



# Intellectual Humility and Cognitive Reflection Predict Trust in Science

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## DESCRIPTION

Intellectual humility refers to the recognition that one's beliefs and knowledge could be incorrect, paired with a willingness to revise those beliefs when presented with new evidence. Cognitive reflection, on the other hand, is the disposition to override intuitive responses in favor of deliberative thinking. These traits, while distinct, are deeply interconnected in shaping how individuals process scientific information and evaluate its credibility.

Research suggests that intellectual humility enhances open-mindedness, making individuals more receptive to evidence even when it conflicts with prior beliefs or political identity. This is particularly relevant in scientific discourse, where evidence can often be complex, counterintuitive, or provisional. For example, the COVID-19 pandemic illustrated how scientific understanding evolves over time and individuals with high intellectual humility were better able to adapt to changing recommendations on masks, vaccines and treatments.

Cognitive reflection contributes by enabling individuals to critically analyze information rather than rely on gut instincts or heuristic shortcuts. Those with high cognitive reflection are less likely to fall for conspiracy theories or pseudoscientific claims, as they are more inclined to question the validity and source of information. In a digital world saturated with superficial narratives and misinformation, this reflective capacity acts as a filter for discerning fact from fiction.

The incremental value of these traits lies in their combined predictive power. While education, political orientation and media consumption habits have been traditional predictors of science trust, they do not fully explain individual variation. Adding intellectual humility and cognitive reflection to the predictive model allows for a more nuanced understanding of who trusts science and why. These traits tap into the underlying cognitive and dispositional mechanisms that govern belief formation and information evaluation.

There is also practical value in understanding these predictors. Interventions aimed at increasing trust in science often focus on

improving scientific literacy, but this alone may not be sufficient. If individuals lack the cognitive disposition to question their assumptions or to engage reflectively with scientific claims, then factual knowledge may have limited effect. Programs that foster intellectual humility through exercises that encourage perspective-taking or acknowledgment of uncertainty can complement traditional science education. Similarly, training in cognitive reflection can help individuals recognize and mitigate biases, making them more discerning consumers of information.

However, it is important to recognize the contextual limits of these traits. Intellectual humility should not be mistaken for gullibility; it must be paired with epistemic vigilance to avoid accepting misinformation under the guise of open-mindedness. Likewise, cognitive reflection does not guarantee objectivity if it is directed by motivated reasoning or ideological biases. Thus, fostering these traits must occur in environments that also promote intellectual integrity and critical dialogue.

The implications for science communication are substantial. When crafting public health campaigns or disseminating climate change information, communicators must consider not only the content of the message but also the cognitive and dispositional readiness of their audience. Tailoring messages that resonate with intellectually humble and cognitively reflective individuals may improve message reception and behavioral compliance. Moreover, these traits could be incorporated into trust assessments when evaluating public opinion on controversial scientific issues, enabling more targeted engagement strategies.

In policy terms, promoting intellectual humility and cognitive reflection may be seen as part of a broader civic education effort. These are not merely academic constructs but essential tools for functioning in a complex, information-rich society. Embedding these traits into school curricula, professional training and media literacy initiatives may help build a more science-trusting and resilient populace.

In conclusion, intellectual humility and cognitive reflection provide distinct and complementary contributions to predicting trust in science. While neither trait is a panacea, their inclusion in models of public trust adds explanatory depth and points

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toward actionable strategies for engagement. As science continues to intersect with public life in critical and contentious ways, understanding and fostering these cognitive dispositions

may be among our best tools for strengthening the social contract between science and society.