The Effects of Perspective Taking on Intellectual Humility and its Relationship to Confirmation Bias

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Abstract

Intellectual humility (IH) is the ability to understand the limits of one's knowledge. It is important to maximize the benefits and mitigate the threats of IH. We explored the impact of perspective taking (PT) on IH and its connection to confirmation bias (CB). In a mixed pretest-posttest experiment with 174 participants randomly assigned to self- or other-perspective, IH was higher in the other-perspective (vs self-perspective). Also, exposure to other-perspective boosted IH (vs baseline) and exposure to self-perspective inhibited IH (vs baseline). Interestingly, IH was not correlated with CB, challenging the notion that IH is a protective factor against CB. The study illustrates a clear distinction between other- and self-perspective and their impact on IH. Practicing other-perspective, allows to transcend from one's egocentric views, fostering IH. While self-perspective, reinforces egocentric views, leading to intellectual arrogance. Lastly, both intellectually humble and arrogant are susceptible to CB, emphasizing the need for more research.

Keywords: Intellectual Humility; Perspective Taking; Confirmation Bias

Introductions

According to Plato, Socrates once confessed that all he knows is that he knows nothing (Plato, 1977), displaying humility towards knowledge and respect for science. Socrates exhibits the virtue of Intellectual Humility (IH), an ability that can prove advantageous for any individual. But what exactly is IH and how can we hone it?

Defining IH can be challenging because there is no consensus on it (Porter, Baldwin, Warren, Murray, Bronk, Forgeard, Snow, & Jayawickreme, 2022). Broadly, IH can be viewed as a subdomain of general humility, focusing on epistemic knowledge (Davis, Rice, McElroy, DeBlaere, Choe, Van Tongeren, & Hook, 2015; McElroy, Rice, Davis, Hook, Hill, Worthington, & Van Tongeren, 2014; Porter, Elnakouri, Meyers, Shibayama, Jayawickreme, & Grossmann, 2022; Porter & Schumann, 2018). Specifically, IH has been characterized as the ability to recognize limitations (Davis et al., 2015; Kross & Grossmann, 2012; McElroy et al., 2014; Porter, Elnakouri, et al., 2022; Porter & Schumann, 2018; Worthington, Davis, & Hook, 2016; Zmigrod, Zmigrod,

Rentfrow, & Robbins, 2019) and fallacies in one's knowledge (Porter, Elnakouri, et al., 2022; Zmigrod et al., 2019), while acknowledging the strengths of other's knowledge (Leary, Diebels, Davisson, Jongman-Sereno, Isherwood, Raimi, Deffler, & Hoyle, 2017; Porter & Schumann, 2018). It also involves the ability to regulate one's arrogance, by presenting their ideas in a non-offensive manner and receiving information without taking offence (McElroy et al., 2014; Worthington et al., 2016). It is characterized by openness to new ideas (Davis et al., 2015; McElroy et al., 2014), need for cognition (Davis et al., 2015; Leary et al., 2017; Worthington et al., 2016), and being objective towards intellectual truth (Davis et al., 2015; Gregg, Mahadevan, & Sedikides, 2017; Leary et al., 2017).

Theoretically, IH is a virtue which exists in a continuum between intellectual arrogance (IA) and intellectual diffidence. IA translates to a person who overvalues themselves and intellectual diffidence refers to the person who undervalues themselves. Consequently, the intellectually humble neither values themselves too much nor undervalues themselves (Porter, Elnakouri, et al., 2022; Roberts & Wood, 2007; Worthington et al., 2016). This review will focus on IH and IA, because these constructs are relevant to the present study.

IA is an epistemic limitation where individuals, believing in their intellectual superiority, dismiss others' opinions without consideration (Roberts & Wood, 2007; Tanesini, 2023). In contrast, those with intellectual humility value cooperation, acknowledge other's perspectives, and impartially evaluate arguments to reach the truth, differentiating themselves from intellectual diffidence by revising beliefs when flaws are identified (Gregg et al., 2017; Leary et al., 2017; Worthington et al., 2016).

Porter, Elnakouri, et al. (2022) suggest that IH boosts social cohesion by reducing extreme beliefs and increasing individual well-being and knowledge. They argue that IH "can decrease polarization, extremism and susceptibility to conspiracy beliefs, increase learning and discovery, and foster scientific credibility" (p. 524). Ethically, IH promotes best practices across various fields including politics, science (Hoekstra & Vazire, 2021; Wiggins & Christopherson,

2019), education, counseling, and medicine, thereby enhancing credibility in these domains. This paper will focus on cognitive aspects that may influence IH, such as PT, and cognitive biases like confirmation bias.

Intellectual Humility & Perspective Taking

PT involves the cognitive capacity to understand another person's thoughts, behavior, and feelings (Galinsky, Maddux, Gilin, & White, 2008; Healey & Grossman, 2018; Hynes, Baird, & Grafton, 2006; Ng, Hsu, & Parker, 2021; Porter, Elnakouri, et al., 2022). This cognitive process allows individuals to anticipate reactions from others and adapt their own behavior accordingly (Ng et al., 2021). In contrast, those unable to practice PT hold on to their egocentric views, have an unjustified sense of entitlement, and increase the risk of conflict (Yip & Schweitzer, 2019).

IH and PT are distinct concepts (Porter, Elnakouri, et al., 2022). IH is the ability to understand one's own intellectual limits whereas PT is the cognitive capacity to understand another's alternative viewpoint. An overlapping characteristic between the two is the reduction of egocentric thinking and increased open-mindedness (Grossmann & Kross, 2014; Kross & Grossmann, 2012; Porter, Elnakouri, et al., 2022). IH involves the recognition of one's intellectual fallibility which requires transcending from their egocentric views (Grossmann & Kross, 2014; Kross & Grossmann, 2012; Roberts & Wood, 2007), and being open/receptive to others' perspectives (Kross & Grossmann, 2012; Porter, Elnakouri, et al., 2022). In contrast, the intellectually arrogant person who lacks this openness clings to their egocentric views and behaves as if they are superior to others (Roberts & Wood, 2007). Thus, engaging in PT may increase one's IH.

Research on PT shows promising results as a mechanism to increase IH. IH tends to increase when individuals take the perspective of another person (other-perspective) compared to their own (self-perspective) (Grossmann, Dorfman, Oakes, Santos, Vohs, & Scholer, 2021; Grossmann & Kross, 2014; Kross & Grossmann, 2012). This finding is in accordance with our understanding of IH; namely, distancing from one's egocentric views allows the person to practice IH, while immersing in their self-views leads them to IA.

However, measuring IH pre- and post-perspective manipulation, interesting results have emerged. Exposure to other-perspective increases IH compared to baseline (Grossmann et al., 2021). This aligns with the idea that engaging in other-perspective, enables individuals to transcend from their own perspective, reduce their egotistical thinking, and gain clarity in their own limits of knowledge. Interestingly, Grossmann et al. (2021) study showed that exposure to self-perspective either has no effect on IH (study 1) or increases IH (study 2), compared to baseline. Theoretically speaking, self-perspective being considered the baseline cognitive perspective (Ng et al., 2021), may lead us to assume that it may have no impact on IH. However, engaging in self-perspective could also enhance one's egotistical thinking and decrease one's IH after manipulation,

which contradicts the findings by Grossmann et al. (2021) (study 2).

Although the above studies offer valuable insight into the effect of PT on IH, they did not follow a clear methodology to manipulate perspective taking and they measure only a subdomain of IH (i.e., limits of one's own knowledge) rather than the entire construct. Previous research by Porter, Baldwin, et al., (2022) shows that IH does not involve only one dimension, but it is rather a multifaceted construct. To have a clear answer on the effect of PT on IH one should incorporate measurements representative of each subdomain of IH.

The present study will address the above problems by providing a clear methodology to manipulate PT and measure the whole construct of IH. The goal is to replicate previous results, investigate the effect PT has on IH as a whole, and the effect PT has on each subdomain of IH.

Intellectual Humility & Confirmation Bias

Another interest of the present study is the relationship between IH and cognitive biases, with a particular focus on confirmation bias (CB). Cognitive biases, including CB, are systematic errors of judgment that stem from relying on mental shortcuts, known as heuristics, to make fast decisions (Berthet, 2021; Kahneman, 2011; Wilke, 2012). CB specifically biases individuals to interpret information in ways that support their pre-existing beliefs (Berthet, 2021; Gertner, Zaromb, Schneider, Roberts, & Matthews, 2016; Wilke, 2012).

In exploring the dynamics of IH and CB, it is important to differentiate between Type 1 and Type 2 thinking. Type 1 thinking, characterized by speed and intuition (Kahneman, 2011) often leads to cognitive biases and IA (Samuelson & Church, 2015), where individuals "disregard new information in favor of past beliefs", resembling CB (Zmigrod et al., 2019, p. 201). In contrast, IH is associated with Type 2 thinking, characterized by deliberation, which enables a thorough evaluation of evidence (Leary et al., 2017), and acknowledgment of personal limitations (Bowes, Costello, Lee, McElroy-Heltzel, Davis, & Lilienfeld, 2021).

IH serves as a protective barrier against cognitive biases (Deffler, Leary, & Hoyle, 2016; Gregg et al., 2017; Hannon, 2020; Leary et al., 2017; Porter, Elnakouri, et al., 2022; Samuelson & Church, 2015; Zmigrod et al., 2019). It promotes cognitive flexibility (Zmigrod et al., 2019) and need for cognition (Porter, Elnakouri, et al., 2022), while decreases vulnerability to misinformation (Bowes et al., 2021) and polarization (Porter, Elnakouri, et al., 2022; Porter & Schumann, 2018). Whereas CB inhibits the need for cognition (Bar-Tal, 2010), while increases susceptibility to fake news and extremism (Dahlgren, 2019; Del Vicario, Scala, Caldarelli, Stanley, & Quattrociocchi, 2017; Tandoc, 2019). Also, political myside bias, which resembles CB (Alfano & Sullivan, 2020), has a negative relationship with IH (Bowes et al., 2021). Evidently, IH and CB have an opposite relationship with various constructs, yet a direct empirical relationship between the two remains unexplored.

By focusing on these distinctions and the theoretical foundations of IH, this study aims to empirically test the relationship between IH and CB. The findings could provide significant insights into how IH might counteract the influence of CB and similar biases.

The present study

The study aims to replicate and extend previous research related to PT and CB. The focus is on selecting more robust tools to measure all dimensions of IH, create a comprehensive methodology to manipulate PT, and understand how IH changes pre- and post-manipulation of PT. In addition, the current study aims to fill gaps in the literature related to CB and use updated measurement tools. Based on the literature that has been overviewed, it is hypothesized that IH will significantly increase in the other-perspective group compared to self-perspective group (H1) and after exposure to other-perspective IH will significantly increase compared to the baseline (H2). Moreover, the current study will try to determine whether exposure to self-perspective will affect IH compared to baseline (RQ1) and whether IH is related to CB (RQ2).

To further elaborate on the research questions, we expect that exposure to self-perspective should either have no effect on IH or decrease IH compared to the baseline. The reasoning stems from the fact that self-perspective is considered the baseline cognitive mode. Hence, exposure to it will have no impact on IH, or it may further reinforce one's egocentric views, and diminish their IH. Concerning CB, the evidence suggests that IH has a negative relationship with various cognitive biases, simultaneously, IH and CB have an opposite relationship with various constructs (e.g., need for cognition, polarization, fake news). Therefore, it is assumed that IH will be negatively related to CB.

Method

Participants

G*Power 3.1.9.6 was used a-priori to calculate the desired sample size of the study ($\alpha = 0.05$, $\beta = 0.8$, small to medium effect size Cohen's $f = 0.17–0.2$) (Kotrlik & Williams, 2003; Watson, 2009). From this calculation 150–206 participants were required. Candidates were recruited from college campus through convenient sampling and were not compensated. Recruitment lasted 9 days between 6/10/2023 and 20/10/2023.

Those who were primarily English speakers, or bilingual English speakers were rejected from participation to avoid any language effects. Participants were excluded from the final analysis if they failed attention checks (N = 16), if their assigned perspective (self/other) did not match the frequency of pronouns (first/third) (N = 7), and if they admitted their participation was not serious (N = 1). After excluding 24 candidates, the final sample consisted of 174 participants, most of which were women (56.3%) and 22 years old on average (SD = 7.86).

Materials

To measure IH the Multi-Dimensional Intellectual Humility (MDIH) scale was used, developed, and validated by Alfano, Iurino, Stey, Robinson, Christen, Yu, & Lapsley, D. (2017). It was selected after reviewing Porter, Baldwin, et al. (2022) study in which they coded every IH scale. From their review the MDIH was the most promising because it included all relevant IH subdomains. It consists of 22-questions rated on a balanced 7-point Likert scale (1 = strongly disagree, 7 = strongly agree), with high scores indicating high IH. It consists of 4 subdomains: (a) open-mindedness (OPM) with 6 items (Cronbach's $\alpha = .619$); (b) intellectual modesty (MOD) with 5 items (Cronbach's $\alpha = .784$); (c) corrigibility (COR) with 5 items (Cronbach's $\alpha = .718$); and (d) engagement (ENG) with 6 items (Cronbach's $\alpha = .652$). The MDIH had robust internal consistency (Cronbach's $\alpha = .805$) in the current study.

The Confirmation Bias Task (CBT), developed by Berthet, Autissier, and de Gardelle (2022) was used to measure CB. It consists of 4-items, each one describing the personality of an individual (e.g., agreeableness) and includes 20 questions to ask this imaginary person: 8 questions assume that the person has the trait (confirmatory strategy), 8 assume that the person does not have the trait (dis-confirmatory strategy), and 4 neutral questions. Using a confirmatory strategy indicates confirmation bias, and the total number of confirmatory questions selected by the participant is the total score of confirmation bias. In the study, internal consistency of the task was satisfactory (Cronbach's $\alpha = .683$).

PT was manipulated with a thought exercise in which participants immersed in an imaginary scenario and engaged in either self-perspective or other-perspective. This thought experiment has been used widely as an effective method to manipulate PT (Dorfman, Oakes, Santos, & Grossmann, 2021; Galinsky et al., 2008; Galinsky, Magee, Rus, Rothman, & Todd, 2014; Grossmann & Kross, 2010, 2014; Kross & Grossmann, 2012; Ng et al., 2021; Sherf & Morrison, 2020), while serving as a mechanism to transcend or immerse in one's viewpoints which affects IH (Grossmann & Kross, 2014; Kross & Grossmann, 2012). Participants were introduced to a scenario (e.g., betrayal from friends or family; a scenario that fits the study population) and were guided to imagine it from either their own perspective or the perspective of another person (Kross & Grossmann, 2012). Next, they were asked to write down their thoughts from either their own perspective using first-person pronouns or the other person's using third-person pronouns. In accordance with other research on PT, this text was used as a manipulation check. It was expected that in self-perspective participants would use more first-person pronouns while in other-perspective more third-person pronouns (Dorfman et al., 2021; Grossmann & Kross, 2010, 2014; Kross & Grossmann, 2012). As such the ratios of first-person pronouns in the self-perspective ($M = .88$, $SD = .13$) and the third-person pronouns in third perspective ($M = .96$, $SD = .09$) were analyzed.

Table 1: Pairwise Comparisons Adjusted with Bonferroni for MDIH, OPM, and COR Scores Across Time (pre/post) and PT (self/other)

	df	F	p	η_p^2
MDIH				
Time 1: Self/Other	1	2.75	0.099	0.016
Time 2: Self/Other	1	9.17*	0.003	0.051
Self: Time 1/Time 2	1	4.37*	0.038	0.025
Other: Time 1/Time 2	1	6.67*	0.011	0.037
OPM				
Time 1: Self/Other	1	2.39	0.12	0.01
Time 2: Self/Other	1	12.05*	< .001	0.065
Self: Time 1/Time 2	1	17.98*	< .001	0.095
Other: Time 1/Time 2	1	0.25	0.616	0.001
COR				
Time 1: Self/Other	1	1.93	0.166	0.011
Time 2: Self/Other	1	7.42*	0.007	0.041
Self: Time 1/Time 2	1	1.18	0.28	0.007
Other: Time 1/Time 2	1	5.21*	0.024	0.029

Note. *p < .05

Procedure

The college's ad hoc psychology department ethics committee approved the study. The study was pre-registered and can be found online along with raw data, and supplementary material in https://researchbox.org/2252.

The experiment was conducted in the computer labs of the college using Qualtrics. Participants were introduced to the informed consent. Then they completed the MDIH which included an attention check. Following that they proceeded to the CBT. After CBT, candidates were randomly assigned to either self- or other-perspective. After the manipulation of PT, they were presented with the MDIH a second time, which included a different attention check. Finaly, the responders completed the demographics section and were debriefed. During the experiment, participants were presented with the items in MDIH and CBT in a randomized sequence.

The study was a 2x2 mixed experimental design with IH time of measurement (pre- and post-manipulation) and PT (self: N = 86, other: N = 88) as factors. Further, a correlational analysis explored the relationship between IH and CB. Data clean-up was performed in Excel and data analysis was conducted with IBM SPSS v27.

Results

The effect of PT on IH was assessed through a mixed two-way ANOVA ensuring its assumptions for normality, sphericity, and homogeneity were satisfied. To assess how gender affected our findings, it was added as an extra factor (male/female) in the mixed ANOVA, resulting in a 2x2x2 design.

The 2x2 mixed ANOVA for MDIH yielded a significant main effect of PT in which MDIH was higher in the other-perspective (M = 115.50, SD = 12.02) compared to self-perspective (M = 110.41, SD = 16.11), F(1, 172) = 5.92, p = .016, η_p^2 = .33. And a significant interaction between time (pre/post) and PT (self/other), F(1, 172) = 10.91, p = .001, η_p^2 = .0596. Post-hoc pairwise comparisons with Bonferroni adjustments revealed a non-significant difference in MDIH scores between groups in time-1, which aligns with random assignment. In time-2, those in the other-perspective (M = 116.41, SD = 12.54) scored significantly higher in MDIH compared to self-perspective (M = 109.66, SD = 16.62), F(1, 172) = 9.17, p = .003, η_p^2 = .051. In self-perspective, MDIH scores significantly decreased from time-1 (M = 111.15, SD = 15.60) to time-2 (M = 109.66, SD = 16.61), F(1, 172) = 4.37, p = .038, η_p^2 = .025. While in the other-perspective, MDIH significantly increased from time-1 (M = 114.59, SD = 11.51) to time-2 (M = 116.41, SD = 12.541), F(1, 172) = 6.67, p = .011., η_p^2 = .037 (see Table 1, Figure 1).

The 2x2 mixed ANOVA for OPM showed a significant main effect of time, in which OPM scores decreased from time-1 (M = 36.87, SD = 3.93) to time-2 (M = 36.06, SD = 4.15), F(1, 172) = 11.35, p < .001, η_p^2 = .062. A significant main effect of PT, in which OPM was higher in the other-perspective (M = 37.25, SD = 3.56) compared to self-perspective (M = 35.68, SD = 4.52), F(1, 172) = 7.6, p = .006, η_p^2 = .042. Lastly, an interaction between time and PT occurred, F(1, 172) = 7.09, p = .009, η_p^2 = .04. Post-hoc pairwise comparisons adjusted with Bonferroni revealed that in time-2 those in the other-perspective (M = 37.16, SD = 3.53) scored significantly higher in OPM compared to self-perspective (M = 34.95, SD = 4.78), F(1, 172) = 12.05, p < 0.001 η_p^2 = .065. In self-perspective OPM significantly decreased from time-1 (M = 36.41, SD = 4.26) to time-2 (M = 34.95, SD = 4.78), F(1, 172) = 17.98, p < .001, η_p^2 = .095 (see Table 1, Figure 1).

Furthermore, the 2x2 mixed ANOVA for COR revealed a main effect of PT, in which those in the other-perspective (M = 26.75, SD = 4.69) scored significantly higher compared to self-perspective (M = 25.15, SD = 5.49), F(1, 172) = 4.73, p = .031, η_p^2 = .027. Also, an interaction between time and PT occurred, F(1, 172) = 5.65, p = .019, η_p^2 = .032. Post-hoc pairwise comparisons with Bonferroni adjustments showed that in time-2, those in the other-perspective (M = 27.12, SD = 4.64) scored significantly higher in COR than those in self-perspective (M = 24.97, SD = 5.78), F(1, 172) = 7.42, p = .007, η_p^2 = .041. And in the other-perspective COR scores significantly increased from time-1 (M = 26.38, SD = 4.74) to time-2 (M = 27.12, SD = 4.64), F(1, 172) = 5.21, p = .024, η_p^2 = .029 (see Table 1, Figure 1). Lastly, there was a main effect of gender (male/female) in COR, but no interaction of gender with PT (self/other) nor time (pre/post). While the interaction between PT and time remained significant. Indicating that gender had no effect on the above findings.
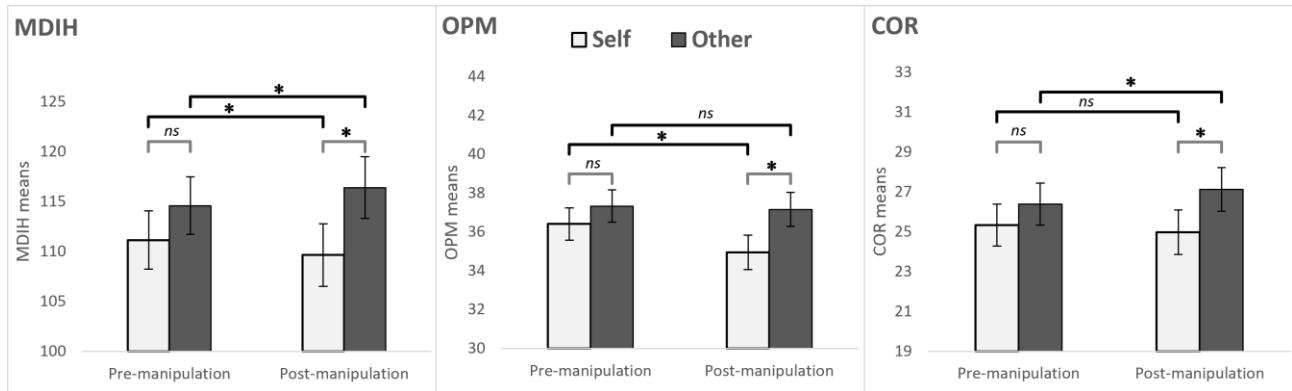
Note. Error bars represent 95% CI, ns = non-significant, * represents significance at $p < .05$

Figure 1: Intellectual Humility Scores Between Groups (self/other) and Across Time (pre-/post-manipulation)

For both ENG and MOD subscales, there were no significant main effects for either time (pre/post) nor PT (self/other) and no interaction effects between the two.

The relationship between IH and CB was assessed using Kendall's non-parametric equivalent of Pearson's r because the relationship between the two variables was not linear. The correlational analysis yielded no significant results between CB and MDIH, including its subscales.

Discussion

IH is a multifaceted construct that involves the ability to approach knowledge with a certain degree of humility (e.g., understanding one's limits of knowledge, appreciating knowledge of other's, regulating one's arrogance, etc.). This ability is of intrinsic value to society because it has the potential to reduce extremism and polarized views. The present study aimed to replicate and extend previous findings on the effect of PT on IH as well as explore whether IH relates to CB.

Intellectual Humility & Perspective Taking

As it was shown, PT significantly affects IH. When considering the entire spectrum of IH (i.e., MDIH) the findings illustrate that placing oneself in another's position, instead of their own, promotes intellectual humility, supporting H1. Previous researchers consistently found that IH was higher in the other-perspective compared to the self-perspective (Grossmann et al., 2021; Grossmann & Kross, 2014; Kross & Grossmann, 2012). This finding reveals that IH levels differ between cognitive perspectives, and those who actively practice PT benefit in terms of IH compared to those who are immersed in their self-views. Furthermore, exposure to other-perspective increased IH compared to baseline, supporting H2, which is also consistent with the study of Grossmann et al. (2021). Moreover, exposure to self-perspective decreased one's IH compared to baseline, addressing RQ1. This finding shed light on the mixed results by Grossmann et al. (2021), who found self-perspective having either no effect or a boosting effect on IH. Overall, the current study shows that our potential for IH gets boosted when we transcend ourselves to another's view and diminishes when we immerse in our egotistical viewpoints.

Previous researchers measured only one aspect of IH (i.e., limits of one's knowledge) (Grossmann et al., 2021; Grossmann & Kross, 2014; Kross & Grossmann, 2012), whereas the present study extends the effects of PT across all domains of IH. This way previous limitations were resolved, and the impact of PT on IH was more clearly articulated.

Specifically, being exposed to another's viewpoint, compared to one's own, increased both OPM and COR scores, showing improved awareness of their limits of knowledge and resilience when challenged. This highlights that in the domain of IH, the limits of one's knowledge is not the only factor affected by PT, but one's resilience when challenged is influenced as well. Moreover, it was found that OPM decreased after exposure to self-perspective (compared to baseline). Thus, when an individual gets absorbed in their egocentric views, the ability to understand their intellectual limits gets diminished leading them to IA. Lastly, it was discovered that exposure to the other-perspective boosted COR (compared to baseline). As such, actively practicing PT helps the person not get offended when they are intellectually challenged and be able to adapt to social situations better.

Using a multidimensional measurement of IH proved useful because it showed how different domains of IH are affected by PT. Such practice revealed that the MOD (i.e., concern about one's intellectual status) and ENG (i.e., drive to learn new things) dimensions were not affected by PT whereas the OPM and COR were. As such, future research in the field should not only measure one's limits in knowledge (i.e., OPM), but their resilience when challenged (i.e., COR) as well.

While the study offered new insights on the impact PT has on IH, there are limitations. First, Levene's homogeneity test was violated for time-2 in MDIH. Second, using a questionnaire focused on the trait of IH may lead to reduced variability post-manipulation, compared to the use of state focused questionnaires (Porter, Elnakouri, et al., 2022). Lastly, the use of questionnaires is prone to biased responses because they rely on the individual's subjective judgment. It is suggested to pair questionnaires with behavioral measures

of IH to increase the validity of the scores (Porter, Elnakouri, et al., 2022).

Future studies could address these limitations by including behavioral measures of IH, larger representative samples, and more robust measurement tools (Porter, Baldwin, et al., 2022; Porter, Elnakouri, et al., 2022) comprised of all relevant domains of IH.

Intellectual Humility & Confirmation Bias

A secondary aim was to explore the relationship between IH and CB. Findings indicate that such a relationship does not occur and that IH is independent of CB. This result may seem counterintuitive, given that Bowes et al. (2021) found a negative correlation between IH and political myside bias. Although CB and myside bias are thought to be similar in nature (Alfano & Sullivan, 2020), our findings suggest that they may operate differently.

The study also suggests that both the intellectually humble and the intellectually arrogant are equally prone to CB. This extends our understanding of how CB operates. If IH works as a protective factor against fake news and polarization (Bowes & Tasimi, 2022; Porter, Elnakouri, et al., 2022; Porter & Schumann, 2018), while CB increases susceptibility to them (Dahlgren, 2019; Del Vicario et al., 2017; Tandoc, 2019), then the intellectually humble person may use other processes to protect themselves from fallacies rather by having the ability to avoid CB (e.g., their openness to other's opinions, flexibility to adapt to new information, or the ability to avoid other cognitive biases).

Nonetheless, the absence of a relationship between IH and CB may be attributed to the limited sample size. Additional research is required to replicate the above and explore the relationship between IH and other cognitive biases. Furthermore, exploring how IH moderates the relationship between CB and susceptibility to fake news and polarization would yield valuable insights.

Conclusion

To sum up, IH has great potential for societal benefits, including reduced polarization, susceptibility to fake news, and conspiracy beliefs. IH can enhance academic integrity, and reduce the spread of false information (e.g., climate denial, denial of electoral outcomes) (Enders, Uscinski, Klofstad, Premaratne, Seelig, Wuchty, Murthi, & Funchion, 2021; Jacques, 2012), among others. Intervention techniques involving PT may offer a means to boost IH. But to maximize the positive impact of such methods, more research is needed to address potential threats of IH, such as cognitive biases.

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