulation is weakened.

[5] The items that had the highest factor loadings in Grant & Dweck, 2003 were selected.

regulated learning (e.g., “when studying for my classes I try to determine which concepts I don’t understand well,”; 5 items; α = .69; Artino, 2005), and effort regulation (e.g., “I work hard to do well in my classes even if I don't like what we are doing,”; 3 items; α = .72; Artino, 2005).

Achievement. Achievement was indexed by grades in math. A composite of first and second semester math grades, which accounted for students’ homework, participation and performance on tests, was computed and used as a measure of students’ overall math achievement.

Results

There were no differences in intellectual humility by participant gender or age.

As in Study 1, intellectual humility was positively associated with learning goals, $r = .48$, $p < .001$. Intellectual humility was not associated with normative ability or normative outcome goals, but was positively associated with ability goals, $r = .44$, $p < .001$. As predicted, intellectual humility was also positively associated with metacognitive self-regulation, $r = .56$, $p < .001$, and effort regulation, $r = .38$, $p < .001$.

Intellectual humility was also positively associated with students’ overall grades in math, $r = .29$, $p < .01$. Each of the associations reported here remained significant controlling for parent education, student gender and age.

Discussion

Findings from Studies 1 and 2 were largely consistent. Study 2 provided additional support for our hypothesis that intellectual humility is associated with outcomes that are relevant for learning in school. High school students higher in intellectual humility were more motivated to learn, used meta-cognitive learning strategies more readily and were more effortful in class. Intellectual humility was also positively associated with students’ actual achievement, suggesting that it may

enhance learning as well as motivation and use of adaptive strategies. Although the magnitude and significance of correlations with intellectual humility differed across Studies 1 and 2 for normative goals and ability goals, the robust association between intellectual humility and learning goals across both studies suggests that those higher in intellectual humility are consistently more motivated to learn relative to low IH peers.

Given the positive associations between intellectual humility and adaptive learning outcomes in Studies 1 and 2, in Study 3 we turned out attention towards identifying a possible source of intellectual humility.

Study 3

If intellectual humility is beneficial for learning, are there ways to increase it? Although the causes of intellectual humility are not well understood, considerable research suggests that people's beliefs of intelligence might exert an important influence on intellectual humility and its consequences. A growth mindset of intelligence (i.e., *an incremental theory*)—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 (e.g., Blackwell, Trzesniewski, & Dweck, 2007), less defensiveness (e.g., Nussbaum & Dweck, 2008), and a more accurate awareness of one's knowledge and abilities (Ehrlinger, Conlon, Park, Fay, & Dweck, in preparation). By contrast, a fixed mindset of intelligence (i.e., *an entity theory*)—the belief that intelligence is an unchangeable trait—might sabotage intellectual humility by increasing people's self-focus and defensiveness in intellectual contexts (e.g., Mueller & Dweck, 1998; Nussbaum & Dweck, 2008). Drawing on this past research, we predicted that having a growth

mindset of intelligence would foster intellectual humility. Thus, in Study 3 we tested the causal association between beliefs about intelligence and intellectual humility[6].

Method

Participants. 104 community college students (54 women, 50 men) were recruited to participate in this study. Three participants were excluded from analyses: one because of suspicion about the experimental manipulation, and two because they submitted identical survey responses. This left 101 participants (53 women, 48 men). Forty-seven percent of participants were Asian, 25% were White, 12% were mixed ethnicity, 7% were Hispanic, 5% were other ethnicity, and 4% were Black. We did not have access to participants' ages for analyses.

Design and procedure. In one online session, participants were randomly assigned to a growth or fixed mindset condition that involved reading a scientific article with evidence for either a growth or fixed view of intelligence. They then completed the intellectual humility scale and responded to questions assessing participants' openness to learning from others during a disagreement – a context that can hinder learning. Assessing this outcome expanded on our previous finding by testing whether intellectual humility relates to learning when learning conditions are particularly challenging.

***Mindset conditions*.** The growth and fixed mindset 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 mindset article was that intelligence can be developed (e.g., "Dr. Stanley and her team of researchers developed an extensive body of scholarship about intelligence. One of their key discoveries was that,

[6] This study also tested how the relation between beliefs about intelligence and intellectual humility might change as individuals experience intellectual successes and failures. This portion of the experiment is described in detail elsewhere (see Porter, 2015). We found experiencing success and failure did not affect the association between intellectual humility and beliefs about intelligence.

essentially, each person's intelligence can grow and develop over time") and the key message of the fixed mindset article was that intelligence is a static trait (e.g., "Dr. Stanley and her team of researchers developed an extensive body of scholarship about intelligence. One of their key discoveries was that, essentially, each person has a certain amount of intelligence, and that amount remains pretty stable over time"). To check participants' understanding of the articles, we asked them to report the article's main idea.

Questionnaires. Next, participants completed measures of IH (9-items, $\alpha = .79$), and openness to learning in the context of a classroom disagreement. For this measure, participants read three scenarios depicting classroom disagreements (e.g., disagreeing with a peer about a class reading, a presentation and an essay). For example:

> For a psychology class, you have to write an essay about major psychological theories for your final project. You do a lot of research and write a well-informed essay. The professor pairs you up with another student in the class and asks you to swap essays with this person and comment on each other's work. The student who reads your essay says that they disagree with many of the points that you made.

For each scenario, participants rated five 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, $\alpha = .88$.

Next, participants imagined that they encountered the person who disagreed with them outside of class, and that the person engaged them in a discussion about the disagreement. Participants rated nine items based on how likely they would be to respond to this person with

open-mindedness and willingness to learn (e.g., "I would try to understand their perspective about the material"; "I would start an argument with them (R)"; 1 = *extremely unlikely* to 7 = *extremely likely*). Negatively-worded items were reverse-scored and averaged with open-minded items to create an openness to learning composite, $\alpha = .89$.

At the end of the session, participants were fully debriefed about the nature of the articles that they read and the feedback that they received. They received course credit and were thanked for their participation in the research.

Results

Manipulation check. All participants except four correctly reported the main idea of the mindset article. The four participants who failed to do so reported either not reading the article, or not understanding it. Analyses were conducted including and excluding these participants, and results were not affected. To give a conservative estimate of the effects of the experiment, these four participants were included in the analyses.

Beliefs about intelligence as a predictor of intellectual humility and openness to learning during disagreement. *As predicted, participants in the growth mindset condition had significantly higher intellectual humility ($M = 5.09$, $SD = .71$) than those in the fixed mindset condition ($M = 4.77$, $SD = .75$), $t(99) = 2.23$, $p = .03$, $d = .44$. Participants in the growth mindset condition also made significantly more respectful attributions ($M = 5.65$, $SD = .87$) than did those in the fixed mindset condition ($M = 5.30$, $SD = .86$), $t(99) = 2.06$, $p = .04$, $d = .40$, and reported being more open to learning in their responses to disagreement ($M = 5.13$, $SD = .73$) than did those in the fixed mindset condition ($M = 4.84$, $SD = .69$), $t(99) = 2.10$, $p = .04$, $d = .41$ (see Figure 1 for all three effects).*

Looking next at whether intellectual humility mediated the effect of mindsets on responses to disagreement, we found support for both respectful attributions and open-minded responses. For respectful attributions, when both mindset condition and IH were included as predictors in the model, IH remained a significant predictor, B = .55 (SE = .10), t(98) = 5.25, p < .001, but the effect of mindset condition on respectful attributions was no longer significant, B = .17 (SE = .16), t(98) = 1.11, p = .27 (see Figure 2). A bias-corrected bootstrap mediation model with 5000 bootstrap re-samples and 95% confidence interval supported the role of IH in mediating the effect of mindset condition on respectful attributions, B = .18; CI = .02 to .39.

Similarly, for open-minded responses, when both mindset condition and IH were included as predictors in the model, IH remained a significant predictor, B = .52 (SE = .08), t(98) = 6.35, p <.001, but mindset condition was not, B = .13 (SE = .12), t(98) = 1.03, p = .30 (see Figure 3). A bootstrapping analysis supported the mediating role of IH in the effect of mindset condition on openness to learning during disagreement, B = .17; CI = .02 to .36.

Discussion

Overall, Study 3 demonstrated that beliefs about intelligence affected intellectual humility and that intellectual humility, in turn, shaped individuals' openness to learning during a disagreement. Those in the growth mindset condition had significantly higher intellectual humility than those in the fixed mindset condition, and intellectual humility mediated the effect of growth mindset condition on participants' responses to disagreement. These findings suggest that promoting a growth mindset of intelligence is one way to (at least temporarily) enhance intellectual humility and its downstream consequences.

These results are particularly promising given past research that has shown that beliefs about intelligence and personality can be changed more enduringly and that this change can

affect important outcomes, including motivation and achievement in school (Blackwell, Trzesniewski and Dweck, 2007; Yeager, Johnson, Spitzer, Trzesniewski, Powers and Dweck, 2014), aggression, (Yeager, Trzesniewski, and Dweck, 2013) symptoms of depression (Miu and Yeager, 2015), stress, and health (Yeager at al., 2014).

Conclusion

The findings from three studies presented here indicate that intellectual humility – a willingness to acknowledge the partial nature of one's current knowledge, and to value others' intelligence – is associated with a number of outcomes that are important for learning in school. Across this research we have established a strong link between intellectual humility, greater motivation to learn and use of adaptive learning strategies. Moreover, this research suggests that increases in intellectual humility may also pay off in terms of students' actual achievement in school. We have also identified one relatively simple method for cultivating intellectual humility: intervening at the level of children's beliefs about intelligence. Teaching students that intelligence is a malleable trait that can be developed through effort and experience offers a promising way to enhance intellectual humility and, ultimately, learning.

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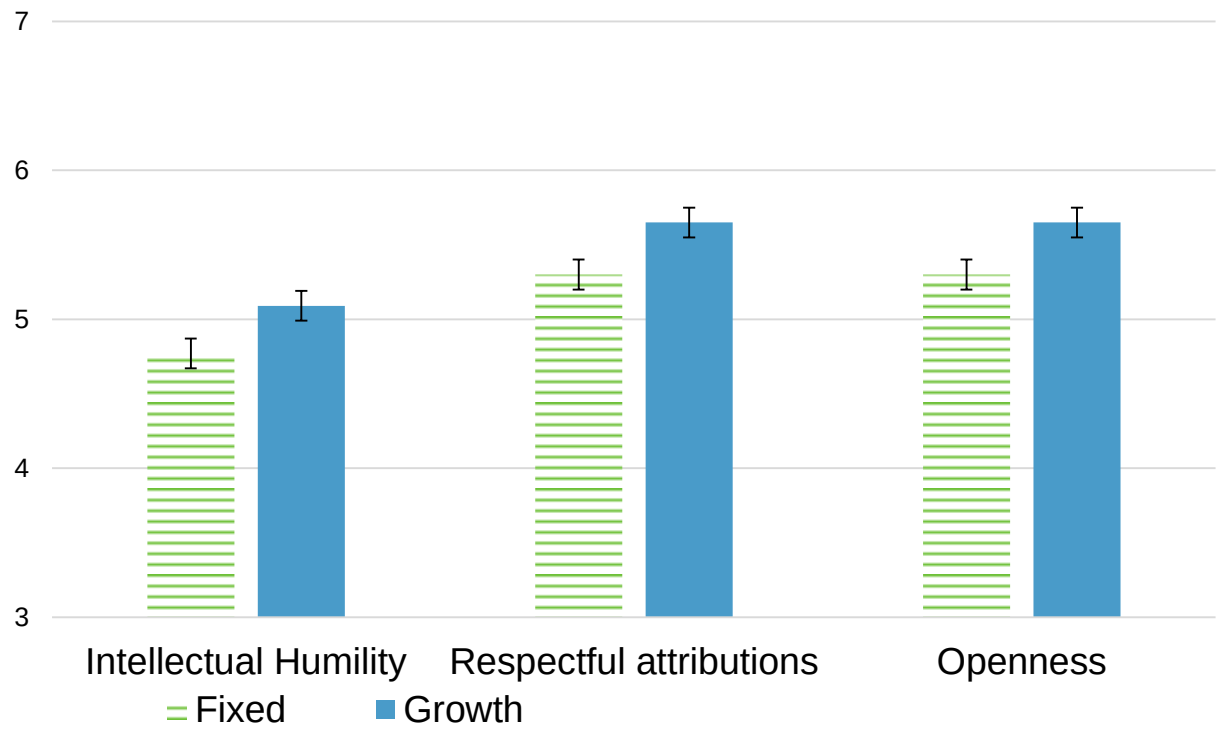

Figure 1: Effect of mindset condition (fixed vs. growth) on intellectual humility, respectful attributions, and openness in Study 3

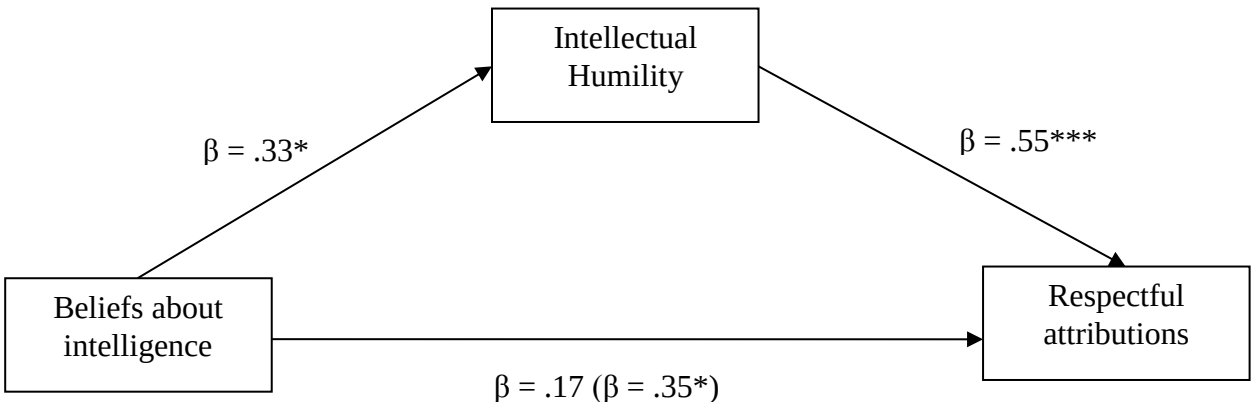

Figure 2. Mediation of IH on beliefs about intelligence, and respectful attributions, Study 3. *Note:* Fixed mindset coded as 0; growth mindset coded as 1. The parenthetical numbers indicate betas before including the mediator. ****p* <.001; ***p* <.01; **p* <.05.

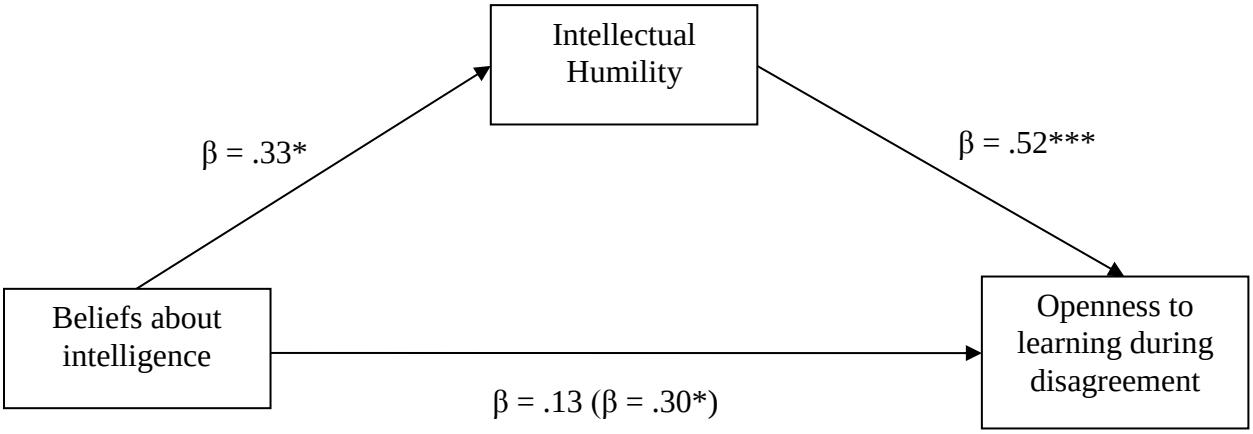

Figure 3. Mediation of IH on beliefs about intelligence and openness to learning in disagreement, Study 6. *Note:* Fixed mindset coded as 0; growth mindset coded as 1. The parenthetical numbers indicate betas before including the mediator. ****p* <.001; ***p* <.01; **p* <.05