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Expanding the Nomological Network of Intellectual Humility: An Examination of Personality Traits, Cognitive Styles, Critical-Thinking, and Self-Perception

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Abstract

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By Shauna M. Bowes

Although intellectual humility (IH) has long been discussed in academic disciplines such as philosophy and ethics, research on the psychological correlates of IH is still in its relative infancy. Preliminary research suggests that IH is positively associated with certain general personality traits, including humility and agreeableness, and negatively with certain personality disorder traits, such as narcissism. Research also indicates that IH is positively associated with certain cognitive styles, such as objectivism and need for cognition, and negatively associated with others, such as dogmatism. Studies suggest that IH, although strongly associated with general humility, is relatively distinct from it, insofar as IH predicts significant variance in relevant outcomes over-and-above general humility. Although research on the nomological network of IH is informative, there are noteworthy gaps in our knowledge. First, little research has simultaneously examined multiple measures of IH, so it remains unclear if certain IH measures possess relatively more construct validity compared with others. Second, potentially key constructs have not yet been examined in relation to IH, including values and personality disorder dimensions. Third, it is unclear whether IH buffers against overconfidence. To replicate and extend research, I examined the associations between IH and a plethora of individual difference constructs in a large community sample (N=573). In addition, I examined the incremental validity of IH above-and-beyond general humility, agreeableness, social desirability, and general intelligence in statistically predicting relevant outcomes. Finally, I investigated the potential for a Dunning-Kruger effect to elucidate whether low IH is associated with overconfidence in one's abilities. My results indicate that IH is robustly associated with an array of individual difference constructs, including normative and abnormal personality traits, cognitive styles, values, and critical-thinking. IH also predicted significant variance in relevant outcomes above-and-beyond all assessed covariates. There was little consistent evidence for a Dunning-Kruger effect in IH. My results suggest that IH is best conceptualized as an intrapersonally-oriented construct that is likely to be multidimensional in nature. Additional research is needed to clarify the latent structure of IH and elucidate its behavioral correlates. In addition, future research should examine whether IH buffers against cognitive bias.

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1. BACKGROUND

1.1 Overview

In the current sociopolitical climate, there is a profound lack of respect, open-mindedness, and humility in across-the-aisle dialogue. Political polarization, particularly affective polarization, has recently burgeoned, although researchers disagree regarding the extent to which ideological polarization on specific policy issues has increased (e.g., Iyengar, Sood, & Lelkes, 2012). Most agree that affective polarization has increased substantially in the American electorate, meaning that American individuals are not only likely to strongly disagree ideologically with those on the opposite side, but to perceive the other side as immoral, unintelligent, and perhaps even evil (Webster & Abramowitz, 2017). On balance, American individuals are increasingly sorting themselves into partisan silos that are largely insulated from potential dissenting voices. These silos are referred to as echo chambers, in which confirmatory information spreads, often rapidly. In contrast, in such chambers, disconfirmatory information reaches people much more slowly, and perhaps not even at all (Sunstein, 2018).

Given the potentially far-reaching and dangerous implications of political bias and cognitive bias writ large in society, Lilienfeld, Ammirati, and Landfield (2009) argued that ideological extremism and confirmation bias, the latter of which is the tendency to seek out, selectively interpret, or remember information that confirms an individual's previously held beliefs and opinions, and to deny, dismiss, or distort information that does not (Nickerson, 1998), should be "among psychological science's most pressing priorities" (p. 390). One construct that may be especially germane to elucidating cognitive bias proneness is *intellectual humility* (IH), which comprises an accurate perception of the fallibility of one's personal beliefs in conjunction with an appropriate attentiveness to one's limitations in seeking out and evaluating information

(e.g., Leary et al., 2017). IH has long been discussed across multiple disciplines, including religion (Hopkin, Hoyle, & Toner, 2014), politics (Porter & Schumann, 2018), philosophy (Whitcomb et al., 2017), and ethics (Schwab, 2012). It is now, and perhaps belatedly, of increasing psychological interest, as well, as it may be a trait-like cognitive variable relevant to information-seeking behaviors, decision-making processes, and cognitive biases.

1.2 Intellectual humility defined

Although IH is relatively new to the field of psychology, there are numerous philosophical accounts of this construct (see Dunnington, 2017, for a review). Although there is disagreement regarding the precise conceptualization of IH, most philosophers perceive IH as an *epistemic virtue*, meaning that it is a positive character trait that facilitates the pursuit of knowledge (Hazlett, 2012). Many psychologists regard IH as a *virtuous mean* between intellectual diffidence and intellectual arrogance (Church & Samuelson, 2017). Nonetheless, there is no consensus definition of IH in psychology, as researchers disagree over the centrality of interpersonal qualities, such as respectfulness, and emotions, such as non-defensiveness, in conceptualizations of IH.

Some researchers contend that IH is primarily intrapersonal in nature, as it "fundamentally reflects people's private assessments of their beliefs" (see Leary et al., 2017; p. 793, for a discussion). Although researchers adopting an intrapersonal approach to IH acknowledge that this construct bears important implications for interpersonal behaviors, they do not regard interpersonal qualities as part-and-parcel of it *per se*. For instance, Leary and colleagues (2017) sought to develop a self-report measure of IH that was "not conflated with behavioral outcomes of IH" (p. 795), such as being able to respectfully disagree with others. They adopted a more circumspect definition of IH focused almost exclusively on metacognitive

processes. According to Leary and colleagues (2017), IH comprises an appropriate attentiveness to the fallibility of one's personal beliefs in addition to one's limitations in seeking out and interpreting new information.

In contrast with intrapersonal accounts of IH, McElroy and colleagues (2014) regard IH as "fundamentally relational in nature" (McElroy et al., 2014; p. 20). According to this and allied relational perspectives, IH comprises an ability to negotiate fairly, the capacity to be non-defensive in the face of disagreement, and a low concern for one's epistemic status relative to others. Roberts and Wood (2003, 2007) noted that the interpersonal qualities of IH make it especially important for those who are regarded as intellectually accomplished and talented, as it fosters respectfulness and open-mindedness as opposed to an inflated sense of self. Researchers emphasizing the interpersonal import of IH conceptualize it "as a trait that helps people predict how they will be treated by a target person" (McElroy et al., 2014; p. 20).

Still others conceptualize IH as a blend of intra- and interpersonal qualities (Alfano et al., 2018; Krumrei-Mancuso & Rouse, 2016; Porter & Schumann, 2018). These definitions broadly align with Whitcomb and colleagues' (2017) *limitations-owning* account of IH, which maintains that IH comprises an appropriate attentiveness to one's epistemic limitations in addition to the ability to own these limitations behaviorally. According to this perspective, intellectually humble individuals admit their weaknesses to others, take responsibility for their limitations, and respond to disagreement without hostility. Thus, self-report measures of IH that were created from this perspective contain items and, on some measures, subdimensions dedicated to either intrapersonal psychological processes or interpersonal behaviors. For instance, although the *Comprehensive IH Scale* (Krumrei-Mancuso & Rouse, 2016), contains two subdimensions reflecting introspection, namely being willing to revise one's viewpoints and lacking intellectual

overconfidence, this scale also comprises two subdimensions reflecting interpersonal qualities, namely being able to interact with those on the opposite side non-defensively and respectfully. Some measures even emphasize the desire to compliment and admire others for their intellectual achievements (Porter & Schumann, 2018) and a low concern with one's intellectual reputation (Alfano et al., 2018).

Taken together, the "core" features of IH are still unclear, and the nomological network of IH may vary across measures in terms of the magnitude of effects with both theoretically related constructs (convergent validity) and theoretically unrelated constructs (discriminant validity). For instance, one would expect intrapersonal measures of IH to be more strongly associated with metacognitive constructs compared with interpersonal measures. I would also expect interpersonal measures of IH to be more strongly associated with responses to disagreement compared with intrapersonal measures.

1.3 Preliminary nomological network of intellectual humility

Although there are still definitional ambiguities in conceptualizations of IH, research suggests that IH is associated with certain cognitive styles, personality traits, and interpersonal attitudes and behaviors.

1.3.1 IH and personality. Researchers and philosophers alike posit that IH is a relatively stable trait-like individual differences construct that maps onto other trait variables, such as those in the personality realm. Studies have examined the relations between IH and personality traits from the *Six Factor Model* of personality (Lee & Ashton, 2004). With minor modifications that we need not address here, the Six Factor Model comprises the traditional *Big Five* (e.g., McCrae & Costa, 1987) personality traits of extraversion (e.g., sociability, positive emotionality), neuroticism (e.g., anxiety-proneness, negative emotionality; it is referred to as emotionality on

the in the six-factor model), agreeableness (e.g., forgivingness, social closeness), openness to experience (e.g., inquisitiveness, unconventionality), and conscientiousness (e.g., diligence, perfectionism), with a sixth additional dimension of honesty-humility (e.g., sincerity, modesty).

The last dimension of honesty-humility has received considerable research attention, given that IH should be robustly associated with general humility but still be separable from it. On balance, some researchers regard IH as a subdomain of general humility that specifically "pertains to humility toward one's knowledge and intellectual influence" (Davis et al., 2016; p. 221). Research indicates that IH is weakly to moderately positively associated with general humility (e.g., Davis et al., 2016). Perhaps more importantly, IH predicts significant additional variance in relevant outcomes, such as open-mindedness, forgivingness, need for cognition, and objectivism, after controlling for honesty-humility (Davis et al., 2016; Hook et al., 2015; Krumrei-Mancuso & Rouse, 2016; Porter & Schumann, 2018).

Most research suggests that IH is also positively associated with agreeableness, although the magnitude of this correlation varies across measures. For instance, Leary and colleagues' (2017) measure of IH, which emphasizes intrapersonal psychological processes, manifests small to moderate positive associations with agreeableness (e.g., Haggard et al., 2018). Measures that emphasize interpersonal qualities, however, manifest medium to large correlations with agreeableness (e.g., Alfano et al., 2018; McElroy et al., 2014). IH also tends to be positively associated with openness and conscientiousness, although some studies have yielded results that were small and not statistically significant (e.g., Haggard et al., 2018; Meagher et al., 2015).

Research examining the associations between IH, on the one hand, and neuroticism (or emotionality) and extraversion, on the other, is mixed. Most studies indicate that IH is negatively associated with neuroticism, but the magnitudes of these correlations range from small (e.g.,

Leary et al., 2017) to large (e.g., McElroy et al., 2014). There is no clear association between IH and extraversion, as some studies report small negative correlations between the two constructs (e.g., Haggard et al., 2018) whereas others report moderate positive correlations (e.g., Zachry et al., 2018). Nevertheless, most research suggests that IH manifests small to medium positive correlations with self-esteem (e.g., Meagher et al., 2015), which overlaps with some facets of extraversion (e.g., Lee & Ashton, 2018).

Although a small body of literature has examined the relations between general personality traits and IH, personality disorder traits have received little attention. Certain personality disorder traits, such as those comprising narcissism or psychopathic personality disorder, may be salient negative predictors of IH, given that such disorders are characterized by a profound lack of insight, guiltlessness, egocentricity, and impulsivity (e.g., Raskin & Terry, 1988; Patrick, Fowles, & Krueger, 2009). The only personality disorder traits that have been examined in relation to IH are those relevant to narcissistic personality disorder and narcissism more broadly. Most studies indicate that narcissism, operationalized as a total score, is negatively associated with IH, although the magnitudes of the correlations range from small (e.g., Porter & Schumann, 2018) to moderate (e.g., Haggard et al., 2018). Dovetailing with these findings, Krumrei-Mancuso (2017) reported that IH manifested large positive correlations with indices of cognitive and affective empathy, and both narcissism and psychopathy are characterized by empathy deficits and remorselessness (e.g., Patrick, Fowles, & Krueger, 2009; Watson et al., 1984). In addition, Zachry and colleagues (2018) found that IH was associated with altruism, which is an interstitial scale on the *HEXACO Personality Inventory-Revised*, which reflects sympathy for those in need (HEXACO PI-R; Lee & Ashton, 2018). Given that both narcissism and psychopathy are characterized by a *lack* of empathy and soft-heartedness, such results

suggest that IH would be negatively associated with a wide range of personality disorder features as opposed to narcissism specifically.

1.3.2 IH and cognitive styles. Cognitive styles are relatively stable individual preferences reflecting the "heuristics an individual uses to process information about his or her environment" (Kozhevnikov, 2007; p. 477). Some posit that cognitive styles represent the nexus between intellect and personality. For instance, Sternberg (1988) described cognitive styles as representing "an important link between intelligence and personality because they probably represent, in part, a way in which personality is manifested in intelligent thought and action" (p. 218). Although cognitive styles are closely linked, at least theoretically, to intellect, evidence suggests that they are separable (e.g., Pennycook et al., 2012).

Research indicates that IH is moderately positively associated with need for cognition, which comprises individual differences in the willingness to engage in effortful thinking and the enjoyment of active cognitive endeavors (Cacioppo & Petty, 1982), objectivism, the latter of which is the tendency to base decisions and beliefs on empirical information (Leary et al., 1986), and open-mindedness (e.g., Davis et al., 2016; Krumrei-Mancuso & Rouse, 2016). Studies also suggest that IH is associated with cognitive flexibility in existential beliefs and worldviews (e.g., Leary et al., 2017; Zachary et al., 2018). In contrast, IH manifests moderate negative associations with need for cognitive closure, which reflects discomfort with ambiguity and strong preferences for order and structure (Webster & Kruglanski, 1994), and dogmatism (e.g., Leary et al., 2017; Porter & Schumann, 2018). Research examining the associations between IH and social vigilantism, which reflects the desire to disseminate one's "superior" beliefs to those who are "ignorant" (Saucier & Webster, 2010), is mixed. Some studies suggest that IH is negligibly associated with social vigilantism (e.g., Leary et al., 2017) whereas others suggest that it is

moderately negatively associated (e.g., Haggard et al., 2018). Taken together, IH appears to be associated with intellectual openness, cognitive flexibility, and the tendency to base decisions on rational considerations. It is unclear, however, whether IH is robustly associated with a "duty to enlighten other people" (Saucier & Webster, 2010; p. 22).

1.3.3 IH and values. Traditionally, personality and values research were distinct domains with little overlap, and scholars have long noted the need to integrate them (e.g., Bilsky & Schwartz, 1994). Recent meta-analyses indicate meaningful relationships between general personality traits and values, which are particularly robust for more cognitively-based (e.g., openness) as opposed to more emotionally-based (e.g., neuroticism) traits (Parks-Leduc, Feldman, & Bardi, 2015). Values are often conceptualized as "inherently cognitive" (in Parks-Leduc et al., 2015; p. 6) stable motivational goals that guide people's preferences and behaviors (e.g., Roccas et al., 2002). Thus, IH might be robustly associated with certain values, such as self-direction and universalism. Only one study has examined the relations between IH and values (Krumrei-Mancuso, 2016), and only three values were examined (benevolence, universalism, and power). In this study, the CIHS was positively associated with benevolence and universalism (*rs* were .24 and .22, respectively) and negatively with power (*r*=-.25).

1.3.4 IH and critical-thinking. Although many definitions of IH imply that it is associated with rationality, few studies have examined the associations between IH and indices of critical-thinking. Most studies investigating the relationships between IH and critical-thinking have used the *Over-claiming Questionnaire* (OCQ; Paulhus et al., 2003), which is a measure of the extent to which people claim that they are knowledgeable about various academic and political topics. The OCQ comprises real items (e.g., Gettysburg Address) in addition to foil, or fake, items (e.g., Mississippi Purchase). Research indicates that IH is positively associated with the ability to

discern real from foil items whereas it is negligibly or negatively associated with a tendency to regard all items as somewhat familiar (Alfano et al., 2018; Deffler, Leary, & Hoyle, 2016). This latter finding suggests that intellectually humble individuals are less likely to self-enhance regarding their knowledge.

One study examined the association between the *Cognitive Reflection Test* (Frederick, 2005), which is a measure of the ability to override intuition to provide a correct answer, and IH. This study indicated that IH was weakly positively associated with correct answers on the CRT (Haggard et al., 2018). Finally, one study indicated that IH is moderately positively associated with fluid intelligence, as assessed on a Raven's progressive matrices task (Zmigrod et al., 2019). Nonetheless, a separate study suggested that IH was not significantly associated with general intelligence, although it was associated with being able to more accurately estimate one's performance on intelligence tasks relative to objective performance (Krumrei-Mancuso et al., 2019). Taken together, IH might buffer against overconfidence at large.

There is also preliminary evidence that individuals with high levels of IH are more likely than individuals with low levels to seek out political information that conflicts with their views, even when said political issues are central to their beliefs (Porter & Schumann, 2018). Dovetailing with these results, IH might be associated with an enhanced ability to discern strong from weak evidence, even when the topic at hand is controversial or personally meaningful (e.g., religion; Leary et al., 2017). Intellectually humble individuals tend to attribute the source of their viewpoints to the careful consideration of facts rather than to sources such as emotional reasoning, religious teachings, and commonly held knowledge, suggesting that intellectually humble individuals perceive their beliefs as stemming from impartial argument evaluation (Hoyle et al., 2016).

1.4 Present study: Aims and hypotheses

Although research on the nomological network of IH is burgeoning, there is still a paucity of psychological research on its nature and boundaries. Although it is tempting to posit that IH reduces risk for cognitive bias and ideological extremism given philosophical definitions of IH (see Church & Samuelson, 2017), it is essential to not put the proverbial cart before the horse. Before scholars can claim with reasonable confidence that IH is a trait-like construct that fosters rationality and buffers against bias, research must first establish that IH is robustly associated with individual differences in critical-thinking and self-enhancement. In addition, there has been a relative explosion of research on the measurement of IH. Within the last four years alone, more than 10 self-report measures of IH have been developed (Alfano et al., 2018; Davis et al., 2016; Leary et al., 2017; Haggard et al., 2018; Krumrei-Mancuso & Rouse, 2016; Krumrei-Mancuso et al., 2019; Meagher et al., 2015; Porter & Schumann, 2018; Zachry et al., 2018). Few studies have compared multiple self-report measures of IH simultaneously (but see Haggard et al., 2018; Krumrei-Mancuso & Rouse, 2016; Zachry et al., 2018), raising the question of whether all measures are needed to accurately assess this construct.

Although research on the nomological network of IH is informative, potentially key constructs have yet to be examined in relation to this construct. Thus, in the present study, I sought to replicate existing findings and address gaps in the literature by examining the associations between multiple self-report measures of IH and a wide range of individual difference constructs in a large community sample (*N*=573). I used multiple indices of IH to avoid mono-operation bias and build in conceptual (or "constructive," see Lykken, 1968) replication. An additional advantage of this methodological approach is that I was able to examine the patterns of convergent and discriminant validity for each measure, which could

clarify definitional ambiguities in IH research. In addition, I elected to examine the correlates of

IH measures separately as opposed to combining them into a latent variable model framework, as

I was interested in elucidating the potential differences in the correlates of these measures. A

latent variable model approach would have obscured these potentially meaningful, and still

unexamined, differences among IH measures. The study is characterized by four broad aims.

1.4.1 Aim 1: Clarify associations between IH and key individual differences constructs

For my first aim, I sought to clarify the associations between IH and key individual

differences constructs to replicate and extend the preliminary nomological network of IH.

As mentioned earlier, research indicates that values are robustly associated with general

personality traits, and scholars have long noted the need to integrate these two domains. Thus, I

examined the associations between IH and personal values. To replicate existing research, I also

investigated the associations between IH and general personality traits. To extend research in this

domain, I investigated the associations between IH and personality disorder traits. Such

investigations can elucidate the relative importance of interpersonal qualities in definitions of IH

and provide preliminary insight into the potential clinical relevance of IH.

Regarding values, I predicted that IH would manifest moderate positive correlations with

benevolence and universalism whereas it would manifest moderate negative correlations with

power (e.g., Krumrei-Mancuso, 2017). Although exploratory in nature, I provisionally predicted

that IH would be unrelated to valuing conformity, security, tradition, and hedonism, as these

values do not appear to be associated with the core features of IH. I hypothesized that IH would

manifest small to moderate positive associations with self-direction; small negative correlations

with achievement; and small positive associations with stimulation (see *Measures* for a

description of the assessed values).

Consistent with research (e.g., Porter & Schumann, 2018), I hypothesized that IH would manifest moderate to large positive correlations with honesty-humility, agreeableness, conscientiousness, and openness; in contrast, I predicted that IH would be negligibly correlated with neuroticism and weakly positively associated with extraversion. I also examined the associations between IH and general personality *facets* to ascertain which aspects of broad personality dimensions are most robustly related to IH. Given that no studies have examined the associations between IH and general personality facets, my hypotheses were exploratory.

In addition, no studies have examined the associations between IH and personality disorder *dimensions*. Existing research has only analyzed the relationships between IH and total scores of narcissism. It is difficult to interpret these findings given that personality disorder traits, including those of narcissism, are multidimensional. Factor-analytic studies demonstrate that narcissism comprises at least two broad factors, namely entitlement/exploitativeness and leadership/authority (Raskin & Terry, 1988), that often fractionate in their relations with an array of external criteria, including attachment styles and general personality traits (Miller et al., 2011). Thus, when these two dimensions are combined, the differential effects at the subdimension level could be diluted or washed out. I hypothesized that IH would manifest small positive correlations with leadership/authority traits and moderate negative correlations with entitlement/exploitativeness traits.

Other potentially relevant personality disorder traits, such as those comprising psychopathic personality disorder (psychopathy), have not yet been examined. One influential descriptive framework of psychopathy is the triarchic model (Patrick, Fowles, & Krueger, 2009). According to this model, psychopathy is best characterized by three overlapping, albeit separable, dimensions: boldness, which comprises threat insensitivity and interpersonal

dominance; disinhibition, which comprises impulsivity and recklessness; and meanness, which comprises cruelty and rebelliousness. Similar to narcissism, psychopathy traits often manifest differential relations with external criteria, as boldness traits are largely positively associated with potentially adaptive outcomes, such as psychological well-being (e.g., Durand, 2016) whereas meanness and disinhibition are primarily associated with potentially maladaptive outcomes, such as antisocial behavior (e.g., Miller & Lynam, 2012). I predicted that IH would manifest small positive associations with boldness traits and moderate negative correlations with disinhibition and meanness traits. Dovetailing with these predictions, I hypothesized that IH would manifest moderate to large positive associations with cognitive and affective empathy (e.g., Krumrei-Mancuso, 2017). No studies have examined the associations between IH and dimensional personality disorder traits, such as those in the DSM-5 Section III (American Psychiatric Association, 2013) alternative model of personality disorders, so it remains unclear whether IH buffers against high levels of a range of maladaptive personality traits, such as antagonism and detachment. I hypothesized that IH would be negatively associated with all assessed personality disorder traits, namely negative affectivity, detachment, disinhibition, antagonism, and psychoticism (see *Measures*).

To probe the potential emotional correlates of IH, I examined the associations between IH, on the one hand, and internalizing symptoms and self-esteem, on the other, as the emotional correlates of IH are still relatively unclear. Theoretical accounts imply that IH would be negatively associated with certain depressive cognitions, particularly those concerning undue guilt and worthlessness, as some authors posit that IH is associated with a positive outlook on life and the ability to sustain a positive outlook even in the face of disagreement (e.g., Church & Samuelson, 2017). Most studies of IH indicate that it is weakly to moderately positively

associated with self-esteem (e.g., Alfano et al., 2017; Meagher et al., 2015), and meta-analytic research suggests that self-esteem is negatively associated with both depression and anxiety (Sowislo & Orth, 2013). Thus, I hypothesized that IH would manifest small positive associations with self-esteem. I also provisionally predicted that IH would manifest small to moderate negative associations with internalizing symptoms.

Regarding cognitive styles, to replicate existing research, I examined the associations between IH and indices of objectivism, cognitive flexibility, and social vigilantism. I hypothesized that IH would manifest moderate to large positive correlations with objectivism, cognitive flexibility, and need for cognition (e.g., Leary et al., 2017). Also in line with previous studies, I predicted that IH would manifest moderate to large negative correlations with dogmatism and need for closure. I hypothesized that interpersonally-oriented measures of IH would manifest moderate negative correlations with social vigilantism whereas intrapersonally-oriented measures would manifest negligible relations with social vigilantism.

To extend research in this domain, I investigated the associations between IH and confirmatory thinking tendencies, as these results could offer preliminary insight into whether IH buffers against confirmation bias. Additionally, I examined the associations between IH and bias blind spot, which is a meta-bias that refers to the recognition of bias in others but not in oneself (Pronin, Lin, & Ross, 2002). By definition, IH should be associated with a smaller-than-average bias blind spot, although this possibility has not been examined empirically. In addition, no research has examined whether IH is negatively associated with conspiratorial or other unscientific beliefs. In theory, IH should be associated with beliefs that have a strong evidentiary basis. Thus, I examined the associations between IH and conspiratorial beliefs.

I also examined a number of critical-thinking measures. Consistent with existing research (Deffler et al., 2016), I predicted that IH would be associated with better discrimination between real and fake items on the OCQ, and it would be negligibly or weakly negatively associated with a tendency to underclaim one's knowledge. In addition, I predicted that IH would manifest weak positive associations with the CRT and general intelligence (e.g., Krumrei-Mancuso et al., 2019; Zmigrod et al., 2019). To extend existing research, I also included a measure that assesses the ability to discern nonsensical, but seemingly profound, sentences from motivational sentences (see *Measures*). Given that IH is associated with an enhanced ability to discern between strong and weak forms of evidence (Leary et al., 2017), I hypothesized that IH would be associated with better discrimination between nonsense and motivational sentences. In addition, I examined the associations between IH and subdimensions of intelligence. Given that no studies have examined these relationships, my hypotheses were exploratory.

Finally, I examined the associations between IH and indices of overconfidence and insight. Overconfidence is heterogeneous and according to some authors, comprises three separable, albeit overlapping, phenomena (see Moore & Healy, 2008): *overestimation*, which refers to perceiving one's performance as greater than it objectively was; *overprecision*, which refers to being more confident in one's performance than warranted by objective performance; and *overplacement*, which refers to perceiving oneself as "better-than-average" even if their objective performance was average or less. Consistent with existing research, I hypothesized that IH would be negatively associated with indices of overconfidence (e.g., Krumrei-Mancuso et al., 2019). I predicted that IH would be positively associated with insight, given that IH is theorized to reflect metacognitive awareness into one's beliefs. No studies have examined the associations between IH and self-reported insight.

1.4.2 Aim 2: Examine the incremental validity of IH above-and-beyond honesty-humility, agreeableness, social desirability, and general intelligence

The extent to which IH's associations with outcomes of interest can be accounted for by other individual difference constructs, such as personality, social desirability, or general intelligence, requires clarification. As described earlier, research suggests that IH predicts significant variance in a range of outcomes, such as objectivism and open-mindedness, even after controlling for honesty-humility (e.g., Davis et al., 2016). These results suggest that IH's associations with outcomes of interest are not fully accounted for by its shared variance with honesty-humility.

Research also indicates that IH is weakly to moderately positively associated with social desirability (e.g., Leary et al., 2017; Haggard et al., 2018). Although the processes underlying this association between IH and social desirability are not known, one possibility is the so-called paradox of humility (see Davis, Worthington, & Hook, 2010; pp. 244-245). According to this paradox, people with low levels of humility might report high levels of humility because they are more willing and more likely to self-enhance compared with others. Conversely, those with high levels of humility might report low levels of humility because it could be immodest and braggadocious to rate themselves as humble. Thus, it is useful to include measures of social desirability in studies on humility to examine the extent to which humility measures statistically increment social desirability in predicting outcomes of interest (but see McCrae & Costa, 1983, for a discussion on the limitations of controlling for social desirability in personality studies). The handful of studies that have examined the incremental validity of IH above-and-beyond social desirability suggest that IH remains a significant predictor of relevant outcomes, including prosociality (Krumrei-Mancuso, 2016), open-mindedness (Krumrei-Mancuso & Rouse, 2016),

narcissism (Zachry et al., 2018), and dogmatism (Haggard et al., 2018), after controlling for its shared variance with social desirability.

Nevertheless, potentially key covariates have not yet been examined, including trait agreeableness and general intelligence. Research indicates that IH manifests medium to large correlations with agreeableness (e.g., McElroy et al., 2014), raising the possibility that IH is associated with relevant outcomes due largely in part to its shared variance with agreeableness. Dovetailing with this supposition, IH's associations with indices of critical-thinking might be due primarily to general intelligence as opposed to IH *per se*. Thus, in the present study, to replicate and extend existing research, the covariates of interest were trait agreeableness, trait humility, social desirability, and intelligence. In subsidiary analyses, I examined the incremental validity of IH above-and-beyond (a) openness, (b) conscientiousness, (c) extraversion, and (d) neuroticism.

To limit the number of analyses conducted and to minimize the risk of family-wise error, only six outcomes were examined: objectivism, dogmatism, need for cognition, the CRT, need for closure, and confirmatory thinking tendencies. These 6 outcomes were selected based on both theoretical and empirical accounts suggesting that these outcomes are particularly central to IH. As discussed earlier, IH is theorized to reflect individual differences in the propensity to be aware of one's limitations in seeking and interpreting evidence and potential biases when forming beliefs (e.g., Leary et al., 2017). In addition, some authors have expanded this definition to incorporate "a nonthreatening awareness of one's intellectual fallibility" (Krumrei-Mancuso & Rouse, 2016; p. 210), which implies that intellectually humble individuals would be low on traits akin to need for closure. Such definitions also suggest that the motivation to remain objective (i.e., confirmatory thinking reversed), seriously consider multiple perspectives (i.e., dogmatism

reversed), and enjoy thinking through challenging issues are central to IH. On balance, if people are aware that their personal beliefs are fallible, it is likely they would strive to be more rational, and thus might perform better on measures such as the CRT. Nevertheless, the causal direction is unclear, as it is also possible that individuals who are more rational and reflective have better meta-cognitive skills to begin with, and these meta-cognitive skills predispose to IH.

1.4.3 Aim 3: Examine the Dunning-Kruger effect at low, medium, and high levels of IH

Finally, in exploratory analyses, I examined the possibility that there is a Dunning-Kruger effect in IH (Kruger & Dunning, 1999). According to the Dunning-Kruger effect, those who are least competent tend to overestimate their abilities relative to their objective performance. As a corollary, those who are most competent sometimes also tend to slightly underestimate their abilities relative to their objective performance. Kruger and Dunning (1999) interpreted these findings as reflecting "a lack of metacognitive skills among less skilled participants" (p. 1131). At high levels of competence, however, they interpreted these findings as reflecting a false-consensus effect (Ross et al., 1977), meaning that highly competent individuals are generally surrounded by other highly competent individuals and thereby underestimate their performance relative to their reference group. Kruger and Dunning (1999) posited that competent individuals "fail to realize that their proficiency is not necessarily shared by their peers" (p. 1131).

Taken together, it seems plausible that such an effect might be found in regards to IH. Those at lower levels of IH are likely less aware of the fallibility of their beliefs compared with those at higher levels of IH. Thus, they might be especially likely to overestimate their cognitive abilities relative to those at higher levels of IH. In addition, those at the highest levels of IH might be acutely attuned to the limitations of their beliefs, and consequently underestimate their performance, especially if they are comparing themselves to their intellectually humble peers.

This provisional hypothesis is slightly different from the one offered by Kruger and Dunning (1999), as an enhanced awareness of one's limitations rather than the false-consensus effect *per se* might drive underestimation in intellectually humble individuals.

2. METHODS

2.1 Participants and exclusion criteria

Participants were recruited from Amazon's Mechanical Turk (MTurk), which is an online crowdsourcing platform through which community members can participate in research studies for monetary compensation. Research examining the personality characteristics of MTurk workers suggests that they are lower on negative affectivity and disinhibition and higher on antagonism than clinical samples and higher on detachment than undergraduate samples (Miller et al., 2017). Research also suggests that data quality from MTurk studies is comparable to those collected from undergraduate samples and other convenience samples, and MTurk workers tend to pass attention checks at similar and perhaps even higher rates than other samples (see Buhrmester, Talaifar, & Gosling, 2018, for a review). Nonetheless, there are controversies surrounding the quality of MTurk data, particularly concerning "bots" that have appeared to infiltrate the platform (see Fort, Adda, & Cohen, 2011) and the validity of experimental data collected on MTurk (Goodman, Cryder, & Cheema, 2013). Recent efforts have been taken, particularly in scholarly blog posts, to enhance the data cleaning process and improve overall data quality in MTurk studies (Buhrmester, 2018).

Research indicates that excluding participants based on "click counts," which is the number of times a participant clicks on a given screen, is one of the best methods to discriminate bots (or automated form fillers) from high effort participants (Buchanan & Scofield, 2018). Number of click counts was recorded from the consent page in the present study. In order to

complete the study, participants had to answer three consent questions correctly and check "yes" to participate (thus 4 "clicks" minimum was required). Participants who did not click at least four times on the consent page were removed (n=3).

In addition, there were two attention checks in the study. The first attention check involved accurately tracking the perspective of an argument. At two timepoints, participants read an argument that either was in favor of a certain topic (e.g., pro-death penalty) or against the topic (e.g., anti-death penalty). The order was randomized across participants to buffer against ordering effects. Upon reading the paragraph, participants were asked a forced-choice question (select agree or disagree): "Did the author of this argument agree or disagree with mandatory vaccinations/the death penalty?". The second attention check involved accurately responding to a question and its prompt. These questions also were presented at two timepoints in the study and the order was randomized. For example, at one timepoint, participants read: "Was Leonardo da Vinci born before or after 1698? Type either before or after." There were 4 pairs of questions, and each question instructed the participant to type either X (e.g., before) or Y (e.g., after).

Regarding the first attention check, participants passed if they correctly identified the author's perspective (e.g., agree or disagree). Regarding the second attention check, participants passed this attention check if they responded with one of the two options presented (e.g., before or after). A recent academic blogpost suggests that unusual or inconsistent responses on fill-in-the-blank questions could indicate the presence of a bot and be a useful screening method (Ryan, 2018). In the present study, one example of such a response was "WINTER" when the prompt asked for either "before or after." If a participant failed two or more attention checks in any combination (e.g., one argument evaluation failure and one fill-in-the-blank failure; two argument evaluation failures), then his/her data were removed from the dataset (n=56).

Only American participants were eligible for this study, given that the survey includes several stimuli specific to U.S. history and culture. The final sample (N=573) was primarily female (54.6%), college-educated (40.3%), heterosexual (85.2%), and married (40.1%; first marriage). Most participants were white (81.9%), and the remainder of the sample was African-American (12.5%), Hispanic (9.7%), and Asian (2.3%). Regarding political identification, participants primarily identified as Democratic (42.7%), followed by Republican (26.9%) and Independent (22.4%). Regarding religious beliefs, participants primarily identified as Christian (50.0%), followed by Agnostic (21.5%) and Atheist (17.9%). The average annual salary before taxes was $50,000 to $59,999 (SD=3.04; income was assessed on a 12-point scale, with 1=less than $10,000 and 10=$150,000 or more). The average age was 37.7 (SD=11.50).

2.2 Procedure

All participants completed an online battery of self-report measures and critical-thinking paradigms. Internal consistencies (i.e., Cronbach's alphas) for each measure in the present sample are presented in parentheses for each scale. Other measures were administered in addition to those described below, including a biased assimilation task, a battery of heuristics and biases problems, and questionnaires on religious and political certainty. These measures will be separately analyzed elsewhere and were not included in the present study.

Intellectual humility. Participants completed five self-report measures of IH (IH). Two of the five measures are unidimensional, yielding composite scores. These two measures were the *Leary General Intellectual Humility Scale* (LIHS; Leary et al., 2017) and the *Porter Intellectual Humility Scale* (PIHS; Porter & Schumann, 2018). The LIHS (α=.86) is a 6-item self-report measure that emphasizes the intrapersonal nature of IH as opposed to its interpersonal components, which the authors theorize as peripheral to the core features of IH (e.g., "I

reconsider my opinions when presented with new evidence"). Participants rated their agreement with each item on a 1 (strongly disagree) to 5 (strongly agree) Likert scale. The PIHS (α=.75) is a 9-item self-report measure that comprises both intrapersonal and interpersonal features, as the authors theorize that both are central to the construct of IH (e.g., "I sometimes marvel at the intellectual abilities of other people"). Participants rated their agreement with each item on a 1 (strongly disagree) to 7 (strongly agree) Likert scale.

The remaining measures were multidimensional, yielding composite scores in addition to subscale scores. These three measures were the *Comprehensive Intellectual Humility Scale* (CIHS; Krumrei-Mancuso & Rouse, 2016), *McElroy Intellectual Humility Scale* (MIHS; McElroy et al., 2014), and *Alfano Intellectual Humility Scale* (AIHS; Alfano et al., 2018). The CIHS is a 22-item self-report measure, and, similar to the PIHS, the authors of the CIHS (α=.90) theorize that IH is both intra- and interpersonal in nature. Factor analyses revealed four underlying dimensions: *Independence of Intellect and Ego* (α=.90; e.g., "I feel small when others disagree with me on topics that are close to my heart [reversed]")*, Openness to Revising One's Viewpoints* (α=.87; e.g., "I am open to revising my important beliefs in the face of new information")*, Respect for Others' Viewpoints* (α=.87; e.g., "I can respect others, even if I disagree with them in important ways")*, and Lack of Intellectual Overconfidence* (α=.83; e.g., "My ideas are usually better than other people's ideas [reversed]")*. Participants rated their agreement with each item on a 1 (strongly disagree) to 5 (strongly agree) Likert scale.

The MIHS (α=.87) was originally a 16-item informant-report measure of IH, and it was later modified to be used as a self-report measure (Davis et al., 2016). The authors of the MIHS theorized that IH is "fundamentally relational in nature," (McElroy et al., 2014; p. 20), and they thus adopted a strong interpersonal perspective in their measure. Factor analyses indicated two

underlying dimensions: *Intellectual Openness* (α=.83; e.g., "I seek out alternative viewpoints")

and *Intellectual Arrogance* (α=.93; e.g., "I often become angry when my ideas are not

implemented"). Participants rated their agreement with each item on a 1 (strongly disagree) to 5

(strongly agree) Likert scale. Finally, the AIHS (α=.89) is a 23-item scale that was developed to

represent a range of conceptualizations of IH. Factor analyses supported a four-factor solution:

Open-mindedness (α=.82; e.g., "I don't take people seriously if they're very different from me

[reversed]"), *Intellectual Modesty* (α=.79; e.g., "I like to be the smartest person in the room

[reversed]"), *Engagement* (α=.79; e.g., "I appreciate being corrected when I make a mistake"),

and *Corrigibility* (α=.76; e.g., "I find it boring to discuss things I don't already understand

[reversed]"). Participants rated their agreement with each item on a 1 (strongly disagree) to 7

(strongly agree) Likert scale.

Intercorrelations among and descriptive statistics for the total scores and subscales are

presented in supplemental materials (Supplemental Table 1). In the analyses reported here, I

examined the correlates of all five IH measures separately (rather than combining them into a

latent variable) given that I was interested in potential differences in the zero-order and

incremental correlates of these measures. In subsidiary, post-hoc analyses, I also examined the

relationships between the IH subscales and a) cognitive styles, b) the PSQ, and c) bias blind spot.

Although not the main focus of the master's thesis, I conducted these analyses to investigate the

potential differential relations between the subscales and these key outcomes.

Values. Participants completed the *Short Schwartz's Value Survey* (α=.75; Lindeman &

Verkasalow, 2005), which assesses 10 different values: achievement (e.g., success, capability),

hedonism (e.g., gratification of desires, enjoyment in life), stimulation (e.g., daring, a varied and

challenging life), self-direction (e.g., creativity, freedom), universalism (e.g., broad-mindedness,

beauty of nature and art), benevolence (e.g., helpfulness, honesty), tradition (e.g., respect for tradition, devotion), conformity (e.g., obedience, politeness), security (e.g., social order, cleanliness), and power (e.g., social power, authority). Values are defined as "life-guiding principles" and the importance of each value was rated on a 0 (opposed to my principles) to 8 (of supreme importance) Likert scale. The value was presented (e.g., "self-direction") along with synonyms to facilitate interpretation (e.g., "creativity, freedom, curiosity, independence, choosing one's own goals). Intercorrelations among and descriptive statistics for the SVS are presented in Supplemental Table 2.

Personality and personality pathology. To assess general personality, participants completed the 100-item version of the *HEXACO Personality Inventory-Revised* (HEXACO PI-R; Lee & Ashton, 2004). The HEXACO measures 24 facet-level personality trait scales that converge on six broad domains comprising the well-established five factor model of personality in addition to the dimension of honesty/humility: Honesty-Humility (α=.85), Emotionality (α=.84), Extraversion (α=.87), Agreeableness (α=.85), Conscientiousness (α=.84), and Openness (α=.83). The HEXACO also yields a score on Altruism (versus Antagonism), which is a 4-item interstitial scale assessing an individual's propensity to be soft-hearted and sympathetic towards others (α=.68). On all HEXACO items, participants rated their agreement with each item on a 1 (strongly disagree) to 5 (strongly agree) Likert scale.

In addition to assessing broadband personality traits I also assessed personality disorder traits to examine the possibility that IH is negatively associated with personality psychopathology. First, the triarchic dimensions of psychopathy (Patrick, Fowles, & Krueger, 2009), namely boldness (α=.81), disinhibition (α=.84), and meanness (α=.79) were extracted from the HEXACO PI-R based on published formulas (Ruchensky, Donnellan, & Edens, 2018).

Second, participants also completed the *Narcissistic Personality Inventory-13* (NPI-13; Gentile

et al., 2013), which yields scores on three domains: Leadership/Authority (α=.66),

Grandiose/Exhibitionism (α=.73), and Entitlement/Exploitativeness (α=.68). The NPI is a forced-

choice measure that instructs participants to select which statement they most agree with in a pair

(e.g., "I expect a great deal from other people" versus "I like to do things for other people").

 Finally, participants completed *The Personality Inventory for DSM-5-Brief Form* (PID-5-

BF; Krueger et al., 2013), which aligns with the alternative model of personality disorders in

Section III of the DSM-5. The PID-5 assesses five personality trait dimensions: Negative Affect

(α=.83), Detachment (α=.81), Antagonism (α=.81), Disinhibition (α=.88), and Psychoticism

(α=.86). Participants rated how often they experience certain emotional states (e.g., "I crave

attention") and behaviors (e.g., "I use people to get what I want") on a 0 (very false or often

false) to 3 (very true or often true) Likert scale. Intercorrelations among and descriptive statistics

for the personality measures are presented in Supplemental Table 3.

 Empathy. Participants completed the *Affective Resonance* (12-items; α=.92) and

Cognitive Empathy (12-items; α=.89) subscales of the *Affective and Cognitive Measure of*

Empathy (ACME; Vachon & Lynam, 2016). ACME Cognitive Empathy measures the capacity

to perceive and comprehend other individuals' emotions (e.g., "It's obvious when people are

pretending to be happy"). ACME Affective Resonance assesses one's ability to experience

emotional responses that are congruent with another individual's emotions (e.g., "I get excited to

give someone a gift that I think they will enjoy"). Participants rated their agreement with each

item on a 1 (strongly disagree) to 5 (strongly agree) Likert scale. In addition, participants

completed the *Perspective Taking* (7-items; α=.84) and *Empathic Concern* (7-items; α=.89)

subscales of the *Interpersonal Reactivity Index* (IRI; Davis, 1980). IRI Empathic Concern

measures the capacity to feel sympathy for other individuals (e.g., "I am often quite touched by things I see happen"). IRI Perspective Taking assesses the ability to adopt another individual's perspective (e.g., "I try to look at everybody's side of a disagreement before I make a decision"). Participants rated how well each item described them on a 1 (does not describe me well) to 7 (describes me very well) Likert scale. Both the ACME and IRI were included, given that neither measure is infallible and comprehensive in its content coverage of cognitive and affective empathy (Murphy et al., 2018). Research recommends using both measures when possible, as each possesses incremental validity over the other for different outcomes of interest, such as personality disorder traits (Murphy et al., 2018). Intercorrelations among and descriptive statistics for the empathy scales are presented in Supplemental Table 4.

Self-esteem and internalizing symptoms. Participants completed three short-form versions of the *Patient-Reported Outcomes Measurement Information System Scales* for Depression, Anxiety, and Anger (PROMIS; Pilkonis et al., 2011). For all of the PROMIS scales, participants rated how often they experienced a given internalizing symptom in the past week on a 1 (never) to 5 (always) Likert scale. The Depression scale comprises 8 items assessing negative mood, decreased positive affect, and feelings of worthlessness ($\alpha=.97$). The Anxiety scale comprises 8 items assessing fearfulness and somatic symptoms related to arousal ($\alpha=.96$). The Anger scale comprises 5 items assessing irritability and hostility ($\alpha=.93$). In addition, participants completed the *Rosenberg Self-Esteem Scale* (RSE; Rosenberg, 1979; $\alpha=.95$), which is a 10-item self-report measure of self-esteem on which participants rate their agreement with each item on a 1 (strongly agree) to 4 (strongly disagree) scale. Intercorrelations among and descriptive statistics for the PROMIS scales and RSE are presented in Supplemental Table 5.

Cognitive styles. A range of cognitive styles were assessed to examine the convergent validity of IH with conceptually similar and dissimilar constructs. Regarding allied constructs, participants completed the *Existential Quest Scale* (Van Pachterbeke, Keller, & Saroglou, 2012)*, Objectivism Scale* (Leary et al., 1986), and *Need for Cognition Scale* (Cacioppo & Petty, 1982). The *Existential Quest Scale* (α=.74) is a 9-item self-report measure of openness and flexibility regarding one's existential beliefs (e.g., "My way of seeing the world is certainly going to change again"). Participants rated how true each statement was of them a 1 (not at all true) to 7 (completely true) Likert scale. The *Objectivism Scale* (α=.78) is an 11-item self-report measure of the propensity to base decisions and beliefs on empirical evidence (e.g., "I gather as much information as possible before making decisions"). Participants rated how characteristic each statement was of them on a 1 (not at all) to 5 (extremely) Likert scale. Finally, the *Need for Cognition Scale* is a 34-item self-report measure of the tendency to seek out knowledge and enjoy thinking (e.g., "I find it especially satisfying to complete an important task that required a lot of thinking and mental effort"). Participants rated their agreement with each item on a -4 (very strong disagreement) to 4 (very strong agreement) Likert scale.

Regarding constructs that were hypothesized to be negatively correlated with IH, participants completed the *Confirmation Inventory* (Rassin, 2008), *Dogmatism Scale* (Altemeyer, 2002), *Social Vigilantism Scale* (Saucier & Webster, 2010), *Belief in Conspiracy Theories Inventory* (Swami et al., 2011), and *Need for Closure Scale Revised-Short Version* (Roets & Van Hiel, 2011). The *Confirmation Inventory* (α=.84) used in the present study was a slightly modified version of the original 10-item self-report measure, as several items were rewritten in simpler English to facilitate interpretation. For instance, one item originally was written as, "Once I have a certain idea, I can hardly be brought to change my mind," and it was modified to

be written as, "When I have an idea, very few things are able to change my mind." The *Confirmation Inventory* assesses the propensity to adhere to one's beliefs despite contradictory evidence and make decisions according to gut feelings. Participants rated their agreement with each item on a 1 (strongly disagree) to 5 (strongly agree) Likert scale. The *Dogmatism Scale* (α=.92) is a 22-item self-report measure of unjustified certainty in one's beliefs (e.g., "My opinions are right and will stand the test of time"). Participants rated the degree to which a statement was true or false for them on -4 (false) to 4 (true) Likert scale.

The *Social Vigilantism Scale* (α=.89) is a 14-item self-report measure of the tendency to impose one's supposedly superior beliefs onto ignorant others for the sake of educating the ill-informed (e.g., "I feel as if it is my duty to enlighten other people"). Participants rated their agreement with each item on a 1 (disagree very strongly) to 9 (agree very strongly) Likert scale. The *Belief in Conspiracy Theories Inventory* (α=.94) is a 15-item scale that comprises specific conspiracy theories to assess general conspiratorial ideation (e.g., "US agencies intentionally created the AIDS epidemic and administered it to Black and gay men in the 1970s"). Participants rated the extent to which they believe that "cover-up versions" of certain events are true on a 1 (completely false) to 9 (completely true) Likert scale. Finally, the *Need for Closure Scale Revised-Short Version* (α=.92) is a 15-item self-report measure of the tendency to seek out concrete answers and avoid uncertainty (e.g., "I feel uncomfortable when I don't understand the reason why an event occurred in my life"). Participants rated their agreement with each item on a 1 (strongly disagree) to 6 (strongly agree) Likert scale. Intercorrelations among and descriptive statistics for the cognitive styles are presented in Supplemental Table 6.

Bias blind spot. Participants completed two measures of bias blind spot, the *Scopelliti Bias Blind Spot Scale* (Scopelliti et al., 2015) and *Stanovich Bias Blind Spot Scale* (West,

Meserve, & Stanovich, 2012). The *Scopelliti Bias Blind Spot Scale* assesses 14 biases. In the validation study, factor analyses indicated that the measure is unidimensional (α=.92). Participants read a description of each bias (e.g., bandwagon effect) and then rated the extent to which a) they themselves are susceptible to that bias and b) the average American is susceptible to that bias on a 1 (not at all) to 7 (very much) scale. Their ratings for their own susceptibility were subtracted from their ratings for the average American's susceptibility. A positive difference between the two indicates a larger bias blind spot. The *Stanovich Bias Blind Spot Scale* (α=.84) is formatted and scored in the same way as the *Scopelliti Bias Blind Spot Scale*, except that it covers 7 biases (e.g., outcome bias) and is on a 1 (not at all likely) to 6 (very highly likely) scale instead. The biases assessed on the two measures do not overlap (thus 21 different biases were assessed across the two measures). The composites of ratings for the average American were highly correlated (*r* in the present study was .72), and the composites of ratings for oneself were also highly correlated (*r* in the present study was .66). Given the high degree of overlap between the two measures, items from each measure were standardized and combined.

  Critical-thinking and intelligence. Participants completed several measures related to critical thinking: the *Over-claiming Questionnaire* (OCQ; Paulhus et al., 2003; α=.96), *Profound Statements Questionnaire* (PSQ; Pennycook et al. 2015; α=.95), and *Cognitive Reflection Test* (CRT; Frederick, 2005). Participants completed a 45-item version of the OCQ, which comprised 33 "real" items and 12 "foil" items. Three domains were assessed on the OCQ: physical sciences (e.g., real: "photon"; fake: "ultra-lipid"), U.S. history (e.g., real: "Bay of Pigs Invasion"; fake: "Philadelphia Address"), and U.S. political sciences (e.g., real: "Electoral College"; fake: "The 30th Amendment"). The ordering of items was created using a random list generator, and the

same order was used for all participants. Subjects were instructed to rate their familiarity with each item on a 0 (never heard of it) to 6 (very familiar) Likert scale.

The OCQ was analyzed using Signal Detection Theory (SDT; Green & Swets, 1966), which is the recommended analytic approach for the OCQ (Paulhus et al., 2003). Through using SDT analyses, it is possible to parse *hits,* which refers to endorsing real items as familiar, from *misses*, which refers to endorsing foils as familiar. First, I calculated the hit rate, which is the proportion of items endorsed as familiar for the 33 real items. Second, I calculated the false alarm rate, which is the proportion of items endorsed as familiar across for the 12 foils. Because the OCQ is a continuous measure, the hit and false alarm rates were calculated at each threshold on the 7-point scale (6 thresholds total; e.g., 0=no, >0=yes; 1=no, >1=yes, etc.).

Using the hit and false alarm rates at each cutoff, two parameters were calculated in Excel using published formulas (Stanislaw & Todorov, 1999): *d'* and *c*. Regarding the first parameter, *d'* is the accuracy or sensitivity index, which quantifies the number of hits relative to the number of misses. The larger the *d'* parameter, the greater the differentiation between real and foil items and, hence, the greater the accuracy. Regarding the second parameter, *c* is the response bias or location criterion index, which quantifies the degree to which participants rate items as either familiar or unfamiliar, regardless of whether the item is real or fake. Negative values of *c* reflect the tendency to endorse an item as familiar, regardless of whether the item is real or fake. Because *d'* and *c* were calculated at each threshold, the values for each parameter were averaged across the thresholds (Paulhus et al., 2004), thus resulting in one *d'* and one *c* parameter for each participant. The sample size was reduced for all analyses with the OCQ (*N*=478) because only participants who completed the entire OCQ were included so as to keep the denominator of the hit and false alarm rates constant across all participants.

The PSQ assesses one's ability to discriminate meaningless sentences (e.g., "Wholeness quiets infinite phenomena") from a) mundane (e.g., "Newborn babies require constant attention") and b) motivational (e.g., "Only those who will risk going too far can possibly find out how far one can go"), sentences. A 30-item version was presented with 10 meaningless, 10 mundane, and 10 motivational sentences. Similar to the OCQ, the ordering of items was created with a random list generator, and the order was held constant for all participants. Subjects were provided with a definition of profound ("of deep meaning, of great and broadly inclusive significance") to facilitate interpretation, and they were subsequently asked to rate how profound each sentence was on a 1 (not at all profound) to 5 (very profound) Likert scale. Six indexes were calculated: a) total for meaningless; b) total for mundane; c) total for motivational; d) difference between meaningless and motivational; e) difference between meaningless and mundane; and f) difference between motivational and mundane. Finally, the CRT comprises 3 problems that assess one's ability to override an incorrect intuitive response and engage in analytical reflection that leads to the correct response. The CRT is weakly to moderately positively correlated with measures of intelligence (Toplak, West, & Stanovich, 2011; *rs* in their study ranged from .17 [WASI Vocabulary] to .40 [WASI Composite + Working Memory]), and is used as an index of rationality. The total number of correct responses on the CRT was computed.

To assess intelligence, participants completed *The International Cognitive Ability Resource* (ICAR; Condon & Revelle, 2013), which is a public-domain measure of intelligence that was validated in approximately 200 countries. In this study, we used a 16-item test (Condon & Revelle, 2013) that yields a total score of intelligence in addition to four subscale scores: Verbal Reasoning (VR; 4-items), which assesses one's vocabulary knowledge and verbal logic; Letter and Number Series, which assesses an individual's ability to complete a sequence of

letters based on a rule (LN; 4-items;); Matrix Reasoning, which assesses one's ability to recognize and complete patterns (MR; 4-items); and Three-Dimensional Rotation, which assesses one's ability to mentally manipulate three-dimensional objects (R3D; 4-items).

In the original validation study of the ICAR, the ICAR was not timed. In the present study, however, participants had 15 minutes maximum to complete the ICAR to a) preclude them from looking up answers online and b) facilitate more rapid completion of the survey battery. The authors of the ICAR noted that "there are not specific reasons precluding timed administrations of the ICAR items, whether online or offline" (Condon & Revelle, 2013; p. 55), which suggests that a timed administration of the ICAR is still a valid proxy for general intelligence. Intercorrelations among and descriptive statistics for the intelligence and critical-thinking measures are presented in Supplemental Table 7.

Insight. To assess level of insight, participants completed the *Beck Cognitive Insight Scale* (BCIS; Beck et al., 2004). The BCIS yields two subscales: *Self-reflectiveness*, which measures the tendency to reflect on one's unusual experiences and correct erroneous judgments (α=.73), and *Self-certainty*, which measures the propensity to be unduly certain about one's perceptions and experiences (α=.75). The BCIS also yields a composite score, which is the difference between Self-reflectiveness and Self-certainty. The BCIS was originally developed as a measure of metacognitive insight in patients with psychopathology. Intercorrelations among and descriptive statistics for the BCIS scales are presented in Supplemental Table 8.

Overconfidence. Participants provided ratings of overestimation (e.g., "How many questions out of X do you believe you answered correctly?"), overprecision (e.g., "How confident are you in the accuracy of your answers overall (ranging from 0% to 100%)?"), and overplacement (e.g., "The 50th percentile represents average performance. Relative to the

average person, how well do you think you performed overall (ranging from the 1st percentile to the 99th percentile)?") following the completion of two tasks: the ICAR (described above) and a challenging multiple-choice trivia questionnaire (e.g., "What is the name of the organ that produces insulin in the human body?"). For overplacement, participants were also provided with a normal curve to visualize the distribution of percentiles. Intercorrelations among and descriptive statistics for the indices of overconfidence are presented in Supplemental Table 9.

Social desirability. Social desirability was assessed using the *Balanced Inventory of Desirable Responding Short Form* (BIDR-16; Hart et al., 2015). In addition to a total score (α=.84), this measure comprises two subscales: *Impression Management* (α=.78; e.g., "I never cover up my mistakes"), which reflects the propensity to provide people with inflated self-descriptions, and *Self-deceptive Enhancement* (α=.77; e.g., "I am very confident of my judgments"), which reflects the tendency to provide ostensibly honest but positively biased responses (i.e., seeing oneself through proverbial rose-colored glasses). Participants rated how true each item was of them on a 1 (not true) to 7 (very true) Likert scale. Intercorrelations among and descriptive statistics for the BIDR-16 subscales are presented in Supplemental Table 10.

3. RESULTS

3.1 *IH's associations with values*

Consistent with hypotheses and research (e.g., Krumrei-Mancuso, 2017), IH was moderately positively associated with valuing universalism and benevolence whereas it was moderately negatively associated with valuing power (Table 1). Also consistent with my hypotheses, IH manifested small to moderate positive correlations with valuing self-direction, and IH was not statistically significantly associated with valuing tradition.

In subsidiary analyses, I examined whether the correlations between IH and the remaining assessed values significantly differed across IH measures, given that these analyses were exploratory in nature. I conducted tests of dependent correlations in which I compared a given correlation to its nearest neighbor to ascertain whether the correlations were statistically different from one another (Lee & Preacher, 2013). My hypotheses regarding valuing achievement, stimulation, hedonism, conformity, and security were partially supported. The AIHS was significantly, albeit weakly, negatively associated with valuing achievement. A test of dependent correlations indicated that the association between the AIHS and achievement was statistically significantly different from the correlations between the other IH measures and achievement (compared with the correlation between the CIHS and achievement; $Z(571)=-3.60$, $p<.01$). In contrast, the PIHS was significantly, albeit weakly, positively associated with valuing achievement. Nevertheless, this correlation was not significantly different from the null association between the LIHS and hedonism ($Z(571)=.98$, $p=.33$). The other IH measures were not significantly associated with achievement.

Only the LIHS manifested the predicted small positive association with valuing stimulation. This correlation was not statistically different from the associations between the other IH measures and hedonism (compared with the correlation between the PIHS and stimulation; $Z(571)=.98$, $p=.33$). The AIHS, in contrast, manifested a small negative correlation with stimulation, although this association was not statistically different from the null association between the CIHS and stimulation ($Z(571)=-1.31$, $p=.19$). The other IH measures were unrelated to stimulation.

Regarding hedonism, conformity, and security, I hypothesized that IH would not be statistically associated with these values. Three out of the five IH measures were not statistically

associated with either hedonism or conformity. The LIHS manifested a small positive association with hedonism, and this association was significantly different from the associations between the other IH measures and hedonism (compared with the association between the PIHS and hedonism; $Z(571)=2.44$, $p<.01$). In contrast the AIHS manifested a small negative correlation with hedonism. Nevertheless, this association was not statistically different from the null association between the MIHS and hedonism ($Z(571)=-1.90$, $p=.06$).

The AIHS also manifested a small negative correlation with conformity, although this association was again not significantly different from the null association between the CIHS and conformity ($Z(571)=-1.31$, $p=.19$). In contrast, the PIHS manifested a small positive correlation with conformity, and this association was significantly different from the correlations between the other IH measures and conformity (compared with the association between the LIHS and conformity; $Z(571)=3.42$, $p<.001$). Four of the five IH measures were not statistically associated with valuing security, although the PIHS manifested a small positive correlation with security. This latter correlation was not significantly different from the null association between the LIHS and security ($Z(571)=.73$, $p=.46$).

3.2 *IH's associations with personality and personality pathology*

By and large, broadband personality traits were robust correlates of IH (Tables 2-3). All measures of IH manifested moderate to large positive correlations with Honesty-Humility, Agreeableness, Conscientiousness, and Openness. IH was also positively associated with extraversion, although the magnitude of the correlation varied across measures. The CIHS and LIHS manifested small positive correlations with Extraversion whereas the AIHS, MIHS, and PIHS manifested medium positive correlations. IH was not significantly associated with Emotionality. IH was moderately positively associated with Altruism, which is an interstitial

scale on the HEXACO. There was a trend for the LIHS to manifest the smallest correlations with general personality traits compared with the other measures of IH.

Next, I examined the associations between IH and the HEXACO PI-R facets. Given the number of correlations (125 in total), I focus on the broad pattern of results (see Table 3). IH was significantly positively associated with all of the Conscientiousness and Openness subscales. IH also manifested moderate to large positive correlations with all of the Agreeableness subscales except for Forgivingness, which was only weakly associated with IH measures and was not significantly related to the LIHS. IH also manifested positive correlations with Honesty-Humility facets, and these ranged from small to large. The LIHS, however, was only weakly to moderately associated with Honesty-Humility facets, and it was not significantly associated with Greed Avoidance. IH manifested small positive correlations with Sentimentality, which is a facet of the Emotionality scale, but manifested small negative correlations with the remaining Emotionality facets, albeit many of the latter correlations were not statistically significant. Finally, regarding facets of Extraversion, IH was consistently positively associated with Social Self-Esteem. All IH measures were also positively associated with Liveliness except for the LIHS, which was not statistically associated with Liveliness.

Next, I examined the associations between IH and personality disorder traits (Tables 4 & 5). Consistent with research, IH manifested small to moderate negative correlations with the NPI-13 total score. By and large, IH manifested small to moderate negative correlations with all narcissism dimensions, including Leadership/Authority. In contrast with my hypotheses, IH was negatively rather than weakly positively associated with Leadership/Authority traits. IH, however, was differentially associated with the triarchic psychopathy dimensions. As predicted, IH was positively associated with Boldness, although the correlations were small and only two

reached statistical significance at the *p*<.05 threshold. In contrast, IH manifested moderate to large negative correlations with both Disinhibition and Meanness. Finally, IH was robustly negatively associated with all of the PID-5 dimensions. The correlations between IH and Negative Affect, Detachment, Disinhibition, and Psychoticism were small to moderate. The correlations between IH and Antagonism were moderate to large.

Post-hoc tests of dependent correlations indicated that the LIHS manifested correlations with Honesty-Humility, Agreeableness, and Conscientiousness that were significantly smaller, in terms of effect size, than the correlations between the other IH measures and these same outcomes (*Z*(571) statistics ranged from -4.42 [compared with the association between the PIHS and Honesty-Humility] to -3.26 [compared with the correlation between the PIHS and Conscientiousness], *p*s<.001). In addition, the LIHS manifested the smallest correlations, in terms of effect size, with most assessed personality disorder traits compared with other IH measures (*Z*(571) statistics ranged from 1.99 [compared with the association between the PIHS and NPI-13 total] to 7.35 [compared with the association between the CIHS and PID-5 Detachment], *p*s<.05).

3.3 IH's associations with empathy

IH manifested moderate to large positive correlations with IRI Perspective Taking and Empathic Concern (Table 6). In addition, IH manifested moderate to large positive correlations with ACME Cognitive Empathy and Affective Resonance. Somewhat surprisingly, the associations between the LIHS and dimensions of empathy were also moderate to large in magnitude, perhaps suggesting that the intrapersonal as well as the interpersonal aspects of IH are associated with empathy.

3.4 IH's associations with self-esteem and internalizing symptoms

I next examined the associations between IH, on the one hand, and internalizing symptoms and self-esteem, on the other (Table 7). IH was weakly to moderately negatively associated with depression, anxiety, and anger, although the LIHS was not significantly associated with depression. Consistent with research (e.g., Meagher et al., 2015), IH manifested small to moderate positive correlations with self-esteem, although the LIHS was not significantly associated with self-esteem. Taken together, these results indicate that IH might buffer against internalizing symptomology and foster healthy self-esteem. Post-hoc tests of dependent correlations indicated that the LIHS manifested the smallest correlations, in terms of effect size, with all assessed internalizing symptoms (Z(571) statistics ranged from 4.73 [compared with the association between the CIHS and PROMIS Anxiety] to 5.64 [compared with the correlation between the CIHS and PROMIS Depression], *ps*<.001) and healthy self-esteem (compared with the correlation between the CIHS and self-esteem; Z(571)=-3.42, *p*<.001).

Summary of Sections 3.1-3.4

In summary, IH was robustly associated with individual differences in values, personality traits, personality disorder traits, empathy, and internalizing symptoms. IH measures manifested small to moderate positive associations with valuing universalism, benevolence, self-direction and moderate negative associations with valuing power. Regarding general personality traits, IH manifested moderate to large positive associations with honesty-humility, agreeableness, conscientiousness, and openness. IH was weakly positively associated with extraversion, particularly with the social self-esteem aspects of extraversion. Finally, IH was not significantly associated with emotionality. Regarding personality disorder traits, IH was moderately negatively associated with narcissism dimensions, meanness and disinhibition psychopathy traits, and general personality disorder features. In contrast, IH was weakly positively associated

with boldness psychopathy traits. IH was also moderately positively associated with affective and cognitive empathy across empathy measures. Finally, IH was weakly positively associated with self-esteem and moderately negatively associated with a range of internalizing symptoms, including depression, anxiety, and anger.

3.5 *IH's associations with cognitive styles*

Next, I examined the associations between IH and a range of cognitive styles to investigate the convergent validity of IH with conceptually similar and dissimilar measures (Table 8). My hypothesis regarding the relationships between IH and Existential Quest (EQ) was partially supported. The CIHS and LIHS manifested small to moderate positive correlations with EQ, which is consistent with research using these IH scales (e.g., Leary et al., 2017; Zachry et al., 2018). The PIHS was also significantly positively associated with EQ, but the correlation was small. In contrast with my hypothesis that all IH measures would be positively associated with EQ, the AIHS and MIHS were not significantly correlated with EQ.[1] Post-hoc tests of dependent correlations indicated that the LIHS manifested the largest correlation, in terms of effect size, with EQ (compared with the correlation between the CIHS and EQ; *Z*(571)=4.18, *p*<.001). As predicted, IH measures manifested moderate to large positive correlations with both objectivism and need for cognition. Also consistent with hypotheses, IH measures manifested moderate to large negative correlations with confirmatory thinking tendencies and dogmatism. Somewhat surprisingly, post-hoc tests of dependent correlations indicated that the LIHS manifested the smallest correlation, in terms of effect size, with need for cognition (compared with the correlation between the CIHS and need for cognition; *Z*(571)=-3.49, *p*<.001).

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[1]See supplemental materials for post-hoc analyses examining the associations between IH subscales and EQ (Supplemental Analyses 1 and Supplemental Table 15).

Regarding social vigilantism (SV), the results were consistent with my hypotheses. The LIHS was not statistically significantly associated with SV, which aligns with existing research (e.g., Leary et al., 2017; Haggard et al., 2018; Zachry et al., 2018). In contrast with the LIHS, all other measures of IH manifested small to moderate negative correlations with SV. Post-hoc tests of dependent correlations indicated that the LIHS manifested the smallest correlation, in terms of effect size, with SV (compared with the correlation between the PIHS and SV; $Z(571)=2.95$, $p<.01$). Also consistent with hypotheses and research, IH measures manifested small to moderate negative correlations with need for closure. Post-hoc tests of dependent correlations indicated that the LIHS manifested the smallest correlation, in terms of effect size, with need for closure (compared with the correlation between the PIHS and need for closure; $Z(571)=3.49$, $p<.001$). In addition, IH was significantly negatively associated with the BCTI, although the magnitudes varied across IH measure. The LIHS and PIHS manifested small correlations with the BCTI whereas the AIHS, MIHS, and CIHS manifested moderate associations with the BCTI. These results suggest that IH might buffer against conspiratorial ideation, although only modestly.

3.6 *IH's associations with bias blind spot*

Contrary to my hypotheses, IH was moderately positively associated with bias blind spot, suggesting that IH is associated with perceiving oneself as *less* biased than the average person (Table 9). When probing into the associations between IH and bias ratings for oneself and the average individual, interesting patterns emerged across the different IH measures. The LIHS was not significantly associated with bias ratings for oneself ($r=-.05$), but it was moderately positively associated with bias ratings for the average person ($r=.26$). These results suggest that the LIHS is not associated with seeing oneself as less biased *per se* but it is associated with

perceiving the average person as biased. In contrast, the remaining IH measures manifested the opposite pattern. The other four IH measures were moderately negatively associated with perceiving oneself as biased (*rs* ranged from -.20 [PIHS] to -.35 [AIHS]), but were unrelated or weakly positively associated with perceiving the average individual as biased (*rs* ranged from .04 [MIHS] to .13 [PIHS]). These results suggest that conceptualizations of IH that consider both interpersonal and intrapersonal features are associated with seeing oneself as less biased and only weakly associated with seeing the average person as biased.[2]

Summary of Sections 3.5-3.6

In summary, IH was consistently positively associated with objectivism and need for cognition. IH was inconsistently associated with EQ, although there was a trend for the associations to be positive. Interpersonally-oriented IH measures were moderately negatively associated with social vigilantism. IH was consistently negatively associated with confirmatory thinking tendencies, dogmatism, need for closure, and conspiratorial ideation. Regarding bias blind spot, in contrast with my hypotheses, IH was moderately positively associated with bias blind, suggesting that IH is related to a larger rather than smaller bias blind spot.

3.7 *IH's associations with critical-thinking and intelligence*

The associations between IH, on the one hand, and critical-thinking and intelligence, on the other, are presented in Tables 10-12.

Consistent with hypotheses and research (Deffler et al., 2016), IH was moderately positively correlated with *d'*, or OCQ Accuracy, indicating that IH was associated with a larger capacity to discriminate real from foil items. Regarding OCQ Response Bias, Deffler and colleagues (2016) found that the LIHS was unrelated to *c*, and I also found that the LIHS was not

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[2]See supplemental materials for post-hoc analyses examining the associations between IH subscales and bias blind spot (Supplemental Analyses 2 and Supplemental Table 15).

significantly associated with c. In addition, the PIHS was not significantly associated with c. In contrast, the AIHS, MIHS, and CIHS were moderately positively associated with c, indicating that IH as assessed on these measures was related to a general tendency to rate items as unfamiliar, regardless of whether they were real or foil items.

Given that previous research suggests that IH is associated with an enhanced ability to differentiate between real and fake items on measures such as the OCQ, I also examined the extent to which IH was associated with perceiving nonsense sentences as less profound than motivational sentences on the PSQ. IH was inconsistently associated with PSQ Nonsense. The AIHS, MIHS, and CIHS were weakly negatively associated with PSQ Nonsense whereas the LIHS and PIHS were not significantly associated with PSQ Nonsense. IH was consistently negatively associated with PSQ Mundane, and these correlations were small to moderate. These results suggest that IH is associated with perceiving mundane sentences as not profound. IH was primarily unrelated to PSQ Motivational, but the LIHS and PIHS were weakly positively associated with PSQ Motivational.[3] Although IH was not consistently associated with PSQ Nonsense, IH manifested small to moderate negative associations with the difference between PSQ Nonsense and Motivational, indicating that IH was related to perceiving nonsense sentences as less profound than motivational sentences. IH was also moderately associated with perceiving motivational sentences as more profound than mundane sentences. Finally, IH was associated with perceiving nonsense sentences as more profound than mundane sentences.

In line with hypotheses and research (Haggard et al., 2018), IH manifested weak to moderate positive correlations with the CRT, suggesting that IH was associated with answering more questions correctly on the CRT. Given that previous research has found that the CRT is

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[3]See supplemental materials for post-hoc analyses examining the associations between IH subscales and PSQ Nonsense (Supplemental Analyses 3 and Supplemental Table 15).

moderately associated with general intelligence (e.g., Toplak et al., 2011), and the CRT was strongly associated with ICAR Total in the present sample ($r=.51$), I hypothesized that IH would also manifest small to medium positive associations with general intelligence. This hypothesis was partially supported. IH measures were weakly to moderately positively associated with ICAR Total, with the exception of the PIHS, which was not significantly associated with ICAR Total. In exploratory analyses, as no study has examined the association between IH and dimensions of intelligence, I investigated the relationships between IH and the ICAR subscales. IH was consistently positively, albeit weakly, associated with Verbal Reasoning. Similar to the associations between IH and ICAR total, all IH measures, with the exception of the PIHS, manifested small to moderate positive associations with Letter-Number Series and Matrix Reasoning. Finally, only two IH measures were significantly, albeit weakly, positively associated with Three-Dimensional Rotation, namely the MIHS and CIHS. Taken together, these results suggest that IH is positively associated with rationality, general intelligence, and specific domains of intelligence.

3.8 *IH's associations with insight*

I next investigated the associations between IH and insight (Table 13). The LIHS was weakly positively associated with BCIS Self-reflection and weakly negatively associated with BCIS Self-certainty. Dovetailing with these results, the LIHS was moderately positively associated with the BCIS Composite, indicating that IH is associated with more self-reflection than self-certainty. The CIHS manifested a somewhat similar pattern of associations, as it was moderately negatively associated with Self-certainty and moderately positively associated with the Composite; nevertheless, the CIHS was not significantly associated with Self-reflection. In contrast, the remaining IH measures, namely the AIHS, MIHS, and PIHS, were weakly to

moderately negatively associated with Self-reflection and also weakly to moderately negatively associated with Self-certainty. These three IH measures were not significantly associated with the Composite.

In post-hoc exploratory analyses, I examined the correlations between IH and the Self-reflection items (see Supplemental Table 17 for the correlations between IH and all BCIS items). IH was consistently positively associated with three items on Self-reflection: "Even though I feel strongly that I am right, I could be wrong", "If somebody points out that my beliefs are wrong, I am willing to consider it", and "There is often more than one possible explanation for why people act the way they do." Thus, IH was moderately positively associated with the items that appear to reflect the "core" features of IH, as defined in the literature. Nevertheless, IH was consistently negatively associated with other Self-reflection items. For instance, IH manifested small to medium negative correlations with the following item: "At times, I have misunderstood other people's attitudes towards me"; this item is arguably associated with empathic abilities (e.g., perspective taking), which is robustly positively correlated with IH. IH was also negatively associated with the items on the Self-reflection scale that explicitly refer to unusual beliefs and experiences.

3.9 *IH's associations with overconfidence*

I next examined the associations between IH and indices of overconfidence, namely overestimation (OE), overprecision (OPR), and overplacement (OPL) on two tasks that yielded objective performance scores, the ICAR and a challenging trivia questionnaire (Table 14). Broadly, IH manifested small associations with indices of overconfidence. First, the PIHS was not significantly associated with any measure of overconfidence across the two tasks, and the LIHS was weakly positively associated only with overestimation on the ICAR. The AIHS,

MIHS, and CIHS were weakly negatively associated with overprecision on the ICAR, overplacement on the ICAR, and overplacement on the trivia questionnaire. The CIHS was also weakly negatively associated with overestimation on the trivia questionnaire, and the CIHS and AIHS were weakly negatively associated with overprecision on the trivia task. Taken together, IH does not appear to be a robust correlate of reduced overconfidence, and in some instances, was associated with greater overconfidence (LIHS with overestimation on the ICAR).[4]

Summary of Sections 3.7-3.9

IH was robustly associated with indices of critical-thinking. Regarding the OCQ, IH was positively associated with a larger capacity to discern real from foil items and a tendency to under- as opposed to overclaim familiarity across items. On the PSQ, IH was associated with perceiving nonsense sentences as less profound than motivational sentences, which indicates that IH is associated with a larger capacity to discriminate semantically meaningless from semantically meaningful sentences. There was also evidence that IH was positively associated with rationality, general intelligence, and specific domains of intelligence. The associations between IH and insight were inconsistent, as two measures of IH were positively associated with insight whereas three measures of IH were negatively associated with insight. The associations between IH and overconfidence were also inconsistent. In addition, the pattern of correlations between IH and overconfidence did not replicate across tasks.

3.10 *IH and the Dunning-Kruger Effect*

The associations between IH and overconfidence were decidedly mixed, as some IH measures and subscales, namely the LIHS and subscales pertaining to openness, were positively associated with overconfidence whereas others were negatively associated. In addition, the

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[4]See supplemental materials for post-hoc analyses examining the associations between IH subscales and indices of overconfidence (Supplemental Analyses 5 and Supplemental Table 16).

associations differed across outcomes (e.g., ICAR or trivia task). These results, in conjunction with results indicating that IH is associated with intelligence, raised the possibility that intellectually humble individuals may not be overconfident but instead might be accurately noting that they performed well on these tasks.

Thus, I examined the distributions of (a) overestimation and (b) actual performance at low, medium, and high percentiles of IH for the LIHS and CIHS. I used the LIHS and CIHS for these analyses, as these two measures differ both theoretically and empirically. As described earlier, the LIHS is a unidimensional, brief measure of the intrapersonal features of IH. The CIHS, in contrast, is a multidimensional measure of both the intra- and interpersonal features of IH. In addition, the CIHS contains the subscale Lack of Intellectual Overconfidence, which by definition should buffer against overconfidence. Through examining the potential for a Dunning-Kruger effect in both measures, it was possible to parse whether the theoretical conceptualization of IH potentially affected the distribution of objective performance in relation to perceived performance (Figures 1-4). I plotted the objective performance (number correct) for the ICAR and trivia task in addition to the perceived accuracy (overestimation) for each task at the low (25th and below), medium (in-between 25th and 75th), and high (75th and higher) percentiles of the LIHS and CIHS. The 95% confidence intervals were also calculated and plotted to facilitate interpretation of statistical significance. For the points at which the 95% confidence intervals did not overlap, one-sample t-statistics were calculated to quantify the significant difference between perceived and objective performance.

Regarding the CIHS, the Dunning-Kruger effect was largely replicated for both the ICAR and the trivia questionnaire, although the effects were not consistently significant across tasks. Those in the 25th percentile of IH overestimated their performance in comparison with their

objective performance, although the effect was only statistically significant for the ICAR (t(121)=5.31, p<.001). Those in the 50th percentile of IH tended to underestimate their performance relative to their objective performance, although the difference was only statistically significant for the trivia questionnaire (t(249)=-4.67, p<.001). Those in the 75th percentile of IH also tended to underestimate their performance relative to their objective performance, although the effect was again only statistically significant for the trivia questionnaire (t(121)=-4.03, p<.001). Thus, on the CIHS, low IH is associated with overestimating one's performance relative to objective performance on the ICAR, and medium to high IH is associated with underestimating one's performance relative to objective performance on the trivia questionnaire.

The Dunning-Kruger effect was not replicated for the LIHS, as there were no statistically significant differences between perceived relative to actual performance across the three IH percentiles for either the ICAR or trivia questionnaire. The overall Dunning-Kruger pattern was found on the trivia questionnaire, as the lowest percentile of IH was associated with overestimating one's performance whereas the higher percentiles were associated with underestimating one's performance. The overall Dunning-Kruger pattern was not found on the ICAR, however, as perceived accuracy actually increased as IH percentiles increased. Taken together, there is little consistent evidence for a Dunning-Kruger effect for IH, as statistically significant results did not replicate across task (e.g., ICAR and trivia questionnaire) or measure (CIHS and LIHS).

3.11 Incremental validity of IH above-and-beyond personality, social desirability, and intelligence in predicting relevant outcomes

To investigate the incremental validity of IH measures above-and-beyond measures of allied constructs, hierarchical regression analyses were conducted in which each covariate of interest was entered in the first step of the model (e.g., honesty-humility, agreeableness, social desirability, and general intelligence) and IH total scores (entered independently rather than simultaneously) were entered in the second step. All predictors were mean-centered. The outcomes of interest were (a) objectivism, (b) dogmatism, (c) need for cognition, (d) the CRT, (e) need for closure, and (f) confirmatory thinking (Tables 15-18).

First, IH across measures remained statistically significant predictors of most outcomes after controlling for its shared variance with Honesty-Humility. The one exception was the PIHS in predicting the CRT, as it was not significantly associated with the CRT after controlling for Honesty-Humility (β=.07, ΔR^2=.01). The average ΔR^2 across all IH measures and all outcomes was .11, suggesting that IH accounts for an average 11% of the variance in these outcomes after controlling for Honesty-Humility. Within IH measure, the AIHS predicted an average 13%; the LIHS an average 10%; the MIHS an average 12%; the CIHS an average 17%; and the PIHS an average 8% of the variance across outcomes above-and-beyond Honesty-Humility. Across IH measures, IH accounted for an average 19% of the variance in objectivism; 17% in dogmatism; 19% in need for cognition; 3% in the CRT; 6% in need for closure; and 8% in confirmatory thinking above-and-beyond Honesty-Humility.

Second, IH across measures remained statistically significant predictors of most outcomes after controlling for its shared variance with Agreeableness. There were two exceptions. One exception was the PIHS in predicting the CRT, as it was not significantly associated with the CRT after controlling for Agreeableness (β=.01, ΔR^2=.01). The second exception was the LIHS in predicting need for closure, as it was not significantly associated with

need for closure after controlling for Agreeableness (β=-.05, ΔR^2 =.00). The average ΔR^2 across all IH measures and all outcomes was .12, suggesting that IH accounts for an average 12% of the variance in these outcomes after controlling for Agreeableness. Within IH measure, the AIHS predicted an average 14%; the LIHS an average 10%; the MIHS an average 12%; the CIHS an average 17%; and the PIHS an average 8% of the variance across outcomes above-and-beyond Agreeableness. Across IH measures, IH accounted for an average 24% of the variance in objectivism; 16% in dogmatism; 17% in need for cognition; 3% in the CRT; 1% in need for closure; and 12% in confirmatory thinking above-and-beyond Agreeableness.

Third, IH across measures remained statistically significant predictors of all outcomes after controlling for its shared variance with social desirability (BID-R Total). The average ΔR^2 across all IH measures and all outcomes was .14, suggesting that IH accounts for 14% of the variance in these outcomes after controlling for social desirability. Within IH measure, the AIHS predicted an average 16%; the LIHS an average 12%; the MIHS an average 15%; the CIHS an average 20%; and the PIHS an average 10% of the variance across outcomes above-and-beyond social desirability. Across IH measures, IH accounted for an average 21% of the variance in objectivism; 22% in dogmatism; 19% in need for cognition; 4% in the CRT; 5% in need for closure; and 16% in confirmatory thinking above-and-beyond social desirability.

Finally, IH across measures remained statistically significant predictors of most outcomes after controlling for its shared variance with intelligence (ICAR Total). There were three exceptions. The AIHS, LIHS, and PIHS were not significantly associated with the CRT after controlling for general intelligence (βs ranged from .01 [LIHS] to .07 [AIHS]; ΔR^2 ranged from .00 to .01). The average ΔR^2 across all IH measures and all outcomes was .12, suggesting that IH accounts for an average 12% of the variance in these outcomes after controlling for intelligence.

Within IH measure, the AIHS predicted an average 13%; the LIHS an average 9%; the MIHS an average 13%; the CIHS an average 16%; and the PIHS an average 10% of the variance across outcomes above-and-beyond intelligence. Across IH measures, IH accounted for an average 21% of the variance in objectivism; 14% in dogmatism; 21% in need for cognition; 1% in the CRT; 7% in need for closure; and 9% in confirmatory thinking above-and-beyond intelligence.

In subsidiary analyses, I also examined the incremental validity of IH above-and-beyond (a) Conscientiousness, (b) Openness, (c) Extraversion, and (d) Emotionality. These results are presented in Supplemental Tables 11-14.

3.12 *Incremental validity of honesty-humility above-and-beyond IH in predicting relevant outcomes*

Finally, to replicate past research (Davis et al., 2016), I examined the extent to which honesty-humility statistically incremented IH in predicting the six outcomes described earlier (Table 19). Honesty-Humility did not significantly predict the CRT when controlling for IH (*βs* ranged from -.03 to .07; ΔR^2 were all .00). Honesty-Humility significantly predicted need for closure after controlling for the LIHS only (*β*=-.11, ΔR^2=.01). After controlling for the LIHS and PIHS, Honesty-Humility remained a weak positive predictor of objectivism (*βs* ranged from .07 to .10; ΔR^2 ranged from .01 to .03). Honesty-Humility consistently negatively predicted confirmatory thinking above-and-beyond IH (*βs* ranged from -.10 to -.26; .10; ΔR^2 ranged from .01 to .06). Honesty-Humility also significantly predicted need for cognition over-and-above the AIHS and LIHS; nonetheless, honesty-humility was weakly negatively associated with need for cognition above-and-beyond the AIHS (*β*=-.09, ΔR^2=.01) whereas it was weakly positively associated above-and-beyond the LIHS (*β*=.15, ΔR^2=.02). Finally, honesty-humility was positively associated with dogmatism after controlling for the AIHS (*β*=.15, ΔR^2=.02), MIHS

(β=.12, ΔR^2=.01), and CIHS (β=.19, ΔR^2=.03), suggesting that honesty-humility with IH partialled from it predicts *more* dogmatism.

The average ΔR^2 across all measures and outcomes was .01, suggesting that honesty-humility accounts for a mere average 1% of the variance in these outcomes after controlling for IH. Honesty-Humility accounted for an average 1% of the variance above-and-beyond the AIHS; 2% above-and-beyond the LIHS; 1% above-and-beyond the MIHS; 1% above-and-beyond the CIHS; and 1% above-and-beyond the PIHS for all the outcomes combined. Across measures of IH, honesty-humility accounted for an average 1% of the variance in objectivism; 1% in dogmatism; 1% in need for cognition; <1% in the CRT; <1% in need for closure; and 3% in confirmatory thinking above-and-beyond IH. Taken together, IH accounted for substantially more variance in cognitive styles and rationality than honesty-humility when controlling for their shared variance.

4. DISCUSSION

In the present study, I sought to expand the nomological network of IH and clarify definitional ambiguities in IH research. To do so, I examined the associations between multiple self-report measures of IH and a plethora of theoretically meaningful individual difference constructs, including general personality, personality disorder traits, values, cognitive styles, internalizing features, bias blind spot, and critical-thinking. In addition, I examined the Dunning-Kruger effect to ascertain whether higher IH is associated with more accurate assessments of one's objective performance compared with lower IH. Finally, I investigated the incremental validity of IH above-and-beyond personality traits, social desirability, and general intelligence to elucidate the extent to which IH accounts for significant variance in relevant outcomes after controlling for its shared variance with overlapping constructs. I elected to examine the

associations between intellectual humility and external criteria at the manifest-level to elucidate the potential differential patterns of correlations across self-report measures of IH.

4.1 Summary and interpretation of results

Consistent with research (Krumrei-Mancuso, 2017), IH was positively associated with valuing universalism and benevolence whereas it was negatively associated with valuing power. In addition, IH was positively associated with valuing self-direction. These results indicate that IH is associated with perceiving principles such as broad-mindedness, wisdom, honesty, helpfulness, creativity, and curiosity as life-guiding values. These results also suggest that IH is associated with devaluing principles such as social power, authority, and wealth. By and large, IH was negligibly or inconsistently associated with the other assessed values. These results, although variable-centered rather than person-centered, raise the possibility that one can be intellectually humble largely irrespective of valuing (or devaluing) tradition, achievement, stimulation, hedonism, conformity, and security. Nevertheless, given that this was the first study to examine IH's associations with a relatively comprehensive set of values, independent replication efforts are warranted.

Regarding general personality, IH manifested moderate to large positive associations with humility, agreeableness, conscientiousness, and openness. There was a trend for IH to manifest small positive associations with extraversion whereas it was negligibly associated with neuroticism. At the subscale level, IH was consistently associated with all conscientiousness and openness subscales, and it was associated with most honesty-humility and agreeableness subscales. In addition, IH was positively associated with altruism and the social self-esteem subscale of extraversion. In contrast, IH was negatively associated with most personality disorder dimensions, including those comprising narcissism, psychopathy, and general personality

disorder traits. The lone exception was boldness, with which IH manifested weak positive correlations. These latter results are consistent with IH's associations with social self-esteem, as boldness traits in part comprise agentic extraversion (e.g., Lilienfeld et al., 2016). IH was also positively associated with cognitive and affective empathy, and these results were consistent across two self-report measures of empathy.

The negative association between IH and leadership/authority narcissism traits was somewhat surprising, as leadership/authority tends to be moderately positively correlated with boldness (e.g., Ackerman et al., 2011). Nevertheless, I used a short-form version of the NPI. Although studies indicate that the NPI-13 is a valid proxy for the full NPI (Gentile et al., 2013), the content coverage of leadership/authority traits is less extensive than in the 40-item NPI. The NPI-40 more comprehensively assesses potentially adaptive narcissism traits, such as self-sufficiency and leadership-orientation, and these traits often manifest positive associations with self-esteem and psychological functioning (Raskin & Terry, 1988). The NPI-13, in contrast, "appears to assess a slightly more pathological and 'darker' variant of narcissism" (Gentile et al., 2013; p. 15) compared with the NPI-40. Thus, it is possible that IH would be positively associated with leadership/authority when using the full version of the NPI.

Consistent with IH's positive associations with boldness and social self-esteem, most IH measures were also positively associated with general self-esteem. In aggregate, most IH measures were moderately negatively associated with depression, anxiety, and anger symptoms. These findings lend preliminary support to the supposition that IH comprises a non-threatening awareness of one's limitations and "is not just endlessly questioning each piece of knowledge or thought" (Haggard et al., 2018; p. 185). Whatever their differences, philosophers and psychologists alike contend that IH is not synonymous with self-deprecation, low self-esteem, or

intellectual servility but is associated with a "non-deficient and non-excessive" (Haggard et al., 2018; p. 185) awareness of one's intellectual limitations (Church, 2017; Haggard et al., 2018).

There was a trend for the LIHS to manifest the smallest correlations with general personality traits, personality disorder traits, and internalizing symptoms, compared with other IH measures. These patterns of correlations are largely consistent with the circumspect conceptualization of IH used in the LIHS, namely that IH is a dispositional variable that is primarily intrapersonal as opposed to interpersonal in nature. In developing the LIHS, the authors conceptualized metacognitive awareness of the limitations of one's beliefs as the "core features" (Leary et al., 2017; p. 795) of IH. The authors acknowledged that IH likely bears meaningful implications for interpersonal interactions, but they perceived specific behaviors, attitudes, and emotions as downstream effects of IH rather than as part-and-parcel of IH. The authors noted that IH is "distinguished from uncertainty or low self-confidence by the degree to which people hold beliefs tentatively specifically because they are aware that the evidence on which those beliefs are based may be limited or flawed" (Leary et al., 2017; p. 794). Taken together, the LIHS conceptualizes IH as an epistemological stance towards one's knowledge that is largely separable from personality traits, emotion, and self-esteem.

All IH measures, even those that comprise interpersonal behaviors and traits, converge on the notion that IH comprises intrapersonal qualities relevant to meta-cognition. Consistent with these definitions of IH and existing research, all IH measures were positively associated with objectivism and need for cognition and negatively associated with confirmatory thinking tendencies, dogmatism, and need for closure. There was a trend for IH to manifest positive associations with flexibility regarding one's existential beliefs, although not surprisingly the correlations were larger for measures focused on intrapersonal features of IH as opposed to

interpersonal qualities. Most measures of IH were negatively associated with social vigilantism. Consistent with research (Leary et al., 2019) the LIHS was negligibly associated with social vigilantism. The authors of the LIHS noted in their validation study that "the lack of correlation with social vigilantism was surprising given that social vigilantism might seem to involve low intellectual humility" (Leary et al., 2017; p. 797). Nonetheless, they noted that SV reflects "a misanthropic view of other people's stupidity and the motive to correct others' beliefs rather than low intellectual humility per se" (p. 798). Finally, IH was negatively associated with conspiratorial ideation, lending preliminary support to the notion that intellectually humble individuals base their beliefs on evidence and rationality (e.g., Hoyle et al., 2016).

Although the LIHS was designed to reflect the epistemic qualities of IH, the it did not consistently manifest the largest correlation with cognitive styles. These findings raise the possibility that the LIHS lacks adequate content validity, as it may not sufficiently sample the realm of possible items that capture the metacognitive aspects of IH, perhaps due at least in part to its brevity. The authors of the LIHS sought to design a measure that was unidimensional and brief to facilitate its implementation in studies where time is of the essence (Leary et al., 2017). Nevertheless, validity may have been sacrificed for efficiency, as other research suggests that IH is multidimensional (e.g., Krumrei-Mancuso & Rouse, 2016), and the LIHS contains only 6-items to capture an ostensibly complex and perhaps multifaceted psychological construct. The authors of the LIHS, however, also perceived IH as distinct from cognitive styles, as they posited that "intellectual humility is related to, but conceptually and empirically distinct from, other constructs that involve a general tendency to be unjustifiably certain of one's beliefs, such as dogmatism, belief superiority, and low openness" (Leary et al. 2017; p. 794). Thus, it appears

that the LIHS was designed to manifest small to moderate correlations with both cognitive styles and personality traits.

Although IH has long been theorized to facilitate a more accurate perception of one's beliefs, IH was unexpectedly associated with a larger as opposed to a smaller bias blind spot. Most IH measures were associated with seeing the average person as more biased whereas they were negligibly associated with seeing oneself as more biased, although the LIHS manifested the opposite pattern of correlations. These results on aggregate were surprising, but they are broadly consistent with research on self-reported bias blind spot, which is decidedly mixed. Scopelliti and colleagues (2015) found that bias blind was positively associated with need for cognition ($r=.16$) and verbal intelligence ($r=.10$). They also found that narcissism, a trait one would expect to be positively associated with bias blind spot, was unrelated to it ($r=-.02$), whereas healthy self-esteem was positively associated ($r=.15$). On balance, they found that trait openness was moderately positively associated with bias blind spot ($r=.33$). They also found a moderate negative correlation between the CRT and bias blind spot, which was the one of the few correlations that was in the expected direction ($r=-.22$). In a separate study, West and colleagues (2012) also found that intelligence, need for cognition, and open-mindedness are positively associated with bias blind spot (rs ranged from .12 [CRT] to .26 [Need for Cognition]). Nevertheless, in contrast with Scopelliti and colleagues (2015), they found that the CRT was weakly positively associated with bias blind spot ($r=.10$).

Although it is tempting to interpret these results as suggesting that intelligent, open-minded individuals are less biased than the average person, West and colleagues (2012) found little evidence to suggest that this was the case when examining objective performance on cognitive bias tasks. Moreover, those who rated themselves as less biased did not perform

significantly better on cognitive bias tasks compared with those who rated themselves as more

biased (West et al., 2012). They concluded that "a conservative way to characterize the findings

here is to say that cognitive ability provides no inoculation at all from the bias blind spot" (p.

515). Nonetheless, this interpretation neglects to acknowledge that intelligence and cognitive

styles associated with openness are not merely unassociated with bias blind spot but are instead

positively associated with it, meaning they are associated with a *larger* bias blind spot.

Taken together, my results in conjunction with existing research in this domain raise

serious red flags regarding the construct validity of bias blind spot scales. In the absence of

objective data on cognitive bias susceptibility vis-à-vis performance on a heuristics and biases

battery, it is unclear what self-reported bias blind spot scales are measuring. For instance, it is

possible that bias blind spot measures are contaminated with positive self-appraisal. Thus,

additional research is needed to examine whether IH buffers against cognitive bias. If IH is

associated with accuracy on bias paradigms, then the positive association between IH and bias

blind spot might reflect an accurate evaluation of one's performance rather than a cognitive bias.

Although the associations between IH and bias blind spot were opposite to what was

predicted, IH was associated with indices of critical-thinking in the expected directions.

Consistent with research (e.g., Deffler et al., 2016), IH was associated with accuracy on the

OCQ, suggesting that IH is related to an enhanced ability to discriminate real from fake items. In

addition, most IH measures were positively associated with response bias on the OCQ, indicating

that IH as assessed on these measures was related to a tendency to perceive items, regardless of

whether they were real or fake, as less familiar rather than more familiar. IH was also weakly

associated with an increased capacity to distinguish between nonsense and motivational

sentences on the PSQ, as IH was associated with rating motivational sentences as more profound

than nonsense sentences. Given that the associations between IH and the PSQ were relatively small, it is possible that intelligence is a more robust correlate of performance on the PSQ rather than intellectual humility *per se*.

Consistent with research (e.g., Haggard et al., 2018), IH was positively associated with accuracy on the CRT. IH was also positively associated with general intelligence and specific dimensions of intelligence. These results raise the possibility that IH is associated with greater intellectual and critical-thinking capacities across problem-solving domains. Nonetheless, the causal direction of these associations is unclear. It is possible that IH fosters intelligence and critical-thinking insofar as intellectually humble individuals are more interested in learning and actively seeking out disconfirmatory information. It is also possible, however, that intelligence fosters IH, as more intelligent individuals might see the nuances of a given argument more clearly and enjoy challenging problems more so than less intelligent individuals.

In contrast, the associations between IH and insight were mixed. Only the intrapersonally-oriented measures of IH were positively associated with insight, and the remaining measures of IH were negatively associated. At first blush, these latter results seem to suggest that certain IH measures lack construct validity in regards to insight. Nevertheless, the BCIS was developed to identify whether *clinical* patients could correctly identify their "aberrant beliefs" (Beck et al., 2004; p. 320) as just that: aberrant. Some items on the Self-reflection scale tap into this "reflecting on aberrant beliefs" component. For example, one item on the Self-reflection scale states, "Other people can understand the cause of my unusual experiences better than I can," and another states, "Some of my experiences that have seemed very real may have been due to my imagination." Because IH is often defined as individual differences in attending to the fallibility of one's thought processes in conjunction with a desire to seek out the truth,

intellectually humble individuals might be less likely to fall prey to unusual beliefs in the first place. In subsidiary analyses, all IH measures were positively associated with items reflecting a willingness to reconsider one's beliefs. whereas they were negatively associated with items reflecting a tendency to perceive one's beliefs as strange. Thus, the BCIS may not be the best measure to use when assessing metacognitive insight in (a) community participants and (b) in regards to IH.

Contrary to prediction, there was little evidence that IH was negatively associated with overconfidence on problem-solving measures. Some measures of IH were positively associated with indices of overconfidence whereas others were weakly negatively associated. In addition, the pattern of correlations between IH and indices of overconfidence did not replicate across problem-solving measure, raising questions regarding the robustness of these associations. Still, IH dimensions reflecting lack of intellectual overconfidence were consistently negatively associated with indices of overconfidence across problem-solving measures. Additionally, there was little evidence for a Dunning-Kruger effect in IH. The general Dunning-Kruger pattern was replicated across IH and problem-solving measures, as low IH was associated with overestimating one's abilities relative to objective performance whereas high IH was associated with slightly underestimating one's abilities relative to objective performance. Nevertheless, the differences between estimated and objective performance often were not statistically significant, and the differences that were statistically significant did not replicate across measures. The statistically significant differences between estimated and objective performance were found on the CIHS, which comprises a dimension reflecting lack of intellectual overconfidence. These results might indicate that lack of intellectual overconfidence, in conjunction with metacognitive reflection, buffer against overestimation as opposed to metacognitive awareness in isolation.

Finally, there was preliminary evidence that IH significantly increments general humility, agreeableness, social desirability, and general intelligence in predicting cognitive styles and critical-thinking abilities. Intellectual humility accounted for more than 10% of the variance in relevant outcomes above-and-beyond each covariate. In aggregate, IH was associated with more than 15% of the variance in cognitive styles, such as dogmatism and objectivism, above and beyond these overlapping variables. Nevertheless, general intelligence appeared to account primarily for the associations between IH and performance on the CRT. Given that the CRT manifests large, positive correlations with general intelligence, it is possible, if not likely, that controlling for general intelligence in the association between IH and the CRT constitutes statistical over-control (e.g., Streiner, 2016). In contrast with IH, General humility was not a robust predictor of cognitive styles and critical-thinking abilities above-and-beyond IH, as honesty-humility accounted for a mere 1% of the variance in outcomes of interest after controlling for IH. Honesty-humility's associations with cognitive styles manifested suppressor effects, even reversing in some instances after partialling for IH, as it was associated with more dogmatism after controlling for IH as opposed to less dogmatism. Taken together, IH accounted for significantly more variance in cognitive styles and critical-thinking than general humility when controlling for their shared variance.

4.2 Limitations

This study was characterized by a number of strengths that distinguishes it from previous studies, including my simultaneous examination of multiple self-report measures of IH and investigation of a Dunning-Kruger effect. Nonetheless, my study was also characterized by limitations that warrant consideration in future research. First, IH was assessed exclusively using self-report, rendering my findings partly susceptible to mono-method bias. Given the potential

for a paradox of humility (see Davis et al., 2016), independent replication efforts utilizing additional methodologies, such as informant report or behavioral observation, are warranted. This limitation notwithstanding, my results demonstrate significant differentiation across IH measures, suggesting the presence of substantive covariance rising above method covariance.

In addition, my study comprised MTurk workers only. MTurk samples tend to be older than undergraduate samples (e.g., Buhrmester et al., 2011) and better educated than other convenience samples (e.g., Berinsky et al., 2012). Given that IH might increase as age and education increase, the generalizability of my results to other samples is relatively unclear. For instance, data indicate that MTurk samples tend to be higher on openness and lower on agreeableness (higher in antagonism) than undergraduates (Behrend et al., 2011; Miller et al., 2017). This distinctive amalgamation of high openness and high antagonism in MTurk workers might also affect the generalizability of my findings, as this combination of personality traits may alter the mean levels of IH, expression of IH, or both. Although the generalizability of my results to other samples warrants additional examination, research using undergraduate samples and in-person community samples has yielded results broadly comparable to those found in the present study (e.g., Davis et al., 2016; Deffler et al., 2016).

This study was cross-sectional, thus precluding formal conclusions regarding temporal precedence, let alone causality, in the associations between IH and individual difference constructs. Longitudinal research is needed to elucidate the development of IH in relation to the development of personality traits and critical-thinking abilities. Only one study has examined IH in children, and this study indicates that the social and epistemic qualities of IH might develop at different times, with the social qualities (e.g., asking for help to solve a challenging problem) developing first and the epistemic qualities (e.g., perceptions of one's knowledge) developing

later (Danovitch et al., 2017). In addition, this study indicated that IH was associated with

neurophysiological (event-related potential) markers reflecting error detection, raising the

possibility that early error detection shapes the expression of IH (or vice-versa). Longitudinal

research is also needed to examine whether IH is stable across the lifespan or shifts as values and

belief systems are crystallized in adulthood. Preliminary evidence suggests that IH is relatively

stable over a 3-month period (test-retest $r=.70$; Krumrei-Mancuso & Rouse, 2016). Nevertheless,

other studies suggest that mean-levels of IH can be experimentally increased (Porter &

Schumann, 2018), and that state IH is separable from trait IH ($r=.53$; Zachry et al., 2018). These

latter findings raise the possibility that IH can change over time and across contexts. Taken

together, research is warranted to clarify the development of IH and its stability over time.

4.3 Future directions and key questions

4.3.1 How should researchers define IH?

Although most researchers concur that IH comprises intrapersonal features, some contend

that IH is largely, or even primarily, interpersonal in nature, as it comprises features such as

respectfulness towards others and a low concern for how one's intellectual abilities are

perceived. In addition, some researchers posit that IH is unidimensional (e.g., Leary et al., 2017),

whereas others posit that it is multidimensional (e.g., Krumrei-Mancuso & Rouse, 2016). There

are numerous self-report measures of IH, with more than 10 measures developed in the last five

years alone. These definitional and measurement ambiguities raise an important, albeit

challenging, question: What is IH?

Results from the present study suggest that intrapersonal qualities may comprise the

"core" of IH. All measures of IH, even those that only assessed intrapersonal features of IH,

were significantly correlated with personality traits, values, personality disorder traits, cognitive

styles, critical-thinking, empathy, and certain internalizing symptoms (e.g., anger). Taken together, these results indicate that that the metacognitive aspects of IH manifest convergent validity with a wide range of allied constructs irrespective of the interpersonal aspects of IH. In addition, they lend preliminary support to Leary and colleagues' (2017) conjecture that IH bears implications for interpersonal interactions and cognitive styles, but it is empirically and theoretically distinct from them, as well. For instance, the correlations between intrapersonal measures of IH and interpersonally relevant outcomes, such as personality traits, were small to moderate. Although IH should be related to interpersonally relevant outcomes, it should not necessarily manifest large correlations with these outcomes, given that IH is theoretically separable from general personality. In addition, intrapersonally-oriented measures of IH did not consistently manifest the largest correlations with cognitive styles. At first glance, these results seem to suggest that intrapersonal measures of IH lack high levels of construct validity; nevertheless, if one adopts a circumspect definition of IH that comprises an awareness of the fallibility of one's beliefs and interpretive abilities, then IH should be distinct from allied cognitive styles in addition to personality traits. Cognitive styles are much broader than IH and reflect aspects that are not necessarily central to IH, such as rigidity and authoritarianism.

On balance, interpersonally-oriented measures of IH might also comprise features that are not necessarily part-and-parcel of IH, and there is a potential concern for criterion-contamination when examining the associations between these measures of IH and interpersonally relevant outcomes. For instance, one item from the agreeableness scale of the HEXACO PI-R is: "When people tell me that I'm wrong, my first reaction is to argue with them." On the intellectual arrogance dimension of the MIHS, one item is: "I get defensive if others do not agree with me." These items are likely capturing the same phenomenon, namely, antagonism (low

agreeableness). Thus, the correlation between interpersonally-oriented measures of IH and interpersonally-relevant outcomes might be spuriously inflated by content overlap. Indeed, in the validation study of the MIHS, the correlation between the MIHS and agreeableness was quite large ($r=.78$), which raises the possibility that interpersonally-oriented measures of IH reflect an amalgam of general dispositions rather than IH *sui generis*.

Although IH might be best characterized as primarily intrapersonal in nature, this does not necessarily imply that IH is unidimensional. Self-report measures of IH that are multidimensional often comprise at least two intrapersonally-oriented factors. For instance, the CIHS contains a dimension reflecting openness to revising one's viewpoint and a separate dimension reflecting lack of intellectual overconfidence. These two factors were positively correlated in the original validation study, albeit modestly (Krumrei-Mancuso & Rouse, 2016; $r=.31$). These results raise the possibility that metacognitive awareness of the evidentiary basis for one's beliefs is heterogeneous. In the present study, multidimensional measures of IH accounted for more variance in cognitive styles and critical-thinking than the unidimensional measures above-and-beyond personality traits, social desirability, and general intelligence. These results may indicate that the multidimensional measures of IH have more construct validity, insofar as they account for more variance in relevant outcomes and perhaps sample a wider range of possible items germane to IH. Nevertheless, it also might depend on what nomological network one adopts, as each measure may be construct-valid for measuring legitimate but rather different conceptualizations of IH. Thus, additional research is warranted to examine the potential multidimensionality of intrapersonal aspects of IH.

Taken together, IH appears to reflect individual differences in the willingness to reflect on one's beliefs and seek out evidence from different perspectives. Interpersonal qualities might

be downstream effects of IH rather than part-and-parcel of IH. Interpersonal qualities might also

be concurrent, correlated features of IH that shape its expression. In addition, IH might be best

characterized as multidimensional, even when adopting an intrapersonal stance towards IH.

Future research utilizing latent variable modeling is warranted to explore the underlying structure

of IH measures. No studies other than the original validation studies have confirmed the factor

structures of IH measures, and such research is needed to clarify the robustness of IH

dimensions. In addition, no studies have examined whether a latent variable framework could be

utilized across measures to elucidate whether multiple IH measures can be combined into a

single latent variable.

 4.3.2 How should researchers measure IH?

 As described earlier, there is a potential paradox in the measurement of humility (e.g.,

Davis et al., 2010). Individuals low on humility might be the most likely to self-enhance and

perceive themselves in a rosier light than warranted. In contrast, individuals high on humility

might be the most likely to demonstrate a modesty effect and rate themselves as less humble than

they are. If there is, indeed, a paradox in the measurement of humility, one might expect social

desirability to largely account for the associations between IH and relevant outcomes. In the

present study and previous research (e.g., Krumrei-Mancuso & Rouse, 2016), IH measures

predicted significant variance in relevant outcomes over-and-above social desirability, indicating

that social desirability does not account fully for these associations. In addition, one might expect

narcissism to be unrelated to or even positively correlated with IH if narcissistic individuals are

the most likely to rate themselves highly on IH. Nevertheless, IH manifests moderate negative

correlations with narcissism traits, suggesting that higher reported narcissism is associated with

lower reported IH. Thus, although the paradox of humility poses a threat to the validity of self-report measures of IH, it might pose less of a threat than originally assumed.

Nonetheless, given these potential threats to the validity of self-report measures of IH, it is essential to consider other methods for assessing intellectual humility. One promising methodology is informant-report measures. Research in the personality domain indicates that informant-reports of general personality moderately converge with self-reports of general personality (*rs* ranged from .23 to .71), but informant-reports also account for additional variance in relevant outcomes, such as personality disorder traits and functional impairment, above-and-beyond self-reports of general personality (e.g., Miller, Pilkonis, & Clifton, 2005). Thus, it is plausible that informant-reports of IH will account for additional variance in relevant outcomes over-and-above self-reports of IH. No studies have examined this possibility, but one study has examined the convergence of self- and informant-reports of IH. Meagher and colleagues (2015) collected self-report measures of IH in addition to informant-reports of IH. The informant-reports were completed by a student's teammate, and the teams worked together in class on a task over the course of the semester. The correlation between self-reported IH and informant-reported IH was modest (*r*=.21), suggesting that the two ratings converge but not highly. Nevertheless, research indicates that self-other agreement in the personality domain is higher when the informant is well-acquainted with the individual (e.g., De Vries, Lee, & Ashton, 2008); thus, the correlation between self-reported IH and informant-reported IH might be larger when including informants who know a given individual well.

Informant-reports of IH, however, may be limited, insofar as informants might not know the extent to which an individual engages in private self-reflections about his or her beliefs. Dovetailing with this conjecture, Meagher and colleagues (2015) found that informant-reports of

agreeableness were indistinguishable from informant-reports of IH (r=.97), suggesting that

perceptions of agreeableness were essentially the same as perceptions of intellectual humility.

Thus, items on informant-report IH measures may need to be modified to more directly assess

informants' perceptions of how a target individual interacts with his or her *own* beliefs rather

than with others in a conversation about his or her beliefs. In addition, informant-reported IH

might be less imbued with ratings of agreeableness when utilizing informants who are closely

acquainted with the target individual.

In addition, research on the behavioral correlates of IH is needed. Such research can

clarify whether IH, as detected by self-report, actually manifests in intellectually humble

behaviors. Although intellectual humility is associated with self-reported open-mindedness,

objectivism, dogmatism (reversed), and confirmatory thinking tendencies (reversed), it remains

relatively unclear whether intellectually humble individuals *behaviorally* seek out

disconfirmatory information and *earnestly* reevaluate their preconceived notions in the face of

new evidence. For instance, on a selective exposure task, which presents individuals with options

to interact with information (typically news articles) that confirms or disconfirms their beliefs

(see Hart et al., 2009), IH should be associated with a tendency to select disconfirmatory

information in addition to confirmatory information. If there is no association between self-

reported IH and behaviorally seeking out disconfirmatory evidence, it raises the possibility that

people are not accurately able to reflect on their willingness to challenge their beliefs. There is

preliminary evidence that IH is associated with seeking out information that conflicts with one's

views, even when these beliefs are strongly held (e.g., Porter & Schumann, 2018).

No studies have examined whether IH is associated with a genuine reconsideration of

one's beliefs in light of new evidence. For instance, Spiegel (2012) notes that an open-minded

individual's "willingness to reconsider is not a matter of mere perfunctory listening to contrary opinions but a genuine readiness to revise or even abandon one's views in light of new objections or counter-evidence" (p. 28). People may expose themselves to disconfirmatory evidence for a variety of reasons. Individuals may interact with disconfirmatory evidence to expand their knowledge. Other individuals, however, may interact with disconfirmatory evidence to bolster their own beliefs and use the evidence against others in an argument. Because people are notoriously incapable of accurately reflecting on the motivations for their behaviors (e.g., Nisbett & Wilson, 1977), behavioral measures of IH that parse an earnest reconsideration of one's beliefs from a disingenuous reconsideration are needed.

4.4 Conclusion

Results from the present study in conjunction with existing research indicate that personality traits, cognitive styles, and indices of critical-thinking are robust correlates of IH. In addition, my results suggest that IH may be a dispositional construct, but it is not strictly an amalgam of general personality traits and cognitive styles, as it is also meaningfully associated with values, intelligence, and rationality. Although some researchers consider IH to be primarily interpersonal in nature (e.g., Davis et al., 2016), my results suggest that IH might be best characterized as an intrapersonally-oriented construct, as intrapersonal measures manifested convergent validity with interpersonally-relevant outcomes in addition to intrapersonally-relevant outcomes. More circumspect definitions of IH focused on a metacognitive awareness of the evidentiary basis of one's beliefs and one's limitations in evaluating new information might prove fruitful in establishing a consensus definition of IH. In addition, multidimensional measures of IH appear to predict more variance in relevant external criteria, such as objectivism, than do unidimensional measures of IH. Future research is needed to clarify the latent structure

of IH and examine the utility of other methodologies in the assessment of IH, including informant-report and behavioral observation. In sum, more research is needed to elucidate the behavioral correlates of IH and whether IH buffers against cognitive bias.

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6. TABLES

Table 1. *Correlations between IH total scores and values.*

Intellectual Humility	SVS Achievement	SVS Hedonism	SVS Stimulation	SVS Self-Direction	SVS Universalism	SVS Benevolence	SVS Tradition	SVS Conformity	SVS Security	SVS Power
AIHS	-.15[a]	-.14[b]	-.11*[b]	**.16**	**.23**	**.30**	-.04	-.11*[b]	.01	**-.43**
LIHS	.05	.09*[b]	.09*[b]	**.25**	**.33**	**.29**	-.04	-.05	.07	**-.19**
MIHS	-.02	-.08	-.03	**.21**	**.29**	**.36**	-.03	-.06	.05	**-.32**
CIHS	-.04	-.06	-.07	**.17**	**.27**	**.29**	-.05	-.07	.04	**-.42**
PIHS	.09*[b]	-.01	.05	**.29**	**.32**	**.38**	.06	.09*[a]	.10*[b]	**-.21**

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

[a] Denotes that the correlation is significantly different from its nearest neighbor within column using a test of dependent correlations.

[b] Denotes that the correlation is not significantly different from its nearest neighbor within column using a test of dependent correlations.

Table 2. *Correlations between IH total scores and HEXACO dimensions.*

Intellectual Humility	Honesty-Humility	Emotionality	Extraversion	Agreeableness	Conscientiousness	Openness
AIHS	**.53**	-.03	**.21**	**.45**	**.50**	**.39**
LIHS	**.21**	.01	.11*	**.27**	**.33**	**.40**
MIHS	**.48**	-.07	**.28**	**.57**	**.48**	**.41**
CIHS	**.42**	-.01	**.15**	**.44**	**.47**	**.39**
PIHS	**.38**	-.05	**.33**	**.42**	**.45**	**.39**

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

Table 3. *Correlations between IH total scores and HEXACO facets.*

HEXACO Facets	AIHS	LIHS	MIHS	CIHS	PIHS
Honesty-humility facets					
Sincerity	**.30**	**.16**	**.32**	**.23**	**.28**
Fairness	**.38**	*.12*	**.36**	**.30**	**.30**
Greed Avoidance	**.31**	.03	**.26**	**.20**	**.17**
Modesty	**.55**	**.31**	**.47**	**.50**	**.35**
Emotionality facets					
Fearfulness	-.04	-.02	-.09*	-.00	-.09*
Anxiety	-.07	.02	*-.15*	-.01	*-.14*
Dependence	*-.14*	-.10*	-.11*	*-.14*	-.05
Sentimentality	**.16**	*.14*	**.18**	*.14*	**.16**
Extraversion facets					
Social Self-Esteem	**.36**	**.16**	**.43**	**.32**	**.40**
Social Boldness	.04	.06	.08	-.00	**.17**
Sociability	.05	.07	.09*	.01	**.19**
Liveliness	**.24**	.06	**.30**	**.17**	**.28**
Agreeableness facets					
Forgivingness	*.15*	.02	**.23**	*.13*	**.17**
Gentleness	**.36**	**.28**	**.49**	**.35**	**.35**
Flexibility	**.50**	**.30**	**.59**	**.51**	**.43**
Patience	**.59**	**.24**	**.45**	**.38**	**.35**
Conscientiousness facets					
Organization	**.37**	**.18**	**.35**	**.32**	**.32**
Diligence	**.48**	**.33**	**.52**	**.46**	**.52**
Perfectionism	**.16**	**.28**	**.18**	**.21**	**.25**
Prudence	**.51**	**.23**	**.43**	**.45**	**.31**
Openness facets					
Aesthetic Appreciation	**.28**	**.24**	**.28**	**.25**	**.25**
Inquisitiveness	**.34**	**.30**	**.36**	**.36**	**.35**
Creativity	**.30**	**.29**	**.32**	**.28**	**.30**
Unconventionality	**.28**	**.40**	**.29**	**.31**	**.28**
Altruism	**.54**	**.34**	**.59**	**.49**	**.48**

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

Table 4. *Correlations between IH total scores and psychopathy/narcissism traits.*

Intellectual Humility	Boldness	Disinhibition	Meanness	Leadership/ Authority	Grandiose/ Exhibitionism	Entitlement/ Exploitativeness	NPI-13 Total
AIHS	.08	**-.53**	**-.61**	**-.35**	**-.30**	**-.40**	**-.40**
LIHS	.07	**-.34**	**-.27**	-.12*	-.08	*-.14*	*-.14*
MIHS	**.16**	**-.53**	**-.56**	**-.30**	**-.23**	**-.34**	**-.34**
CIHS	.03	**-.48**	**-.53**	**-.33**	**-.27**	**-.37**	**-.38**
PIHS	**.21**	**-.43**	**-.42**	*-.14*	**-.18**	**-.23**	**-.22**

Note: Bolded is $p<.001$, italicized is $p<.01$, and * is $p<.05$.

Table 5. *Correlations between IH total scores and PID-5 dimensions.*

Intellectual Humility	PID-5 Negative Affect	PID-5 Detachment	PID-5 Antagonism	PID-5 Disinhibition	PID-5 Psychoticism
AIHS	**-.42**	**-.41**	**-.56**	**-.47**	**-.49**
LIHS	*-.12*	-.09*	**-.22**	**-.19**	*-.14*
MIHS	**-.44**	**-.41**	**-.53**	**-.44**	**-.43**
CIHS	**-.33**	**-.32**	**-.47**	**-.39**	**-.40**
PIHS	**-.36**	**-.33**	**-.38**	**-.30**	**-.29**

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

Table 6. *Correlations between IH total scores and empathy.*

Intellectual Humility	IRI Perspective Taking	IRI Empathic Concern	ACME Cognitive Empathy	ACME Affective Resonance
AIHS	**.57**	**.48**	**.33**	**.56**
LIHS	**.56**	**.38**	**.38**	**.46**
MIHS	**.65**	**.53**	**.40**	**.62**
CIHS	**.61**	**.46**	**.40**	**.58**
PIHS	**.53**	**.45**	**.36**	**.48**

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

Table 7. *Correlations between IH total scores and the PROMIS scales and self-esteem.*

Intellectual Humility	PROMIS Depression	PROMIS Anxiety	PROMIS Anger	Self-Esteem
AIHS	**-.32**	**-.31**	**-.44**	**.22**
LIHS	-.04	-.10*	*-.15*	.04
MIHS	**-.31**	**-.34**	**-.47**	*.16*
CIHS	**-.22**	**-.25**	**-.31**	*.15*
PIHS	**-.25**	**-.26**	**-.35**	**.16**

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

Table 8. *Correlations between IH total scores and cognitive styles.*

Intellectual Humility	Existential Quest	Objectivism	Confirmatory Thinking	Dogmatism	Need for Cognition	Social Vigilantism	BCTI	Need for Closure
AIHS	-.00	**.54**	**-.43**	**-.32**	**.53**	**-.39**	**-.24**	**-.30**
LIHS	**.32**	**.49**	**-.23**	**-.49**	**.38**	-.03	-.10*	-.*15*
MIHS	.07	**.50**	**-.37**	**-.35**	**.51**	**-.37**	**-.23**	**-.34**
CIHS	**.19**	**.54**	**-.50**	**-.55**	**.48**	**-.40**	**-.26**	**-.26**
PIHS	.09*	**.48**	**-.21**	**-.24**	**.50**	**-.15**	-.*13*	**-.26**

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

Table 9. *Correlations between IH total scores and bias blind spot.*

Intellectual Humility	**Bias Blind Spot Total Self**	**Bias Blind Spot Total Average**	**Bias Blind Spot Average - Self**
AIHS	**-.35**	.08	**.38**
LIHS	-.05	**.26**	**.28**
MIHS	**-.30**	.04	**.30**
CIHS	**-.23**	.09*	**.29**
PIHS	**-.20**	*.13*	**.30**

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

Table 10. *Correlations between IH total scores and the a) CRT and b) OCQ.*

Intellectual Humility	CRT Total Correct	OCQ Accuracy (*d'*)	OCQ Response Bias (*c*)
AIHS	**.20**	**.40**	**.29**
LIHS	**.16**	**.25**	.03
MIHS	**.19**	**.41**	**.24**
CIHS	**.24**	**.38**	**.25**
PIHS	.10*	**.26**	.09

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

Table 11. *Correlations between IH total scores and the PSQ.*

Intellectual Humility	PSQ Nonsense	PSQ Mundane	PSQ Motivational	PSQ Nonsense-Motivational	PSQ Nonsense-Mundane	PSQ Motivational-Mundane
AIHS	**-.19**	**-.44**	-.06	**-.20**	**.29**	**.40**
LIHS	-.04	**-.18**	.10*	**-.18**	**.16**	**.25**
MIHS	-.10*	**-.31**	.04	**-.18**	**.24**	**.33**
CIHS	**-.16**	**-.37**	.01	**-.24**	**.24**	**.38**
PIHS	.00	**-.18**	.10*	*-.13*	**.18**	**.24**

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

**Table 12.** *Correlations between IH total scores and intelligence.*

Intellectual Humility	ICAR Verbal Reasoning	ICAR Letter-Number Series	ICAR Matrix Reasoning	ICAR Three-Dimensional Rotation	ICAR Total
AIHS	**.20**	.10*	**.18**	.08	**.18**
LIHS	**.19**	**.18**	**.23**	.09	**.23**
MIHS	*.13*	.11*	*.15*	.10*	**.16**
CIHS	**.20**	**.20**	**.16**	*.14*	**.22**
PIHS	.10*	.05	.08	.02	.08

*Note:* Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

Table 13. *Correlations between IH total scores and insight.*

Intellectual Humility	**BCIS Self-Reflection**	**BCIS Self-Certainty**	**BCIS Composite**
AIHS	**-.28**	**-.39**	.06
LIHS	**.16**	*-.12*	**.24**
MIHS	**-.16**	**-.25**	.05
CIHS	-.07	**-.35**	**.20**
PIHS	-.10*	**-.16**	.03

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

Table 14. *Correlations between IH total scores and overconfidence.*

Intellectual Humility	ICAR OE	ICAR OC	ICAR OPL	Trivia OE	Trivia OC	Trivia OPL
AIHS	-.02	-*.12*	-*.12*	-.08	-.11*	-*.12*
LIHS	.12*	-.02	.01	.03	-.02	-.00
MIHS	.00	-.09*	-*.13*	-.06	-.08	-.11*
CIHS	.01	-.11*	-.11*	-.11*	-*.14*	-.10*
PIHS	.03	-.07	-.08	.01	.00	-.04

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

Figure 1. *Perceived Accuracy vs. Actual Performance on the ICAR by CIHS Percentile*
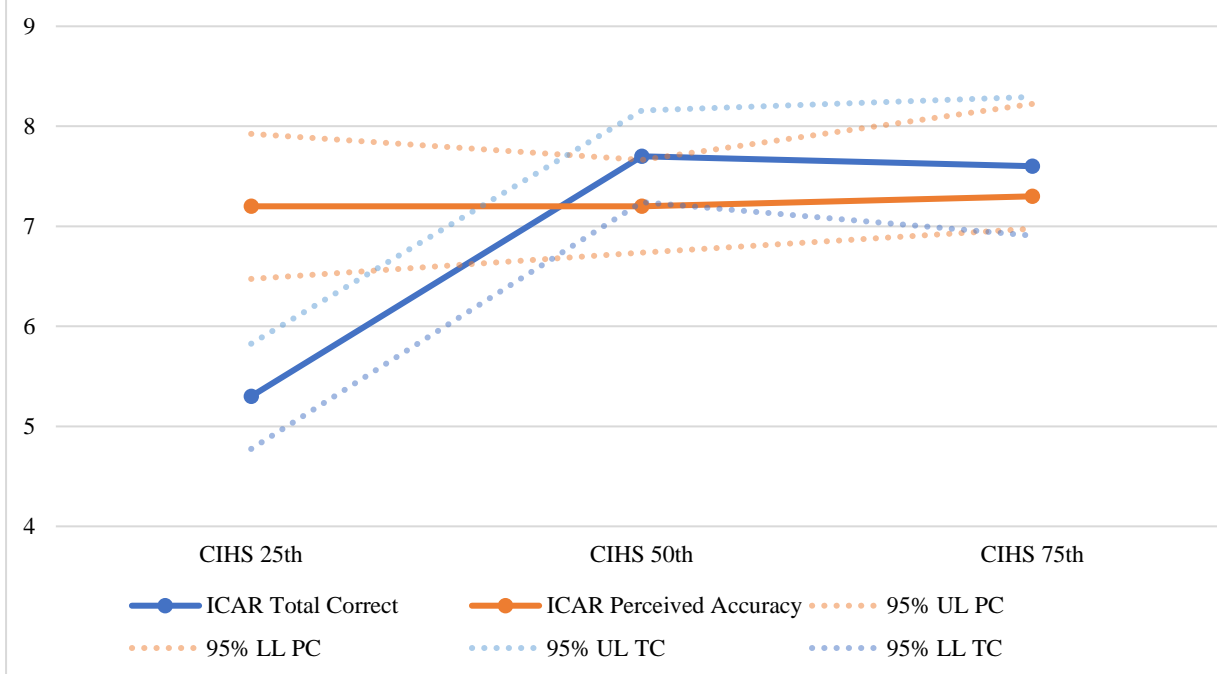
Figure 2. *Perceived Accuracy vs. Actual Performance on the ICAR by LIHS Percentile*
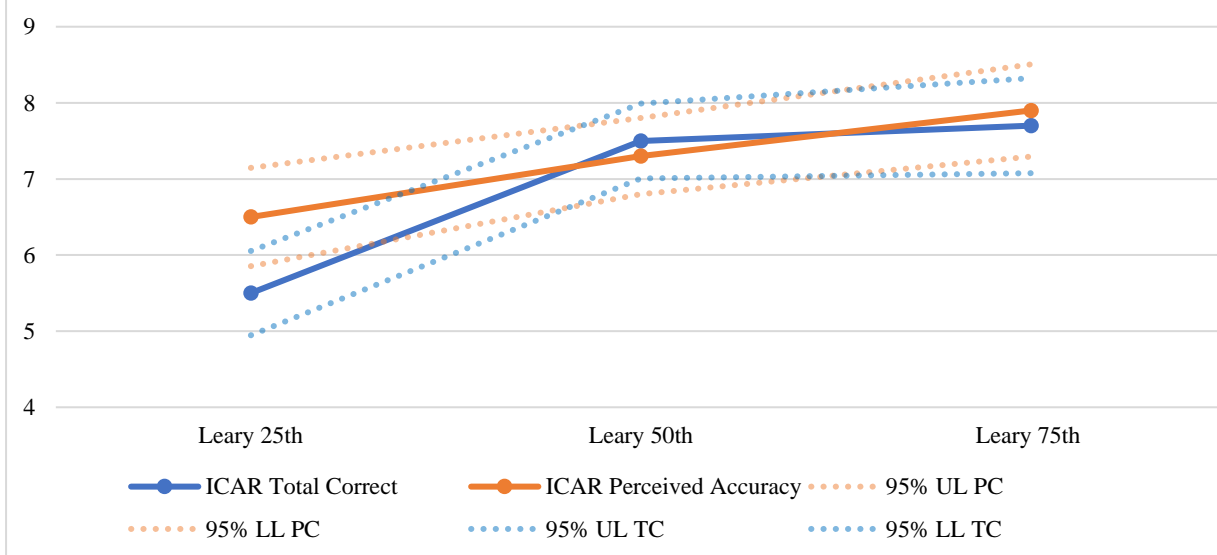
Figure 3. *Perceived Accuracy vs. Actual Performance on the Trivia Questionnaire by CIHS Percentile*
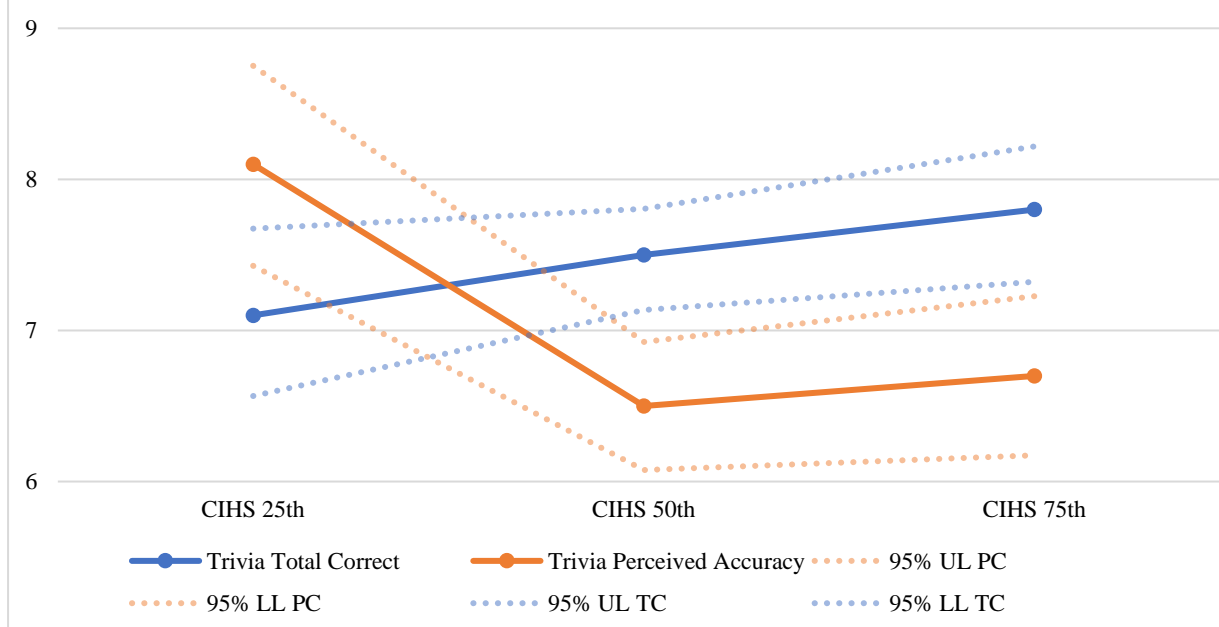
Figure 4. *Perceived Accuracy vs. Actual Performance on the Trivia Questionnaire by LIHS Percentile*
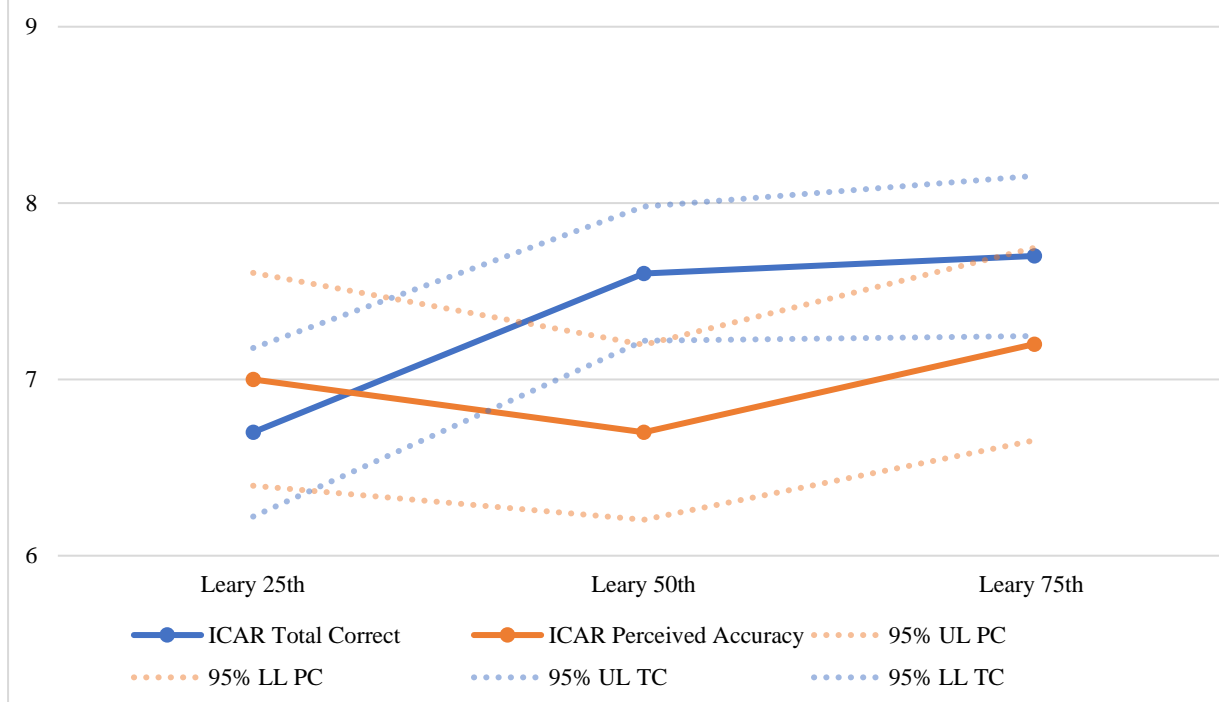
Table 15. *Incremental validity of IH total scores above-and-beyond HEXACO Honesty-Humility.*

Predictor	Outcome	b (β)	Std. error of b	95% CI for b	Adj. R²	ΔR²
AIHS	**M1. Objectivism**	**.18 (.54)**	.01	.15, .21	.29	.22
	M2. Dogmatism	**-.59 (-.39)**	.07	-.73, -.45	.11	.11
	M3. Need for Cognition	**1.26 (.58)**	.10	1.07, 1.45	.29	.24
	M4. CRT	**.01 (.22)**	.00	.01, .02	.04	.03
	M5. Need for Closure	**-.25 (-.33)**	.04	-.32, -.18	.09	.08
	M6. Confirmatory Thinking	**-.32 (-.38)**	.04	-.40, -.24	.19	.10
LIHS	**M1. Objectivism**	**.73 (.44)**	.06	.61, .85	.26	.19
	M2. Dogmatism	**-3.67 (-.50)**	.29	-4.23, -3.11	.24	.24
	M3. Need for Cognition	**3.85 (.35)**	.45	2.97, 4.74	.16	.12
	M4. CRT	*.04 (.14)*	.01	.02, .07	.03	.02
	M5. Need for Closure	*-.46 (-.13)*	.16	-.77, -.15	.03	.02
	M6. Confirmatory Thinking	**-.76 (-.19)**	.17	-1.10, -.43	.12	.03
MIHS	**M1. Objectivism**	**.30 (.47)**	.03	.25, .36	.24	.17
	M2. Dogmatism	**-1.21 (-.41)**	.14	-1.47, -.94	.13	.13
	M3. Need for Cognition	**2.24 (.52)**	.19	1.87, 2.61	.26	.21
	M4. CRT	**.02 (.19)**	.01	.01, .03	.03	.03
	M5. Need for Closure	**-.53 (-.34)**	.07	-.67, -.40	.12	.10
	M6. Confirmatory Thinking	**-.48 (-.29)**	.07	-.63, -.34	.15	.07
CIHS	**M1. Objectivism**	**.26 (.51)**	.02	.22, .30	.29	.21
	M2. Dogmatism	**-1.47 (-.63)**	.09	-1.65, -1.29	.33	.33
	M3. Need for Cognition	**1.58 (.46)**	.15	1.29, 1.87	.23	.18
	M4. CRT	**.02 (.24)**	.00	.01, .03	.05	.05
	M5. Need for Closure	**-.28 (-.24)**	.05	-.39, -.18	.07	.05
	M6. Confirmatory Thinking	**-.59 (-.46)**	.05	-.70, -.49	.26	.17
PIHS	**M1. Objectivism**	**.35 (.43)**	.03	.29, .42	.23	.16
	M2. Dogmatism	**-.94 (-.25)**	.17	-1.27, -.61	.06	.05
	M3. Need for Cognition	**2.65 (.49)**	.23	2.21, 3.10	.25	.20
	M4. CRT	.01 (.07)	.01	-.00, .02	.01	.01
	M5. Need for Closure	**-.44 (-.24)**	.08	-.61, -.28	.07	.05
	M6. Confirmatory Thinking	*-.24 (-.12)*	.09	-.42, -.06	.10	.01

Note. Bolded is *p*<.001, italicized is *p*<.01, * is *p*<.05.

Table 16. *Incremental validity of IH total scores above-and-beyond HEXACO Agreeableness.*

Predictor	Outcome	b (β)	Std. error of b	95% CI for b	Adj. R^2	ΔR^2
AIHS	**M1. Objectivism**	**.19 (.59)**	.01	.17, .22	.30	.28
	M2. Dogmatism	**-.52 (-.35)**	.07	-.66, -.39	.10	.10
	M3. Need for Cognition	**1.13 (.52)**	.09	.95, 1.31	.28	.21
	M4. CRT	**.01 (.23)**	.00	.01, .02	.04	.04
	M5. Need for Closure	**-.13 (-.17)**	.03	-.19, -.06	.16	.02
	M6. Confirmatory Thinking	**-.39 (-.46)**	.04	-.46, -.31	.19	.17
LIHS	**M1. Objectivism**	**.78 (.47)**	.07	.65, .91	.23	.21
	M2. Dogmatism	**-3.72 (-.50)**	.29	-4.29, -3.15	.24	.23
	M3. Need for Cognition	**3.65 (.33)**	.46	2.74, 4.55	.18	.10
	M4. CRT	*.04 (.14)*	.01	.02, .07	.02	.02
	M5. Need for Closure	-.18 (-.05)	.15	-.48, .11	.15	.00
	M6. Confirmatory Thinking	**-.89 (-.22)**	.18	-1.24, -.54	.06	.04
MIHS	**M1. Objectivism**	**.38 (.59)**	.03	.33, .44	.26	.24
	M2. Dogmatism	**-1.29 (-.43)**	.15	-1.57, -1.00	.13	.13
	M3. Need for Cognition	**2.26 (.52)**	.20	1.86, 2.65	.26	.18
	M4. CRT	**.03 (.23)**	.01	.02, .04	.04	.04
	M5. Need for Closure	**-.28 (-.19)**	.07	-.41, -.14	.17	.02
	M6. Confirmatory Thinking	**-.70 (-.42)**	.08	-.86, -.54	.14	.12
CIHS	**M1. Objectivism**	**.30 (.58)**	.02	.26, .34	.29	.27
	M2. Dogmatism	**-1.45 (-.62)**	.09	-1.63, -1.27	.32	.31
	M3. Need for Cognition	**1.51 (.44)**	.15	1.22, 1.81	.23	.16
	M4. CRT	**.02 (.26)**	.00	.02, .03	.05	.05
	M5. Need for Closure	-.13 (-.11)*	.05	-.23, -.03	.16	.01
	M6. Confirmatory Thinking	**-.70 (-.54)**	.05	-.81, -.60	.26	.24
PIHS	**M1. Objectivism**	**.40 (.49)**	.04	.34, .47	.22	.20
	M2. Dogmatism	**-.90 (-.24)**	.17	-1.23, -.56	.01	.05
	M3. Need for Cognition	**2.55 (.47)**	.23	2.10, 3.00	.25	.18
	M4. CRT	.01 (.08)	.01	-.00, .03	.01	.01
	M5. Need for Closure	*-.22 (-.12)*	.08	-.38, -.06	.16	.01
	M6. Confirmatory Thinking	**-.37 (-.18)**	.10	-.56, -.18	.05	.03

Note. Bolded is *p*<.001, italicized is *p*<.01, * is *p*<.05.

Table 17. *Incremental validity of IH total scores above-and-beyond social desirability.*

Predictor	Outcome	*b* (*β*)	Std. error of *b*	95% CI for *b*	Adj. R^2	ΔR^2
AIHS	**M1. Objectivism**	**.17 (.52)**	.01	.15, .20	.29	.24
	M2. Dogmatism	**-.65 (-.44)**	.06	-.77, -.53	.22	.17
	M3. Need for Cognition	**1.08 (.49)**	.09	.91, 1.25	.29	.22
	M4. CRT	**.01 (.23)**	.00	.01, .02	.04	.05
	M5. Need for Closure	**-.20 (-.27)**	.03	-.27, -.14	.10	.06
	M6. Confirmatory Thinking	**-.42 (-.51)**	.03	-.49, -.36	.24	.23
LIHS	**M1. Objectivism**	**.76 (.46)**	.06	.63, .88	.26	.21
	M2. Dogmatism	**-3.76 (-.51)**	.27	-4.29, -3.33	.30	.26
	M3. Need for Cognition	**3.99 (.37)**	.43	3.14, 4.85	.21	.13
	M4. CRT	**.05 (.16)**	.01	.02, .07	.02	.02
	M5. Need for Closure	*-.49 (-.14)*	.15	-.79, -.19	.07	.02
	M6. Confirmatory Thinking	**-.98 (-.24)**	.17	-1.32, -.64	.06	.06
MIHS	**M1. Objectivism**	**.30 (.46)**	.03	.25, .35	.23	.19
	M2. Dogmatism	**-1.44 (-.49)**	.12	-1.67, -1.21	.25	.21
	M3. Need for Cognition	**2.00 (.46)**	.18	.17, 2.34	.27	.19
	M4. CRT	**.03 (.22)**	.01	.02, .04	.04	.04
	M5. Need for Closure	**-.47 (-.32)**	.06	-.60, -.35	.14	.09
	M6. Confirmatory Thinking	**-.75 (-.45)**	.07	-.88, -.61	.19	.18
CIHS	**M1. Objectivism**	**.27 (.52)**	.02	.23, .31	.30	.26
	M2. Dogmatism	**-1.41 (-.61)**	.08	-1.57, -1.25	.40	.36
	M3. Need for Cognition	**1.53 (.45)**	.13	1.28, 1.79	.28	.20
	M4. CRT	**.02 (.25)**	.00	.02, .03	.06	.06
	M5. Need for Closure	**-.27 (-.23)**	.05	-.37, -.18	.11	.05
	M6. Confirmatory Thinking	**-.67 (-.52)**	.05	-.77, -.58	.27	.26
PIHS	**M1. Objectivism**	**.36 (.44)**	.03	.29, .43	.22	.17
	M2. Dogmatism	**-1.33 (-.35)**	.16	-1.64, -1.01	.15	.11
	M3. Need for Cognition	**2.49 (.46)**	.22	2.06, 2.93	.27	.19
	M4. CRT	.02 (.11)*	.01	.00, .03	.01	.01
	M5. Need for Closure	**-.40 (-.21)**	.08	-.56, -.23	.09	.04
	M6. Confirmatory Thinking	**-.56 (-.27)**	.09	-.74, -.38	.07	.06

Note. Bolded is *p*<.001, italicized is *p*<.01, * is *p*<.05.

Table 18. *Incremental validity of IH total scores above-and-beyond general intelligence.*

Predictor	Outcome	b (β)	Std. error of b	95% CI for b	Adj. R²	ΔR²
AIHS	**M1. Objectivism**	**.17 (.51)**	.01	.14, .19	.32	.25
	M2. Dogmatism	**-.39 (-.26)**	.07	-.53, -.26	.10	.07
	M3. Need for Cognition	**1.12 (.51)**	.09	.95, 1.30	.29	.25
	M4. CRT	.00 (.07)	.00	.00, .01	.26	.01
	M5. Need for Closure	**-.23 (-.30)**	.03	-.30, -.16	.09	.09
	M6. Confirmatory Thinking	**-.30 (-.37)**	.04	-.37, -.23	.21	.13
LIHS	**M1. Objectivism**	**.72 (.44)**	.07	.59, .85	.26	.19
	M2. Dogmatism	**-3.44 (-.47)**	.30	-4.03, -2.85	.25	.21
	M3. Need for Cognition	**3.84 (.36)**	.48	2.90, 4.78	.16	.12
	M4. CRT	.00 (.01)	.01	-.02, .03	.25	.00
	M5. Need for Closure	*-.55 (-.15)*	.17	-.88, -.22	.02	.02
	M6. Confirmatory Thinking	*-.62 (-.16)*	.18	-.97, -.27	.10	.02
MIHS	**M1. Objectivism**	**.29 (.45)**	.03	.24, .34	.27	.19
	M2. Dogmatism	**-.96 (-.32)**	.13	-1.22, -.71	.13	.10
	M3. Need for Cognition	**2.15 (.50)**	.18	2.81, 2.50	.28	.24
	M4. CRT	.01 (.08)*	.01	.00, .02	.26	.01
	M5. Need for Closure	**-.52 (-.35)**	.07	-.65, -.40	.12	.12
	M6. Confirmatory Thinking	**-.55 (-.34)**	.07	-.69, -.42	.19	.11
CIHS	**M1. Objectivism**	**.25 (.49)**	.02	.21, .30	.30	.23
	M2. Dogmatism	**-1.24 (-.52)**	.09	-1.42, -1.05	.30	.26
	M3. Need for Cognition	**1.51 (.44)**	.15	1.22, 1.80	.22	.18
	M4. CRT	.01 (.09)*	.09	.00, .02	.26	.01
	M5. Need for Closure	**-.31 (-.27)**	.05	-.42, -.21	.07	.07
	M6. Confirmatory Thinking	**-.56 (-.44)**	.05	-.66, -.46	.25	.18
PIHS	**M1. Objectivism**	**.38 (.46)**	.03	.31, .44	.29	.21
	M2. Dogmatism	**-.79 (-.21)**	.17	-1.11, -.47	.08	.04
	M3. Need for Cognition	**2.65 (.49)**	.22	2.22, 3.08	.28	.24
	M4. CRT	.01 (.03)	.01	-.01, .02	.25	.00
	M5. Need for Closure	**-.46 (-.24)**	.08	-.62, -.30	.06	.06
	M6. Confirmatory Thinking	**-.33 (-.16)**	.09	-.50, -.16	.10	.03

Note. Bolded is *p*<.001, italicized is *p*<.01, * is *p*<.05.

Table 19. *Incremental validity of HEXACO Honesty-Humility above-and-beyond IH total scores.*

First Step Predictor	Outcome	b (β)	Std. error of b	95% CI for b	Adj. R^2	ΔR^2
AIHS	**M1. Objectivism**	-.01 (-.01)	.03	-.06, .04	.29	.00
	M2. Dogmatism	*.38 (.15)*	.12	.14, .62	.11	.02
	M3. Need for Cognition	-.33 (-.09)*	.17	-.66, -.01	.29	.01
	M4. CRT	-.00 (-.03)	.01	-.01, .01	.04	.00
	M5. Need for Closure	.06 (.05)	.06	-.06, .19	.09	.00
	M6. Confirmatory Thinking	-.14 (-.10)*	.07	-.27, -.01	.19	.01
LIHS	**M1. Objectivism**	**.10 (.18)**	.02	.03, .15	.26	.03
	M2. Dogmatism	.07 (.03)	.10	-.12, .27	.24	.00
	M3. Need for Cognition	**.57 (.15)**	.15	.27, .87	.16	.02
	M4. CRT	.01 (.07)	.00	-.00, .02	.03	.00
	M5. Need for Closure	*-.15 (-.11)*	.06	-.25, -.04	.03	.01
	M6. Confirmatory Thinking	**-.37 (-.26)**	.06	-.49, -.25	.12	.06
MIHS	**M1. Objectivism**	.03 (.05)	.02	-.02, .08	.24	.00
	M2. Dogmatism	*.32 (.12)*	.12	.08, .55	.13	.01
	M3. Need for Cognition	-.09 (-.02)	.16	-.41, .23	.26	.00
	M4. CRT	-.00 (-.01)	.01	-.01, .01	.03	.00
	M5. Need for Closure	.04 (.03)	.06	-.08, .16	.12	.00
	M6. Confirmatory Thinking	**-.23 (-.16)**	.07	-.36, -.11	.16	.02
CIHS	**M1. Objectivism**	.04 (.07)	.02	-.01, .08	.29	.00
	M2. Dogmatism	**.49 (.19)**	.10	.29, .69	.33	.03
	M3. Need for Cognition	.14 (.04)	.16	-.18, .45	.23	.00
	M4. CRT	-.00 (-.01)	.01	-.01, .01	.05	.00
	M5. Need for Closure	-.06 (-.05)	.06	-.18, .05	.07	.00
	M6. Confirmatory Thinking	*-.16 (-.11)*	.06	-.28, -.05	.26	.01
PIHS	**M1. Objectivism**	*.07 (.12)*	.02	.02, .11	.23	.01
	M2. Dogmatism	.05 (.02)	.12	-.18, .28	.06	.00
	M3. Need for Cognition	.13 (.03)	.16	-.18, .43	.25	.00
	M4. CRT	.01 (.06)	.01	-.00, .02	.01	.00
	M5. Need for Closure	-.07 (-.05)	.06	-.18, .04	.07	.00
	M6. Confirmatory Thinking	**-.37 (-.25)**	.06	-.49, -.24	.10	.06

Note. Bolded is *p*<.001, italicized is *p*<.01, * is *p*<.05.

7. APPENDICES

Supplemental Analyses

1. Associations between IH subscales and EQ

In post-hoc analyses, I examined the associations between the subscales of the multidimensional IH measures and EQ (Supplemental Table 15). Regarding the AIHS, the Modesty subscale manifests a small negative correlation with EQ whereas the Engagement subscale manifests a small positive correlation. The other two subscales of the AIHS, namely Corrigibility and Open-mindedness, were not statistically significantly associated with EQ. Regarding the MIHS, the two subscales do not manifest opposite relationships with EQ, but instead, the magnitude of the correlations differed. Intellectual Arrogance manifests a small positive association with EQ whereas Intellectual Openness manifests a moderate positive correlation. Finally, regarding the CIHS, Lack of Intellectual Overconfidence, Respect for Others, and Openness to Revising One's Viewpoints, manifested small to moderate positive correlations with EQ. CIHS Independence of Intellect and Ego, however, manifested a weak negative correlation with EQ. AIHS Modesty and CIHS Independence of Intellect and Ego, which are ostensibly intellectual arrogance reversed, are both negatively associated with EQ whereas MIHS Intellectual Arrogance is positively associated with EQ. These results, although small in magnitude, may indicate that the EQ might be slightly imbued with features of intellectual arrogance.

2. Associations between IH subscales and bias blind spot

I conducted post-hoc exploratory analyses to examine the associations between IH subscales and bias blind spot (Supplemental Table 15). AIHS Open-mindedness, Engagement, and Corrigibility manifested moderate positive associations with bias blind spot. AIHS Modesty

was weakly positively associated with bias blind spot. MIHS Intellectual Arrogance was moderately negatively associated with bias blind spot and Intellectual Openness was weakly positively associated with bias blind spot. The negative correlation between Intellectual Arrogance and bias blind spot was unexpected. One potential interpretation of this result is that the items on the Intellectual Arrogance scale reflect angry defensiveness of one's ideas; thus, it is possible that individuals scoring high on this dimension recognize that they are biased vis-à-vis their recognition that they get upset and impatient when others disagree with them. Finally, CIHS Independence of Intellect and Ego, Openness to Revising One's Viewpoint, and Respect for Others were moderately positively associated with bias blind spot. CIHS Lack of Intellectual Overconfidence was not related to bias blind spot.

3. Associations between IH subscales and PSQ Nonsense

I conducted post-hoc investigations of the associations between IH subscales and PSQ Nonsense (Supplemental Table 15). AIHS Open-mindedness and Engagement were moderately negatively associated with PSQ Nonsense whereas Modesty and Corrigibility were unrelated to PSQ Nonsense. On the MIHS, Intellectual Arrogance and Intellectual Openness were weakly positively associated with PSQ Nonsense. Finally, regarding the CIHS, Independence of Intellect and Ego and Lack of Intellectual Overconfidence were weakly to moderately negatively associated with PSQ Nonsense whereas Openness to Revising One's Viewpoint and Respect for Others were negligibly associated. Thus, it appears that a nonthreatening awareness of and interest in opposite perspectives are negatively associated with PSQ Nonsense. Nonetheless, individual differences in open-mindedness are inconsistently associated with PSQ Nonsense.

4. Associations between IH total scores and BCIS items

In post-hoc exploratory analyses, I examined the correlations between IH and the Self-reflection items (see Supplemental Table 17 for the correlations between IH and all BCIS items). IH was consistently positively associated with three items on Self-reflection: "Even though I feel strongly that I am right, I could be wrong", "If somebody points out that my beliefs are wrong, I am willing to consider it", and "There is often more than one possible explanation for why people act the way they do". Thus, IH was moderately positively associated with the items that appear to reflect the "core" features of IH, as defined in the literature. Nevertheless, IH was consistently negatively associated with other Self-reflection items. For instance, IH manifested small to medium negative correlations with the following item: "At times, I have misunderstood other people's attitudes towards me"; this item is arguably associated with empathic abilities (e.g., perspective taking), which is robustly positively correlated with IH. In contrast, IH is negatively associated with the items on the Self-reflection scale that explicitly refer to unusual beliefs and experiences.

5. Associations between IH subscales and indices of overconfidence

In post-hoc analyses, I examined the associations between IH subscales and overconfidence (Supplemental Table 16). AIHS Corrigibility was not statistically associated with any index of overconfidence, and AIHS Engagement was weakly negatively correlated with overprecision on the ICAR and trivia questionnaire. AIHS Open-mindedness was weakly negatively associated with overconfidence for all three indexes on the trivia questionnaire, but it was unrelated to overconfidence on the ICAR. AIHS Intellectual Modesty was negatively associated with all indices of overconfidence across the two tasks, except for overprecision on the trivia questionnaire. Both MIHS Intellectual Arrogance and Intellectual Openness were positively associated with indices of overconfidence across the two tasks, except Intellectual

Openness was not significantly associated with overprecision on the ICAR. CIHS Respect for

Others was not significantly associated with overconfidence, except for a small positive

association with ICAR overestimation. CIHS Openness to Revising One's Viewpoint was only

weakly positively associated with ICAR overestimation and overplacement. CIHS Independence

of Intellect and Ego was weakly negatively associated with overestimation on the trivia task and

overprecision and overplacement on the ICAR. Notably, the CIHS Lack of Intellectual

Overconfidence, which by definition should be negatively associated with overconfidence, was

moderately negatively associated with all indices of overconfidence across the two tasks.

Supplemental Table 1. *Intercorrelations among and descriptive statistics for the intellectual humility measures.*

Intellectual Humility	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. AIHS Total	104.85 (19.99)		.85	.53	.84	.81	.49	.71	-.69	.27	.73	.66	.37	.48	.51	.63
2. AIHS Open-mindedness	33.76 (6.90)			.25	.63	.68	.57	.63	-.57	.32	.70	.55	.47	.51	.43	.55
3. AIHS Intellectual Modesty	17.47 (5.67)				.38	*.12*	.04	.29	-.43	*-.13*	.27	.30	-.04	.63	.37	.21
4. AIHS Corrigibility	24.44 (6.13)					.59	.41	.62	-.59	.28	.60	.61	.28	.55	.34	.64
5. AIHS Engagement	29.09 (7.30)						.45	.61	-.54	.34	.62	.55	.37	.43	.41	.52
6. LIHS Total	23.58 (4.05)							.58	-.35	.59	.70	.32	.72	.55	.33	.52
7. MIHS Total	59.71 (10.11)								-.87	.58	.75	.61	.43	.07	.50	.64
8. MIHS Intellectual Arrogance	19.40 (8.23)									-.10*	-.65	-.63	-.20	.37	-.58	-.51
9. MIHS Intellectual Openness	25.14 (5.04)										.43	.19	.51	.21	.05	.44
10. CIHS Total	81.77 (12.81)											.76	.68	.42	.68	.63
11. CIHS Ind. Intellect & Ego	18.12 (5.23)												.25	.34	.41	.50
12. CIHS Open. Revise Views	19.74 (3.70)													.64	.22	.43
13. CIHS Respect Others	24.29 (4.20)														.22	.58
14. CIHS Lack Int. Overconf.	19.42 (4.82)															.28
15. PIHS Total	46.28 (7.98)															

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

Supplemental Table 2. *Intercorrelations among and descriptive statistics for the SVS.*

Values	Mean (SD)	1	2	3	4	5	6	7	8	9	10
1. Achievement	6.10 (2.01)		**.26**	**.37**	.26	.06	**.17**	**.23**	**.23**	**.29**	**.52**
2. Hedonism	5.45 (2.20)			**.41**	**.16**	**.16**	.04	.09*	*.13*	**.19**	**.35**
3. Stimulation	5.50 (2.11)				**.23**	**.15**	.05	.10*	.09*	.09*	**.39**
4. Self-direction	7.14 (1.71)					**.39**	**.30**	.10*	.03	**.18**	.06
5. Universalism	6.48 (2.09)						**.39**	.09*	.08*	.06	-.01
6. Benevolence	7.08 (1.84)							**.39**	**.24**	**.35**	-.04
7. Tradition	5.46 (2.38)								**.65**	**.52**	**.23**
8. Conformity	4.91 (2.40)									**.48**	**.28**
9. Security	6.56 (2.00)										**.20**
10. Power	4.37 (2.29)										

Note: Bolded is $p<.001$, italicized is $p<.01$, and * is $p<.05$.

Supplemental Table 3. *Intercorrelations among and descriptive statistics for the personality measures.*

Personality measures	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. H	56.24 (11.61)		.00	.07	**.38**	**.35**	**.15**	**.49**	-.02	**-.46**	**-.46**	**-.39**	**-.40**	**-.36**	**-.32**	**-.26**	**-.56**	**-.39**	**-.38**
2. E	51.33 (11.03)			**-.26**	**-.22**	-.05	-.04	**.25**	**-.49**	*.14*	**-.33**	**-.19**	-.10*	*-.13*	**.50**	.02	-.09*	.05	.08
3. X	49.52 (11.84)				**.42**	**.22**	**.18**	**.28**	**.74**	**-.20**	*-.13*	*.16*	*.17*	-.01	**-.49**	**-.59**	-.06	**-.18**	**-.28**
4. A	51.05 (10.73)					**.19**	**.20**	**.45**	**.34**	**-.27**	**-.34**	**-.16**	-.07	**-.18**	**-.42**	**-.36**	**-.28**	**-.23**	**-.32**
5. C	60.15 (10.01)						**.22**	**.41**	.06	**-.47**	**-.34**	**-.19**	**-.21**	**-.22**	**-.39**	**-.37**	**-.44**	**-.62**	**-.49**
6. O	56.06 (10.61)							**.34**	**.16**	**-.17**	**-.27**	-.04	-.03	*-.13*	**-.15**	*-.15*	**-.19**	*-.12*	-.07
7. HEXACO Altruism	15.68 (3.27)								-.01	**-.45**	**-.58**	**-.31**	**-.27**	**-.38**	**-.24**	**-.44**	**-.51**	**-.39**	**-.36**
8. Boldness^a	2.87 (.76)									-.05	**.22**	**.29**	**.20**	*.13*	**-.48**	**-.28**	*.11*	-.01	-.10*
9. Disinhibition^a	2.27 (.77)										**.38**	**.26**	**.25**	**.26**	**.54**	**.43**	**.56**	**.70**	**.62**
10. Meanness^a	2.28 (.67)											**.38**	**.34**	**.39**	.07	**.36**	**.52**	**.31**	**.31**
11. Leadership/Authority	1.18 (1.28)												**.54**	**.60**	.07	*.14*	**.41**	**.27**	**.23**
12. Grandiose/Exhibitionism	1.35 (1.52)													**.50**	.11*	.09	**.39**	**.28**	**.25**
13. Entitlement/Exploitativeness	.97 (1.22)														**.17**	**.22**	**.44**	**.29**	**.26**
14. PID-5 Negative Affectivity	10.01 (3.99)															**.59**	**.48**	**.57**	**.61**
15. PID-5 Detachment	9.42 (3.84)																**.53**	**.53**	**.63**
16. PID-5 Antagonism	7.87 (3.28)																	**.67**	**.68**
17. PID-5 Disinhibition	7.98 (3.59)																		**.75**
18. PID-5 Psychoticism	8.50 (3.74)																		

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

^a Overlapping items between the HEXACO-derived psychopathy scales and HEXACO scales were removed from the psychopathy scales prior to analyzing the intercorrelations to prevent criterion-contamination.

Supplemental Table 4. *Intercorrelations among and descriptive statistics for the empathy scales.*

Empathy	Mean (SD)	1	2	3	4
1. ACME Affective Resonance	48.74 (9.59)		.56	.72	83
2. ACME Cognitive Empathy	44.47 (8.48)			.50	.49
3. IRI Perspective Taking	26.47 (5.47)				.78
4. IRI Empathic Caring	26.86 (6.24)				

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

Supplemental Table 5. *Intercorrelations among and descriptive statistics for the PROMIS scales and the RSE.*

Internalizing and self-esteem	Mean (SD)	1	2	3	4
1. PROMIS Depression	15.59 (8.96)		**.80**	**.72**	**-.35**
2. PROMIS Anxiety	17.12 (8.76)			**.75**	**-.26**
3. PROMIS Anger	10.17 (4.83)				**-.21**
4. RSE	27.72 (8.72)				

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

Supplemental Table 6. *Intercorrelations among and descriptive statistics for cognitive styles measures.*

Cognitive styles	Mean (SD)	1	2	3	4	5	6	7	8
1. Existential Quest	38.36 (9.04)		-.01	.05	-.09*	**-.60**	.06	.06	.00
2. Objectivism	41.31 (6.60)			**.54**	**-.34**	**-.21**	-.04	**-.22**	-.07
3. Need for Cognition	205.48 (43.68)				**-.30**	**-.21**	-.05	-.*14*	**-.42**
4. Confirmation Inventory	44.91 (16.78)					**.45**	**.41**	**.30**	**.21**
5. Dogmatism	93.64 (30.06)						**.25**	**.17**	*.13*
6. Social Vigilantism	70.45 (20.59)							**.32**	**.20**
7. BCTI	37.68 (18.20)								.07
8. Need for Closure	60.20 (14.84)								

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

Supplemental Table 7. *Intercorrelations among and descriptive statistics for the critical thinking measures.*

Critical thinking	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11
1. OCQ Total Real	146.13 (38.31)		**.55**	*.15*	.07	.04	-.02	*.15*	.05	*.12*	.10*	.11*
2. OCQ Total Fake	31.57 (14.96)			-.20	**.33**	**.45**	*.11*	**-.21**	**-.29**	-.08	-.15	-.12
3. CRT Total Correct	1.48 (1.17)				**-.34**	**-.35**	**-.21**	**.51**	**.44**	**.35**	**.38**	**.31**
4. PSQ Nonsense Total	26.74 (9.77)					**.50**	**.66**	**-.28**	**-.27**	**-.17**	**-.20**	**-.17**
5. PSQ Mundane Total	19.05 (11.62)						**.34**	**-.35**	**-.35**	**-.25**	**-.28**	*-.15*
6. PSQ Motivational Total	31.96 (8.30)							-.05	-.08	-.03	-.02	-.07
7. ICAR Total	7.00 (3.59)								**.78**	**.78**	**.75**	**.65**
8. ICAR VR	2.67 (1.29)									**.44**	**.47**	**.33**
9. ICAR LN	1.99 (1.31)										**.43**	**.38**
10. ICAR MX	1.70 (1.25)											**.32**
11. ICAR R3D	.70 (.98)											

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

Supplemental Table 8. *Intercorrelations among and descriptive statistics for the BCIS.*

BCIS	Mean (SD)	1	2	3
1. BCIS Composite[a]	7.72 (4.84)		**.69**	**-.53**
2. BCIS Self-reflectiveness	21.66 (4.21)			**.25**
3. BCIS Self-certainty	13.95 (3.64)			

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

[a] The BCIS composite is the difference between Self-reflectiveness and Self-certainty.

Table 9. *Correlations between IH total scores and indices of overconfidence.*

Overconfidence	Mean (SD)	1	2	3	4	5	6
1. Trivia Overestimation	7.03 (3.53)		**.76**	**.70**	**.26**	**.32**	**.25**
2. Trivia Overconfidence	49.16 (27.89)			**.67**	*.13*	**.46**	**.23**
3. Trivia Overplacement	49.98 (22.83)				**.21**	**.33**	**.45**
4. ICAR Overestimation	7.84 (6.76)					**.38**	**.20**
5. ICAR Overconfidence	49.08 (26.34)						**.57**
6. ICAR Overplacement	45.90 (24.52)						

Note: Bolded is $p<.001$, italicized is $p<.01$, and * is $p<.05$.

Supplemental Table 10. *Intercorrelations among and descriptive statistics for the BID-R.*

BID-R	Mean (SD)	1	2	3
1. BID-R Total	67.01 (19.09)		**.86**	**.88**
2. BID-R Self-Deceptive Enhancement	33.06 (8.87)			**.52**
3. BID-R Impression Management	34.17 (9.67)			

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

Supplemental Table 11. *Incremental validity of IH total scores above-and-beyond HEXACO Conscientiousness.*

Predictor	Outcome	b (β)	Std. error of b	95% CI for b	Adj. R²	ΔR²
Alfano Total	**M1. Objectivism**	**.11 (.33)**	.01	.08, .13	.41	.08
	M2. Dogmatism	**-.54 (-.36)**	.07	-.68, -.40	.10	.10
	M3. Need for Cognition	**.87 (.40)**	.09	.69, 1.06	.33	.12
	M4. CRT	**.01 (.19)**	.00	.01, .02	.04	.03
	M5. Need for Closure	**-.34 (-.45)**	.04	-.41, -.27	.16	.15
	M6. Confirmatory Thinking	**-.37 (-.43)**	.04	-.44, -.29	.18	.14
Leary Total	**M1. Objectivism**	**.53 (.32)**	.06	.42, .65	.43	.09
	M2. Dogmatism	**-3.77 (-.51)**	.30	-4.35, -3.19	.24	.23
	M3. Need for Cognition	**2.76 (.25)**	.44	1.90, 3.61	.28	.06
	M4. CRT	*.04 (.12)*	.01	.01, .06	.02	.01
	M5. Need for Closure	**-.68 (-.19)**	.17	-1.01, -.36	.03	.03
	M6. Confirmatory Thinking	**-.77 (-.19)**	.18	-1.12, -.41	.08	.03
McElroy Total	**M1. Objectivism**	**.17 (.27)**	.03	.13, .22	.39	.06
	M2. Dogmatism	**-1.16 (-.39)**	.14	-1.43, -.90	.12	.12
	M3. Need for Cognition	**1.56 (.36)**	.18	1.20, 1.91	.32	.10
	M4. CRT	**.02 (.18)**	.01	.01, .03	.03	.02
	M5. Need for Closure	**-.71 (-.48)**	.07	-.84, -.58	.18	.18
	M6. Confirmatory Thinking	**-.58 (-.35)**	.08	-.73, -.43	.13	.10
CIH Total	**M1. Objectivism**	**.17 (.33)**	.02	.13, .21	.42	.09
	M2. Dogmatism	**-1.49 (-.64)**	.09	-1.68, -1.31	.33	.32
	M3. Need for Cognition	**1.11 (.32)**	.14	.83, 1.39	.31	.08
	M4. CRT	**.02 (.23)**	.00	.01, .03	.05	.04
	M5. Need for Closure	**-.42 (-.36)**	.05	-.53, -.32	.10	.10
	M6. Confirmatory Thinking	**-.66 (-.51)**	.06	-.77, -.55	.25	.20
Porter Total	**M1. Objectivism**	**.22 (.26)**	.03	.15, .28	.38	.05
	M2. Dogmatism	**-.91 (-.24)**	.18	-1.26, -.57	.05	.05
	M3. Need for Cognition	**1.93 (.35)**	.23	1.48, 2.37	.32	.10
	M4. CRT	.01 (.05)	.01	-.01, .02	.01	.00
	M5. Need for Closure	**-.67 (-.35)**	.07	.19, .46	.10	.10
	M6. Confirmatory Thinking	*-.31 (-.15)*	.10	-.50, -.12	.06	.02

Note. Bolded is *p*<.001, italicized is *p*<.01, * is *p*<.05.

Supplemental Table 12. *Incremental validity of IH total scores above-and-beyond HEXACO Openness.*

Predictor	Outcome	b (β)	Std. error of b	95% CI for b	Adj. R²	ΔR²
Alfano Total	**M1. Objectivism**	**.15 (.45)**	.01	.12, .18	.32	.17
	M2. Dogmatism	**-.38 (-.25)**	.07	-.51, -.25	.12	.05
	M3. Need for Cognition	**.77 (.35)**	.08	.61, .92	.45	.10
	M4. CRT	*.01 (.16)*	.00	.00, .02	.05	.02
	M5. Need for Closure	**-.14 (-.19)**	.03	-.21, -.08	.16	.03
	M6. Confirmatory Thinking	**-.35 (-.41)**	.04	-.42, -.28	.19	.15
Leary Total	**M1. Objectivism**	**.64 (.39)**	.07	.51, .77	.27	.13
	M2. Dogmatism	**-3.38 (-.46)**	.30	-3.97, -2.78	.24	.18
	M3. Need for Cognition	**1.87 (.17)**	.42	1.04, 2.70	.37	.02
	M4. CRT	.03 (.10)*	.01	.00, .05	.04	.01
	M5. Need for Closure	.00 (.00)	.16	-.31, .32	.14	.00
	M6. Confirmatory Thinking	**-.76 (-.18)**	.19	-1.13, -.39	.07	.03
McElroy Total	**M1. Objectivism**	**.26 (.40)**	.03	.21, .49	.28	.13
	M2. Dogmatism	**-.85 (-.29)**	.13	-1.11, -.60	.13	.07
	M3. Need for Cognition	**1.34 (.31)**	.16	1.03, 1.66	.43	.08
	M4. CRT	*.02 (.14)*	.01	.01, .03	.05	.02
	M5. Need for Closure	**-.33 (-.22)**	.06	-.45, -.20	.18	.04
	M6. Confirmatory Thinking	**-.56 (-.34)**	.07	-.70, -.50	.14	.10
CIH Total	**M1. Objectivism**	**.23 (.45)**	.02	.19, .27	.32	.17
	M2. Dogmatism	**-1.24 (-.53)**	.09	-1.42, -1.06	.30	.24
	M3. Need for Cognition	**.97 (.28)**	.13	.72, 1.22	.42	.07
	M4. CRT	**.02 (.19)**	.00	.01, .03	.06	.03
	M5. Need for Closure	*-.15 (-.13)*	.05	-.25, -.05	.16	.01
	M6. Confirmatory Thinking	**-.64 (-.49)**	.05	-.74, -.54	.25	.21
Porter Total	**M1. Objectivism**	**.31 (.38)**	.03	.25, .38	.27	.12
	M2. Dogmatism	**-.59 (-.17)**	.17	-.92, -.26	.10	.02
	M3. Need for Cognition	**1.73 (.32)**	.20	1.34, 2.11	.43	.09
	M4. CRT	.00 (.03)	.01	-.01, .02	.03	.00
	M5. Need for Closure	*-.23 (-.12)*	.08	-.39, -.07	.15	.01
	M6. Confirmatory Thinking	*-.31 (-.15)*	.10	-.50, -.13	.06	.02

Note. Bolded is *p*<.001, italicized is *p*<.01, * is *p*<.05.

Supplemental Table 13. *Incremental validity of IH total scores above-and-beyond HEXACO Extraversion.*

Predictor	Outcome	b (β)	Std. error of b	95% CI for b	Adj. R²	ΔR²
Alfano Total	**M1. Objectivism**	**.17 (.53)**	.01	.15, .20	.28	.27
	M2. Dogmatism	**-.54 (-.36)**	.06	-.67, -.42	.14	.13
	M3. Need for Cognition	**1.05 (.48)**	.08	.89, 1.21	.34	.22
	M4. CRT	**.01 (.22)**	.00	.01, .02	.04	.05
	M5. Need for Closure	**-.19 (-.25)**	.03	-.25, -.13	.16	.06
	M6. Confirmatory Thinking	**-.41 (-.49)**	.03	-.48, -.35	.25	.23
Leary Total	**M1. Objectivism**	**.77 (.47)**	.06	.64, .89	.24	.21
	M2. Dogmatism	**-3.77 (-.51)**	.28	-4.31, -3.23	.27	.26
	M3. Need for Cognition	**3.84 (.35)**	.42	3.00, 4.67	.25	.12
	M4. CRT	**.05 (.16)**	.01	.02, .07	.02	.02
	M5. Need for Closure	*-.43 (-.12)*	.15	-.73, -.14	.11	.01
	M6. Confirmatory Thinking	**-1.07 (-.26)**	.17	-1.40, -.73	.09	.07
McElroy Total	**M1. Objectivism**	**.31 (.49)**	.03	.26, .37	.24	.22
	M2. Dogmatism	**-1.24 (-.42)**	.12	-1.48, -1.00	.18	.16
	M3. Need for Cognition	**1.91 (.44)**	.17	1.58, 2.23	.31	.18
	M4. CRT	**.03 (.21)**	.01	.02, .04	.04	.04
	M5. Need for Closure	**-.41 (-.27)**	.06	-.52, -.29	.17	.07
	M6. Confirmatory Thinking	**-.75 (-.45)**	.07	-.87, -.62	.21	.19
CIH Total	**M1. Objectivism**	**.27 (.52)**	.02	.23, .31	.28	.26
	M2. Dogmatism	**-1.37 (-.59)**	.08	-1.53, -1.21	.35	.34
	M3. Need for Cognition	**1.47 (.43)**	.13	1.22, 1.72	.32	.18
	M4. CRT	**.02 (.24)**	.00	.02, .03	.06	.06
	M5. Need for Closure	**-.26 (-.22)**	.05	-.35, -.16	.15	.05
	M6. Confirmatory Thinking	**-.70 (-.54)**	.05	-.80, -.61	.31	.29
Porter Total	**M1. Objectivism**	**.39 (.47)**	.03	.32, .45	.21	.19
	M2. Dogmatism	**-1.21 (-.32)**	.16	-1.52, -.90	.11	.09
	M3. Need for Cognition	**2.33 (.43)**	.22	1.91, 2.75	.29	.16
	M4. CRT	.02 (.11)*	.01	.00, .03	.01	.01
	M5. Need for Closure	**-.32 (-.17)**	.08	-.47, -.16	.13	.03
	M6. Confirmatory Thinking	**-.63 (-.30)**	.09	-.81, -.45	.10	.08

Note. Bolded is *p*<.001, italicized is *p*<.01, * is *p*<.05.

Supplemental Table 14. *Incremental validity of IH total scores above-and-beyond HEXACO Emotionality.*

Predictor	Outcome	b (β)	Std. error of b	95% CI for b	Adj. R²	ΔR²
Alfano Total	**M1. Objectivism**	**.18 (.54)**	.01	.15, .20	.29	.29
	M2. Dogmatism	**-.48 (-.32)**	.06	-.60, -.36	.11	.10
	M3. Need for Cognition	**1.14 (.52)**	.08	.99, 1.30	.32	.27
	M4. CRT	**.01 (.19)**	.00	.01, .02	.05	.04
	M5. Need for Closure	**-.22 (-.29)**	.03	-.28, -.17	.29	.09
	M6. Confirmatory Thinking	**-.37 (-.43)**	.03	-.43, -.30	.19	.19
Leary Total	**M1. Objectivism**	**.79 (.48)**	.06	.67, .92	.23	.23
	M2. Dogmatism	**-3.63 (-.49)**	.28	-4.18, -3.08	.24	.24
	M3. Need for Cognition	**4.26 (.39)**	.44	3.40, 5.11	.20	.15
	M4. CRT	**.05 (.16)**	.01	.02, .07	.04	.03
	M5. Need for Closure	**-.57 (-.16)**	.14	-.85, -.30	.23	.02
	M6. Confirmatory Thinking	**-.99 (-.24)**	.17	-1.34, -.65	.05	.06
McElroy Total	**M1. Objectivism**	**.32 (-.49)**	.03	.27, .36	.24	.24
	M2. Dogmatism	**-1.05 (-.35)**	.12	-1.28, -.81	.13	.12
	M3. Need for Cognition	**2.14 (.49)**	.16	1.82, 2.46	.30	.24
	M4. CRT	**.02 (.18)**	.01	.01, .03	.05	.03
	M5. Need for Closure	**-.47 (-.32)**	.05	-.57, -.36	.31	.10
	M6. Confirmatory Thinking	**-.63 (-.38)**	.07	-.76, -.50	.14	.14
CIH Total	**M1. Objectivism**	**.27 (.53)**	.02	.24, .31	.28	.28
	M2. Dogmatism	**-1.28 (-.55)**	.08	-1.45, -1.12	.31	.30
	M3. Need for Cognition	**1.62 (-.47)**	.13	1.36, 1.87	.28	.22
	M4. CRT	**.02 (.24)**	.00	.01, .03	.07	.06
	M5. Need for Closure	**-.30 (-.26)**	.04	-.39, -.22	.28	.07
	M6. Confirmatory Thinking	**-.66 (-.50)**	.05	-.75, -.56	.25	.25
Porter Total	**M1. Objectivism**	**.38 (.46)**	.03	.32, .44	.22	.22
	M2. Dogmatism	**-.91 (-.24)**	.16	-1.21, -.60	.06	.06
	M3. Need for Cognition	**2.67 (.49)**	.20	2.27, 3.07	.29	.24
	M4. CRT	.01 (.09)*	.01	.00, .03	.02	.01
	M5. Need for Closure	**-.45 (-.24)**	.07	-.59, -.31	.26	.06
	M6. Confirmatory Thinking	**-.44 (-.21)**	.09	-.62, -.27	.04	.04

Note. Bolded is *p*<.001, italicized is *p*<.01, * is *p*<.05.

Supplemental Table 15. *Correlations between IH subscales and (a) cognitive styles, (b) PSQ nonsense, and (c) bias blind spot.*

Intellectual Humility	Existential Quest	Objectivism	Confirmatory Thinking	Dogmatism	Need for Cognition	Social Vigilantism	BCTI	Need for Closure	PSQ Nonsense	Bias Blind Spot Average - Self
Alfano										
Open-mindedness	.04	**.61**	**-.41**	**-.34**	**.51**	**-.22**	**-.24**	*-.15*	**-.23**	**.41**
Modesty	-.10*	.09*	**-.19**	-.08	-.10*	**-.49**	-.10*	-.07	-.07	*.12*
Corrigibility	-.08	**.40**	**-.24**	**-.19**	**.46**	**-.28**	*-.14*	**-.32**	-.07	**.29**
Engagement	*.12*	**.51**	**-.46**	**-.35**	**.69**	**-.24**	**-.23**	**-.38**	**-.22**	**.33**
McElroy										
Intellectual arrogance	.11*	**-.39**	**.42**	**.24**	**-.38**	**.58**	**.32**	**.29**	**.19**	**-.25**
Intellectual openness	**.35**	**.33**	-.06	**-.31**	**.40**	**.21**	.07	**-.20**	*.12*	**.19**
CIH										
Ind. Intellect and ego	-.09*	**.44**	**-.40**	**-.25**	**.44**	**-.40**	**-.24**	**-.31**	**-.21**	**.26**
Openness to revising	**.35**	**.47**	**-.24**	**-.48**	**.32**	-.00	-.10*	-.05	-.08	**.26**
Respect for others'	**.23**	**.44**	*-.15*	**-.38**	**.40**	-.04	-.03	*-.12*	.05	**.26**
Lack of int. overconf.	**.15**	**.22**	**-.57**	**-.50**	**.22**	*-.12*	**-.30**	**-.20**	**-.19**	.07

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05.

Supplemental Table 16. *Correlations between IH subscales and indices of overconfidence.*

Intellectual Humility	ICAR OE	ICAR OPR	ICAR OPL	Trivia OE	Trivia OPR	Trivia OPL
Alfano						
Open-mindedness	.07	-.07	-.06	*-.12*	**-.16**	*-.13*
Modesty	**-.19**	*-.13*	**-.20**	-.11*	-.05	*-.12*
Corrigibility	-.00	-.07	-.07	.04	.06	-.01
Engagement	.05	-.10*	-.07	-.04	-.10*	-.08
McElroy						
Intellectual arrogance	.11*	**.16**	**.22**	**.18**	**.17**	**.20**
Intellectual openness	**.19**	.09	.11*	**.18**	*.14*	*.12*
CIH						
Ind. Intellect and ego	-.06	*-.12*	**-.17**	-.09*	-.08	**-.08**
Openness to revising	**.17**	.05	.09*	.01	-.01	.03
Respect for others'	**.16**	.05	.02	.03	.00	.02
Lack of int. overconf.	**-.16**	**-.22**	**-.20**	**-.24**	**-.26**	**-.21**

Note: Bolded is *p*<.001, italicized is *p*<.01, and * is *p*<.05. OE=overestimation; OPR=overprecision; OPL=overplacement

Supplemental Table 17. *Associations between BCIS items and IH total scores.*

BCIS Items	AIHS	LIHS	MIHS	CIHS	PIHS
At times, I have misunderstood other people's attitudes towards me.	**-.21**	-.01	**-.19**	*-.12*	*-.13*
My interpretations of my experiences are definitely right.	**-.21**	-.07	*-.12*	**-.24**	-.07
Other people can understand the cause of my unusual experiences better than I can.	**-.49**	**-.17**	**-.31**	**-.37**	**-.26**
I have jumped to conclusions too fast.	**-.36**	-.09*	**-.35**	**-.26**	**-.25**
Some of my experiences that have seemed very real may have been due to my imagination.	**-.54**	**-.18**	**-.39**	**-.38**	**-.30**
Some of the ideas I was certain were true turned out to be false.	*-.13*	.11*	*-.14*	-.03	-.07
If something feels right, it means that it is right.	**-.38**	**-.16**	**-.29**	**-.37**	**-.21**
Even though I feel strongly that I am right, I could be wrong.	**.22**	**.43**	**.23**	**.37**	**.20**
I know better than anyone else what my problems are.	.02	**.16**	.05	.08	*.12*
When people disagree with me, they are generally wrong.	**-.50**	**-.25**	**-.36**	**-.42**	**-.30**
I cannot trust other people's opinion about my experiences.	**-.31**	-.11*	**-.23**	**-.28**	**-.15**
If somebody points out that my beliefs are wrong, I am willing to consider it.	**.26**	**.50**	**.35**	**.38**	**.31**
I can trust my own judgment at all times.	**-.18**	-.05	-.05	*-.13*	.01
There is often more than one possible explanation for why people act the way they do.	**.27**	**.38**	**.29**	**.34**	**.25**
My unusual experiences may be due to my being extremely upset or stressed.	**-.29**	-.06	**-.26**	**-.20**	**-.24**

Note. Bolded is *p*<.001, italicized is *p*<.01, * is *p*<.05.