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Distinguishing intellectual humility and general humility

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Two studies provide evidence for distinguishing intellectual humility (IH) from general humility (GH). Humility involves (a) an Accurate View of Self and (b) the ability to regulate egotism and cultivate an other-oriented stance; IH is a subdomain of humility that involves (a) having an accurate view of one's intellectual strengths and limitations and (b) the ability to negotiate ideas in a fair and inoffensive manner. First, we present a theoretical framework for distinguishing these constructs. In Study 1, with a sample of undergraduate students ($N = 1097$), we used confirmatory factor analysis to provide empirical evidence for this distinction. We also found that IH predicted unique variance in openness to experience relative to GH. In Study 2, we examined additional evidence of discriminant validity with another sample of college students ($N = 355$). IH also predicted unique variance in need for cognition, objectivism, and religious ethnocentrism relative to GH.

Keywords: humility; measurement; intellectual humility

Although the study of virtues in psychology has lagged far behind that in philosophy, the positive psychology movement has started to close the gap by encouraging empirical research on virtues. Recently, psychologists have begun to study the virtue of intellectual humility (IH), which may be especially relevant in arenas tending to evoke ideological conflict (e.g. religion and politics). For example, McElroy and colleagues (2014) recently developed a measure of IH and discussed its utility in the context of religious leadership. However, important questions remain about what exactly constitutes IH, and the extent to which it can be reliably distinguished from general humility (GH). Thus, in this article, we provide a conceptual distinction between IH and GH, and we also present initial evidence for distinguishing IH and GH in two empirical studies.

Humility and its subdomains

GH has been defined as involving (a) an accurate view of one's strengths and weaknesses (including acknowledging one's limitations) and (b) an interpersonal stance that is other oriented rather than self-focused, marked by the ability to restrain egotism (i.e. self-oriented emotions such as pride or shame) (Davis et al., 2011). Whereas many scholars agree that humility involves having an Accurate View of Self, there is less agreement on interpersonal behaviors that are essential to vs. correlates of humility. Relative to other virtues (e.g. such as gratitude or forgiveness), humility appears to involve a broad range of situations

(i.e. there are many contexts in which others might view one as arrogant), which has led scholars to explore the idea that humility may involve a variety of subdomains.

Based on recent work in the field of philosophy (Baehr, 2011; Roberts & Wood, 2007), psychologists have suggested that GH may involve several subdomains (analogous to intelligence or self-efficacy; McElroy et al., 2014). According to this perspective, IH is a more specific version, or subdomain, of GH. McElroy et al. (2014) defined IH as follows:

> Intellectual humility (IH) pertains to one's knowledge or intellectual influence. Namely, IH involves having (a) insight about the limits of one's knowledge, marked by openness to new ideas; and (b) regulating intellectual arrogance, marked by the ability to present one's ideas in a non-offensive manner and receive contrary ideas without taking offense, even when confronted with alternative viewpoints. (p. 20)

This definition presumes that IH may predict criteria better than GH in certain contexts – an assumption that has not been empirically evaluated. Thus, the overarching goal of these studies is to investigate when IH (as defined by McElroy et al., 2014) uniquely predicts criterion variables relative to GH.

There are two principles that guided our examination of discriminant validity. First, a general measurement principle is that constructs tend to predict criteria more strongly when assessed at a similar level of specificity (Ajzen & Fishbein, 2005). Thus, being able to identify

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specific forms of humility, beyond GH, has important implications for the predictive efficacy of aspects of humility in relation to outcomes of interest. Second, to judge a trait accurately, one must have an opportunity (i.e. a 'good situation') to judge trait-relevant behavior (Funder, 1995). McElroy et al. (2014) theorized that IH is best judged in *diagnostic situations* in which one has a high motivation for being right, such as when one has a strong personal connection or investment with one's ideas or convictions. Taken together, these two ideas suggest that IH should predict behaviors involving negotiation of ideas (e.g. openness to new ideas, tempering of offensive reactions and responses to critique) better than GH. Indeed, IH and GH ought to be correlated with each other. However, IH ought to be a more precise predictor of domain-specific behavior, because GH is diluted by content from other domains (e.g. modesty behavior involves accounts that moderate envy).

Current evidence for the distinction between IH and GH

To our knowledge, there have only been two empirical studies that have included a measure of IH within the field of psychology (Hopkin, Hoyle, & Toner, 2014; McElroy et al., 2014). Hopkin et al. (2014) created a domain-specific measure of IH focused on religious beliefs. Undergraduates ($N = 202$) were randomly assigned to two conditions that involved reading an article either for or against religious attendance. After reading the article, participants rated the article and author. To assess the strength of religious beliefs, they rated their agreement or disagreement with a variety of beliefs (e.g. 'Do you believe the universe was created by a divine being?'). They also completed items designed to assess IH. Exploratory factor analysis produced four factors that Hopkin et al. labeled as follows: (a) awareness of fallibility (e.g. 'When it comes to religious or spiritual beliefs, mine are more accurate than others'. [reverse coded]), (b) discretion in asserting beliefs (e.g. 'Even when I have a strong religious or spiritual belief, I don't need everyone to know it'.), (c) comfort keeping beliefs private (e.g. 'It's important to share my religious or spiritual views with others regardless of whether they agree with me'. [reverse coded]), and (d) respect for others' beliefs (e.g. 'I listen to others' religious or spiritual beliefs without disagreeing even when I think I am right'.). They found several interactions between IH subscales and condition, which suggested that, when participants rated an article that was counter to their beliefs, IH was associated with more positive ratings of the article and author. Additionally, when the article was congruent with participants' beliefs, participants with lower IH rated the article more favorably.

McElroy et al. (2014) created the intellectual humility scale (IHS) in four studies. In the first two studies, they presented results from exploratory and confirmatory factor analyses (CFA). The IHS was found to have two subscales: intellectual openness and intellectual arrogance. In Study 3, McElroy et al. randomly assigned participants to think of an exemplar of virtue or vice, using a 2 (most/least virtuous) × 3 (intellectually humble, modest, driven) experimental design. A significant interaction effect revealed a significant gap in IHS scores between ratings obtained in the most and least virtuous conditions, as would be expected, and that the widest gap occurred when subjects were rating an intellectually humble person they identified. In Study 4, participants who experienced a major offense by a religious leader completed the IHS along with measures of spirituality and forgiveness. Scores on the IHS were positively and moderately associated with attitudes toward God. Even stronger positive associations were observed between IHS scores and different dimensions of forgiveness.

Despite providing preliminary evidence of construct validity of IH, in terms of a broader nomological net (Cronbach & Meehl, 1955), neither of these articles evaluated whether IH was distinct from GH. Thus, additional work is needed to clarify (a) how IH is related to GH and (b) the extent to which IH predicts unique variance in constructs hypothesized to be especially related to IH (e.g. variables that indicate a strong need for being right, or a strong personal connection or investment with one's ideas or convictions).

Purpose of the present studies

In these studies, we sought to examine whether there is evidence to distinguish IH from GH. We used two strategies. First, we explored whether IH and GH could be distinguished using factor analysis. Specifically, we employed CFA, entering all items on a measure of IH (McElroy et al., 2014) and GH (Davis et al., 2011) into a model with subscales modeled as separate latent variables. We hypothesized that this model would show evidence of good fit (Hypothesis 1). This is a stringent test, because it assumes independence (i.e. zero cross-loadings) between subscales, and deviations from this assumption would produce poor model fit. We also examined several alternative models in which strongly correlated factors were constrained to be equal to each other.

Second, we investigated whether IH would predict unique variance in constructs hypothesized to be closely related to IH after controlling for GH. That is, we examined the unique variance explained by IH above and beyond that explained by GH. Across two samples, we conducted a series of hierarchical regression models in which we entered GH in the first step and IH in the second step. Then, we reversed the order. For dependent

variables, we used measures of several constructs and we thought might optimally distinguish IH and GH.

In this study, we are specifically interested in behavioral tendencies in situations that may strain IH. We examined this in several ways. The domain of IH is particularly focused on behavior associated with negotiation of ideas, which we reasoned ought to be related to openness to new experiences or ideas. Therefore, we hypothesized that IH would account for significant variation in openness to experience on the Big Five (Hypothesis 2a). Measures of GH have consistently been linked with agreeableness (for a review, see Ashton & Lee, 2007; Davis, Worthington Jr., & Hook, 2010). Agreeableness does not necessarily involve the intellectual domain. IH does have an interpersonal dimension, involving fair and inoffensive negotiation of ideas, but GH covers a broader range of situations. Thus, we expected both IH and GH to uniquely predict agreeableness (Hypothesis 2b).

Next, we focused on several constructs associated with general patterns of thinking that we hypothesized would be related to IH. Need for cognition refers to one's tendency to engage in and enjoy cognitive activities or situations that require effort (Cacioppo, Petty, Feinstein, & Jarvis, 1996). Those high in IH may generally enjoy engaging different ideas, including challenging dialogs, and may have a greater capacity to tolerate disagreement without becoming defensive. Conversely, those low in IH may not readily put themselves in situations that challenge their thinking because they are less open to new ideas. They may be more likely to seek out situations that confirm their existing beliefs, which requires less cognitive effort. Therefore, we hypothesized that IH would positively predict the need for cognition above the contribution of GH (Hypothesis 2c).

A third relevant construct is objectivism, which refers to the degree to which one prefers to base decisions on empirical information or reasoning rather than intuition (Leary, Shepperd, McNeil, Jenkins, & Barnes, 1986). Although someone might certainly value objectivism without being intellectually humble, objectivism does invoke a general process of submitting one's ideas to a broader system of thought designed to sharpen the quality of one's ideas. Therefore, we expected that IH would positively predict objectivism (Hypothesis 2d).

Finally, we predicted that IH would be positively related to constructs associated with openness toward those who are religiously different. More specifically, we hypothesized that IH would be negatively associated with religious ethnocentrism (Hypothesis 2e), which involves the degree to which one views one's perspective as morally superior to other groups (for a review, see McCleary, Quillivan, Foster, & Williams, 2011).

Study 1

Study 1 involved a sample of undergraduates who completed measures of IH, GH, and the Big Five. First, we conducted a CFA that combined items representing subscales from the IHS (McElroy et al., 2014) and the relational humility scale (Davis et al., 2011), as a measure of GH. Second, we hypothesized that IH (as defined by McElroy et al., 2014) would uniquely predict openness to experience relative to GH (Hypothesis 2a). The strongest pattern would be that IH would predict additional variance in openness to experience after controlling for GH, but the reverse would not be true. Although GH may involve interpersonal openness, IH refers more to cognitive openness, which is conceptually more aligned with the openness to experience construct. We also hypothesized that IH and GH would each predict unique variance in agreeableness (Hypothesis 2b).

Method

Participants and procedure

Participants were 1097 undergraduates (68.9% female; 30.1% male) from a large urban university in the southeastern United States. Participants were offered course credit in psychology courses. The mean age was 24.99 years (SD = 6.67). The sample was diverse in terms of race/ethnicity (48.6% Black/African-American; 26.3% White; 11.9% Asian/Pacific Islander; 5.7% Latino/a; 6% other; and 1.6% did not respond). The sample was predominantly religious/spiritual (86.1%). The study was approved by the Institutional Review Board. Participants indicated consent online. They completed several demographic items as well as measures of IH, GH, and the Big Five in randomized order. Upon completion of the study, participants were granted a small amount of course credit.

Measures

Intellectual humility

IH was assessed with the self-report version of the 16-item IHS (McElroy et al., 2014). Items were rated on a 5-point Likert-type scale, ranging from 1 = *strongly disagree* to 5 = *strongly agree*. Higher scores indicate greater IH. The measure has two subscales: intellectual arrogance (e.g. 'Values winning an argument over maintaining a relationship'.) and intellectual openness (e.g. 'Is open to competing ideas'.). The intellectual arrogance subscale is reverse coded. Items were refined based on other reports in McElroy et al. (2014); however, in this study, participants completed the self-report version (i.e. we had participants rate themselves as the target person). Cronbach's alpha coefficients for the subscales ranged from .90 to .97 across four studies (McElroy et al.,

2014). The measure showed evidence of construct validity in associations with Big Five personality dimensions of agreeableness and openness, as well as with measures of relationship quality and relational spirituality. However, as discussed above, there is limited evidence of discriminant validity relative to measures of GH. The Cronbach's alpha coefficients were .89 for the total score, .88 for intellectual openness, and .87 for intellectual arrogance.

General humility

GH was assessed with the self-report version of the 16-item relational humility scale (RHS; Davis et al., 2011). Items were rated on a 5-point Likert-type scale, ranging from 1 = *strongly disagree* to 5 = *strongly agree*. Higher scores indicate greater GH (the superiority subscale is reverse coded). Items were originally refined based on other reports, but have also been used to assess self-reports (Davis et al., 2013). The scale has three subscales: global humility (e.g. I have humble character), Superiority (e.g. I think of myself too highly), and Accurate View of Self (e.g. I know my weaknesses). Cronbach's alphas for the full scale score ranged from .90 to .95 (Davis et al., 2011). In addition, the RHS has shown initial evidence of construct validity. It was found to correlate with empathy and forgiveness of an offender, and relationship characteristics with a parent, such as closeness and positive and negative affects. The Cronbach's alpha coefficients were .86 for the total score, .94 for global humility, .85 for Superiority, and .91 for Accurate View of Self.

Openness and agreeableness

Openness and agreeableness were measured with subscales of the 44-item Big Five Inventory (John, Donahue, & Kentle, 1991). Items were completed on a five-point rating scale from 1 = *strongly disagree* to 5 = *strongly agree*. Higher scores indicate more openness and agreeableness. John and Srivastava (1999) reported Cronbach's alphas for the subscales ranging from .75 to .80, and estimates of 3-month temporal stability ranging between .80 and .90. The subscales were found to be highly correlated with longer measures of the five-factor model such as the NEO (Costa Jr. & McCrae, 1992). The Cronbach's alphas coefficients in the current sample were .74 for openness and .78 for agreeableness.

Results and discussion

Our first hypothesis was that IH and GH would be distinguished using factor analysis. Specifically, we hypothesized that a confirmatory factor analytic model with IH and GH as separate latent variables would fit the data well. We conducted a CFA that included items from both the IHS and RHS. Thus, we specified five factors, including the three factors of the RHS (i.e. global, superiority, and Accurate View of Self) and the two factors of the IHS (i.e. positive and negative). The covariance matrix was analyzed with MLR estimation using Mplus 6.1 (Muthen & Muthen, 2008). Several fit indices were examined to evaluate the overall fit of the model – the Chi-square value, the comparative fit index (CFI), and the root mean square error approximation (RMSEA). As a rule of thumb, a CFI around .95 and an RMSEA equal to or less than .06 suggest good fit (Hu & Bentler, 1999). The five-factor model showed adequate fit, $\chi^2(454) = 1674.30$, $p < .001$; CFI = .91, RMSEA = .05 (95% confidence interval [CI] = .047, .052), although the CFI was slightly less than the desired .95 cutoff. We also examined a one-factor model, and this showed very poor fit, $\chi^2(464) = 8670.29$, $p < .001$; CFI = .40, RMSEA = .13 (95% CI = .12, .13). Next, we examined a two-factor model (i.e. RHS items loading on one factor and IHS items loading on another), which also showed very poor fit, $\chi^2(463) = 7073.86$, $p < .001$; CFI = .52, RMSEA = .11 (95% CI = .11, .12). Finally, we examined a model with a higher order factor predicting the five lower order factors. This model showed adequate fit, ΔCFI = .009; CFI = .90, $\chi^2(459) = 1876.32$, $p < .001$; RMSEA = .05 (95% CI = .05, .06).

Next, we conducted several model comparisons to provide additional evidence of discriminant validity. Means, standard deviations, and factor intercorrelations between study variables are in Table 1. The largest factor correlation derived from the two scales occurred between the arrogance subscale of the IHS and the superiority subscale of the RHS, $r = .63$, $p < .001$. Thus, we examined a model in which the correlation between these subscales was constrained to unity, but model fit worsened substantially, $\chi^2(455) = 2385.88$, $\Delta\chi^2(1) = 206.34$, $p < .0001$; CFI = .86, RMSEA = .06 (95% CI = .047–.052). The intellectual openness subscale was moderately related to the global humility subscale of the RHS, $r = .47$, $p < .001$. We examined a model in which the correlation between these subscales was constrained to be one, but again model fit worsened substantially, $\chi^2(455) = 3373.51$, $\Delta\chi^2(1) = 489.07$, $p < .0001$; CFI = .79, RMSEA = .08 (95% CI = .047–.052). Thus, results of the CFA suggested evidence of discriminant validity for the IHS relative to the RHS.

Our second hypothesis was that IH would positively predict unique variance in openness to experience relative to GH (Hypothesis 2a). After creating subscale scores, in hierarchical regression analyses, we entered RHS subscales in the first step, and then entered the IHS subscales in the second step. Then, we examined the reverse model in which IHS subscales were entered in a first step, and then, RHS subscales

Table 1. Means, standard deviations, and intercorrelations of constructs in Study 1.

	M	SD	1	2	3	4	5	6	7	8	9
1. Intellectual humility total	3.87	.54	1	.86**	.82**	.65**	.49**	.51**	.34**	.38**	.65**
2. Lack of intellectual arrogance	3.78	.68		1	.40**	.58**	.35**	.58**	.19**	.18**	.60**
3. Intellectual openness	3.96	.61			1	.51**	.47**	.25**	.38**	.48**	.49**
4. General humility total	3.88	.54				1	.76**	.77**	.51**	.27**	.61**
5. Global humility	3.84	.83					1	.29**	.31**	.27**	.51**
6. Lack of superiority	3.80	.75						1	.06	.09**	.44**
7. Accurate View of Self	4.07	.70							1	.26**	.29**
8. Openness to experience	3.60	.53								1	.32**
9. Agreeableness	3.82	.58									1

Note: $N = 197$.
*$p < .05$; **$p < .01$.

were entered in a second step. Results are presented in Table 2.

The IHS subscales predicted 23% of the variance in openness ($p < .001$) and the RHS subscales only accounted for an additional 1% of the variance in openness scores ($p < .001$). Specifically, the openness subscale ($\beta = .43$, $p < .001$) and Accurate View of Self ($\beta = .09$, $p = .003$) were related to openness to experience. Global humility ($\beta = .05$, $p = .093$), Superiority ($\beta = -.04$, $p = .21$), and Defensiveness ($\beta = .00$, $p = .996$) did not predict openness to experience when entered simultaneously with other subscales. Tolerance values ranged from .82 to .59. In reverse order, the RHS subscales accounted for 10% of the variance in openness scores ($p < .001$), and the IHS subscales accounted for an additional 12% of the variance in openness scores ($p < .001$).

The IHS subscales predicted 43% of the variance in agreeableness scores ($p < .001$), and the RHS only predicted an additional 6% of the variance ($p < .001$). Defensiveness ($\beta = .38$, $p < .001$), openness ($\beta = .17$, $p < .001$), global humility ($\beta = .25$, $p < .001$), Superiority ($\beta = .10$, $p < .001$), and Accurate View of Self ($\beta = .07$, $p = .004$) were related to agreeableness scores when entered simultaneously. Tolerance values ranged from .59 to .82. In reverse order, the RHS predicted 37% of the variance, and the IHS predicted an additional 13% of the variance ($p < .001$).

Table 2. Hierarchical regression analyses in Studies 1 and 2.

Construct	RHS entered first, then IHS		IHS entered first, then RHS	
	1. RHS R^2	2. IHS ΔR^2	1. IHS R^2	2. RHS ΔR^2
Openness	.10**	.12**	.23**	.01**
Agreeableness	.37**	.13**	.43**	.06**
Need for cognition	.03	.08**	.11**	.00
Objectivism	.20**	.06**	.18**	.08**
Religious ethnocentrism	.11**	.11**	.17**	.05**

Notes: RHS = Relational humility subscales; IHS = Intellectual humility subscales; tolerance values ranged from .53 to .82.
*$p < .05$; **$p < .01$.

Taken together, results of CFA in Study 1 provided strong evidence that IH and GH assess different constructs, both in terms of item-to-factor structure and differentiated overlap between the factors. Additional evidence of discriminant validity emerged through analyses indicating IH explained additional, unique variance in openness to experience and agreeableness after controlling for GH. In brief, IH and GH dimensions are related humility dimensions, but IH appears to be sufficiently distinct from GH in important ways in terms of factor structure, discriminant validity, and criterion-related validity.

Study 2

In Study 2, we examined whether IH would predict three patterns of thinking hypothesized to distinguish IH from GH. We anticipated that IH would explain substantial variation in these constructs even after controlling for variability attributable to GH. Specifically, we hypothesized that IH would positively predict need for cognition (Hypothesis 2c) and objectivism (Hypothesis 2d). In addition, in a subsample of Christians (because items on the measure of religious ethnocentrism focus on Christianity), we predicted that IH would uniquely predict lower levels of religious ethnocentrism (Hypothesis 2e).

Method

Participants and procedure

Participants were 355 undergraduates (64.8% female; 35.2% male) who attended a large urban university in the southeastern region of the United States. They were offered course credit in psychology courses. On average, participants were 24.38 years old (SD = 6.03). As with Study 1, the sample represented a diverse distribution of race/ethnicity (42.5% Black/African-American; 32.4% White; 11% Asian/Pacific Islander; 6.5% Latino/a; 4.8% other; and 2.8% did not respond). Approximately

84.8% endorsed being religious or spiritual. After providing informed consent, participants completed an online survey, including measures of IH, GH, need for cognition, and objectivism. A subsample of self-identified Christians ($n = 224$) also completed a measure religious ethnocentrism. Participants were granted a small amount of course credit upon completion of the study.

Measures

As in Study 1, participants completed the self-report versions of the IHS and RHS as described in Study 1. The Cronbach's alpha coefficients were .92 for the total score, .91 for intellectual openness, and .91 for intellectual arrogance. The Cronbach's alpha coefficients were .89 for the total score, .95 for global humility, .90 for Superiority, and .93 for Accurate View of Self. In addition, they completed the following measures.

Need for cognition

Need for cognition was assessed with the 18-item version of the need for cognition scale (Cacioppo, Petty, & Chuan Feng, 1984). Items were rated on a 5-point Likert-type scale ranging from $1 = strongly\ disagree$ to $5 = strongly\ agree$. Higher scores indicate greater need for cognition. An example item is 'I usually end up deliberating about issues even when they do not affect me personally'. The scale showed evidence of reliability, with a Cronbach's coefficient alpha of .90 (Cacioppo et al., 1984). In addition, it has shown evidence of construct validity across a wide variety of studies in personality and social psychology (Petty, Brinol, Loersch, & McCaslin, 2009). The Cronbach's alpha in the current sample was .86.

Objectivism

Objectivism was assessed with the 11-item objectivism scale (Leary et al., 1986). Items were rated on a 5-point Likert-type scale ranging from $1 = not\ at\ all\ characteristic\ of\ me$ to $5 = extremely\ characteristic\ of\ me$. Higher scores indicate greater objectivism. An example item is 'I am only confident of decisions that are made after careful analysis of all available information'. The scale showed evidence of reliability, with Cronbach's alpha coefficients ranging from .80 to .83 (Leary et al., 1986). The scale also showed evidence of construct validity, being negatively associated with subjectivism, preference for intuition, preference for feeling over thinking, and preference for perceiving over judging. The scale showed a weak correlation with social desirability. The Cronbach's alpha in the current sample was .69.

Religious ethnocentrism

Religious ethnocentrism was assessed with the 16-item religious ethnocentrism scale (Altemeyer, 2003). These items were only rated by participants who identified as Christian because some items focused on Christianity (e.g. 'Christian prayer [and only Christian prayer] should be said in our public schools'.). Items were rated on a 9-point Likert-type scale, ranging from $1 = strongly\ disagree$ to $9 = strongly\ agree$. Higher scores indicate greater religious ethnocentrism. An example item is, 'You can trust members of all religions equally; no one religion produces better people than any other does'. The scale showed evidence of reliability, with Cronbach's alpha coefficients ranging from .80 to .83 (Altemeyer, 2003). The scale also showed evidence of construct validity, being positively associated with intergroup discrimination (Altemeyer, 2003). The Cronbach's coefficient alpha in the current sample was .83.

Results and discussion

Our primary hypothesis was that the IHS would show evidence of discriminant and criterion-related validity relative to the RHS. Accordingly, we conducted a series of hierarchical regressions using measures of need for cognition, objectivism, and religious ethnocentrism as criterion variables. For each dependent variable, we first entered subscales of the RHS in Step 1, and then, we entered the subscales of the IHS in Step 2. Results from regression analyses are presented in Table 2. Then, we entered subscales in the reverse order. Means, standard deviations, and intercorrelations between variables are reported in Table 3.

The RHS subscales predicted 3% of the variance in need for cognition scores ($p = .107$), and the IHS subscales predicted an additional 8% of the variance ($p < .001$). Specifically, need for cognition was associated with higher scores on the openness subscale ($\beta = .31$, $p < .001$) and lower scores on the defensiveness subscale ($\beta = -.14$, $p = .042$). Global humility ($\beta = -.10$, $p = .067$), Superiority ($\beta = .05$, $p = .395$), and Accurate View of Self ($\beta = .04$, $p = .470$) did not predict need for cognition when entered simultaneously with other subscales. Tolerance values ranged from .53 to .82. In reverse order, the IHS subscales predicted 11% of the variance, and the RHS subscales did not predict additional variance ($p = .842$).

The RHS subscales predicted 20% of the variance in objectivism scores ($p < .001$), and the IHS subscales predicted an additional 6% of the variance ($p < .001$). Specifically, objectivism was related to the openness subscale ($\beta = .22$, $p < .001$) and Accurate View of Self ($\beta = .30$, $p < .001$). Global humility ($\beta = -.002$, $p = .97$), Superiority ($\beta = .11$, $p = .062$), and Defensiveness ($\beta = .09$, $p = .165$) did not predict objectivism when entered simultaneously with other subscales. Tolerance values ranged from .53 to .82. In reverse order, the IHS subscales predicted 18% of the variance ($p < .001$), and

Table 3. Means, standard deviations, and intercorrelations of constructs in Study 2.

	M	SD	N	1	2	3	4	5	6	7	8	9	10
1. Intellectual humility total	3.68	.64	330	1	.86**	.84**	.60**	.44**	.50**	.36**	.37**	.42**	−.39**
2. Lack of intellectual arrogance	3.66	.80	330		1	.46**	.63**	.41**	.58**	.31**	.29**	.35**	−.27**
3. Intellectual openness	3.73	.69	330			1	.39**	.33**	.26**	.30**	.37**	.38**	−.40**
4. General humility total	3.78	.62	333				1	.75**	.81**	.56**	.20**	.40**	−.28**
5. Global humility	3.77	.88	333					1	.32**	.37**	.08	.25**	−.14*
6. Lack of superiority	3.70	.88	333						1	.18**	.19**	.27**	−.32**
7. Accurate View of Self	3.93	.73	332							1	.15**	.41**	−.04
8. Need for cognition	3.26	.56	333								1	.37**	−.19**
9. Objectivism	3.42	.48	327									1	−.35**
10. Religious ethnocentrism	2.57	.63	229										1

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

the RHS subscales predicted an additional 8% of the variance ($p < .001$).

In the analyses involving a subsample of Christians, the RHS subscales predicted 11% of the variance in ethnocentrism ($p < .001$), and the IHS subscales predicted an additional 11% of the variance ($p < .001$). Religious ethnocentrism was related to the openness subscale ($\beta = -.39$, $p < .001$) and Superiority ($\beta = .27$, $p < .001$). Global humility ($\beta = .05$, $p = .491$), Accurate View of Self ($\beta = .08$, $p = .249$), and Defensiveness ($\beta = .04$, $p = .65$) did not predict religious ethnocentrism when entered simultaneously with other subscales. Tolerance scores ranged from .48 to .81. In reverse order, the IHS predicted 17% of the variance ($p < .001$), and the RHS subscale predicted an additional 5% of the variance ($p = .003$).

Taken together, the results of Study 2 provided additional evidence for the discriminant validity of IH relative to GH. The strongest pattern was observed for need for cognition, with IH predicting the dependent variables above and beyond GH, but not the reverse. For objectivism and religious ethnocentrism, IH and GH both predicted unique variance in scores. In general, IH appears to predict constructs associated with the regulation of beliefs and the expression of ideas in non-biased, tolerant ways as well as or better than GH. In congruence with Study 1, Study 2 provides additional support for our theorizing that IH is a separate domain from GH.

General discussion

Psychologists have recently begun to study IH; however, we had foundational questions about the discriminant validity of this construct and whether it could be differentiated from GH. Therefore, in this article, we presented a rationale for distinguishing IH from GH and then used several strategies to evaluate evidence for the distinction.

First, we examined results of CFA in a model that included items from a measure of IH and GH. This is a stringent test of construct validity because it assumes cross-loadings are zero across subscales, so deviations

from this assumption will indicate poor model fit. In this regard, results from Study 1 showed evidence that latent constructs associated with IH are related but distinct from latent constructs associated with GH.

Second, we examined several constructs that ought to distinguish IH and GH, based on the theoretical framework proposed by McElroy et al. (2014), which defined IH as a subdomain of GH that pertains to humility toward one's knowledge and intellectual influence. Their conceptualization suggested two complimentary rationales for understanding when IH should better predict GH. First, a general principle of measurement is that constructs tend to be most strongly related when they are assessed at a similar level of specificity. Second, diagnostic behavior (i.e. a good situation) enhances one's ability to accurately judge a behavior. Accordingly, IH should predict constructs associated with being a fair negotiator of ideas.

The results of our studies were consistent with this theorizing. IH predicted openness to experience after controlling for GH, but the reverse was not true. Not surprisingly, IH and GH both predicted agreeableness. Indeed, GH has been robustly linked to agreeableness – in fact, an alternative to the Big Five includes an Honesty–Humility factor, a sixth factor that includes some content from the agreeableness factor of the traditional Big Five (Ashton, Lee, & de Vries, 2014).

IH also incrementally predicted two cognitive styles that we reasoned should promote higher IH (and for need for cognition, the reverse was not true). Need for cognition involves intrinsic motivation to engage in effortful cognitive processing. Our findings are consistent with the idea that intellectual disagreements may be less depleting for people who enjoy intellectual stimulation. Our results, however, were only based on a cross-sectional relationship between two self-report measures and should be interpreted with caution until researchers have tested this hypothesis more definitively. IH also predicted objectivism. This supported our theorizing that IH should be related to submitting oneself to a system or process for evaluating limitations in one's ideas. Science

is one such example of this process. It involves a systematic process of clarifying and evaluating assumptions, as well as checks and balances (e.g. peer review) designed to gradually correct for biases.

Finally, IH incrementally predicted religious ethnocentrism. McElroy et al. (2014) identified religious conviction as an area that may make IH particularly difficult to practice. Ideas are often exchanged and negotiated as a way of influencing decisions. However, in the context of religious conviction, ideas often get used as signals of loyalty to the group, which can undermine someone's typical cognitive strategies for fairly considering evidence. Namely, endorsing ideas that violate cherished beliefs of a group may lead to social exclusion. Therefore, in some communities, just considering alternative religious perspectives may evoke shame, so people may generally avoid thinking about controversial topics. We found initial evidence that IH was related to lower religious ethnocentrism in a subgroup of Christians in Study 2. This is a promising link, given that previous research has found that religious ethnocentrism fully mediated the link between fundamentalism and discriminatory attitudes (Altemeyer, 2003). We are especially interested in learning more about individuals who are able to bridge or span ideological major differences well, such as those who are able to form strong relationships with those who hold very different ideological commitments (e.g. someone who is theologically and politically liberal who is nonetheless able to connect well with those who are more theologically and politically conservative).

Taken together, these findings provide support for distinguishing IH as a subdomain of GH, suggesting that the empirical investigation of IH (rather than simply GH alone) is worthwhile. Indeed, we provided several opportunities for this distinction to fail empirically (e.g. if the CFA had shown substantial cross-loading and poor fit or if regression analyses indicated that IH did not incrementally predict key constructs after controlling for GH). Given that IH passed these tests, our findings provide promising evidence for approaching humility not just as a general construct, but also for examining specific contexts that make humility especially difficult to practice. Basic research on IH has important implications for a variety of highly productive research areas, such as factors that promote cohesiveness, effective decisions, and optimal performance in relationships or teams. Research on IH also has implications for dialog and training in areas that tend to get entrenched in ideological conflict, including cross-cultural work, politics, religion, or science.

Limitations and areas for future research

This study had several limitations. First, we only used self-report measures to assess IH and GH. Scholars have been particularly concerned about the validity of self-reports of humility (Davis et al., 2010). Claiming to be humble on a self-report measure may paradoxically seem akin to bragging about one's humility, which might be evidence that one is not humble. As it turns out, there is relatively little empirical evidence for this unique response bias (i.e. modesty effect) despite considerable growth in empirical work on humility in recent years (Davis et al., 2013). Reliable alternatives to self-report measures are available (Davis et al., 2011) that have been effectively used in previous research (Van Tongeren, Davis, & Hook, 2014). For other evaluative traits, however, researchers have generally found that self-reports and other reports uniquely predict behavior (Vazire, 2010), so we suspect that the eventual gold standard for studying humility will incorporate information from multiple sources, including self-report, other-report, and behavior (e.g. physiological or observational measures). Thus, we encourage researchers to use multiple methods of measurement in future research (Dorn, Hook, Davis, Van Tongeren, & Worthington Jr., 2014). Related to this, our measure of religious ethnocentrism, thought widely used in previous research, may have contained items that appeared to be double-barreled. Future research should replicate our findings with a different measure of religious ideological priority.

Second, our study only employed cross-sectional, correlational designs. Thus, conclusions about causality and directions of effects should not be made. Two important next steps involve (a) studying IH and GH longitudinally and (b) experimentally straining humility by putting people in situations where most people become more selfish, arrogant, or defensive (see Hopkin et al., 2014) and then determining whether IH explains variability in reactions to experimental manipulations better than GH.

Third, although our sample represented considerable racial/ethnic diversity, our studies ultimately used convenience samples. It is important to examine IH across the lifespan. For example, children may approach the intellectual domain with greater flexibility in certain domains, but as they develop a sense of identity, individuals may become less open to considering new information. On the other hand, some adults and older adults may develop exceptional levels of IH, as experience is combined with intellectual habits of engaging and integrating ideas, as well as developing complex social skills to curb conflict with those advancing competing ideologies. Future research might also explore cultural differences in the expression of IH. The second aspect of our definition refers to the ability to fairly and inoffensively negotiate ideas. Groups have different norms regarding the evaluation of ideas (i.e. epistemology) and social norms regarding respectful dialog. Accordingly, there are a variety of populations that could be strategically sampled to study IH. Related to the logic in this article, people who are

committed to ideological positions may find it especially difficult to practice IH. However, at the same time, certain members within these communities may be especially practiced at regulating egotism and cultivating fair-mindedness toward other perspectives. From this vantage point, it would be especially interesting to study people who are able to 'span' large ideological distances (Haidt, 2011). Likewise, there are a variety of situations where the context may strain fair-mindedness, but where IH may promote better outcomes (e.g. high-pressure medical decisions, leadership, and science).

Fourth, our study focused primarily on behavior in contexts that might make it difficult for someone to remain open and willing to fairly negotiation ideas, but it is also important to study situations that might make people too diffident. IH is not just a rigid strategy of compromising and assimilating ideas, but also involves the ability to advance one's ideas non-defensively. Thus, researchers might use paradigms that have been used to study conformity in groups. Sometimes, IH may involve the need to boldly defend a conviction by anticipating competing ideologies and determining the strongest way to present one's own ideas. Therefore, situations in which there is pressure to conform may also provide good situations for studying IH.

Conclusion

Due to failure to establish evidence of discriminant validity, many constructs falter before ever becoming an established scientific literature. This was certainly a viable threat for the construct of IH, but these studies provide initial evidence that GH likely involves subdomains such as IH. If findings converge across contexts and with other measures, theoretical development is necessary to clarify the key subdomains of GH and further instantiate IH within the nomological network of humility. Given that traits are generally difficult to change, we suspect that subdomain-level changes may provide a more promising target for intervention. People low to moderate in IH may be able to develop certain skills, abilities, and strategies that help them determine when they are likely to respond more defensively and arrogantly and to curtail these behaviors. As basic research on IH accumulates, it will clarify the focus and promise of interventions design to curtail ideological arrogance.

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