

Article

# A Construct Validity Study for the Humility at Work Scale: Item-Content Validity and Convergent-Discriminant Validity

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**Abstract:** The humility at work scale was developed to provide a numeric representation of the humility at work construct, defined as one's estimate of low to modest self-importance in the act of doing the work itself and in relation to one's role in doing the work. In prior studies, scores yielded by the scale have shown concurrent validity with measures of predicted union outcomes. In the present study, published and unpublished sample data were used to show convergent-discriminant validity as a demonstration of construct validity stemming from item-content validity. Using principal component analysis, four distinctive item-content domains were identified as interpretable: expressive humility, supportive humility, effective humility, and appreciative humility. Represented as item-subscales, yielded scores were found to show convergent-discriminant validity with scores yielded from measures of constructs thought to be related and unrelated to the humility construct, with the exception of scores yielded by the effective humility subscale. Included are discussion points for detected and undetected scale validity with an eye on scale use in prediction models and construct applications that bear on the experience of work in reference to supervisors and subordinates whether employed as union or nonunion employees and whether employed in union or nonunion work environments.

**Keywords:** humility at work; scale validity; supervisors; subordinates; union employees; nonunion employees



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## 1. Introduction

Union-management relations is an interdisciplinary field of research that includes a focus on the psychological experience of employees at work in actual or anticipated unionized work environments (for inception and seminal studies, see [1–7]). Central to the focus is the development and validation of prediction measures intended to model psychological elements germane to the experience of union and nonunion employees, such as predicting an employee's tolerance—as opposed to intolerance—of unions (i.e., an emotional response to unions) or predicting an employee's willingness to become a union member—as opposed to becoming a fee-paying nonmember—after a union election win (i.e., a cognitive response to unions) (for example studies of these and other psychological elements as predicted outcomes, see [8–13]).

One recently introduced prediction measure in the field is the humility at work scale, a measure constructed to provide a valid (i.e., an accurate) numeric representation of the humility at work construct (for a scale origin study, see [11]). As a contextualized construct in reference to the experience of work, humility is conceived in self-referential terms as one's low to modest estimate of self-importance in the act of doing the work itself and in relation to one's role in doing the work—an estimate that is a conscious part of one's conception of

self at work, elements of which include a willingness to acknowledge the support, guidance, and knowledge received from others at work, a willingness to admit mistakes to others and share limitations at work, and, whenever possible, to enact a felt aversion for being singled out for accomplishments at work that include the accomplishments of others at work (for elaborations of the construct, see [11,14]; for readings on the conscious self in everyday life and at work, see [15–20]).

The intent of the present study is to combine published and unpublished data collected across samples of employees specific to age, gender, supervisory status, union status, and responses to the items that comprise the humility at work scale to augment the claim that the scale is a valid measure of the humility at work construct and, in doing so, to discern how the scale might be best used to effectively represent the construct in future studies with either modeling or application in mind. As a guide to our study, we first distinguish the construct and note prior uses of the scale in studies that suggest concurrent validity. We next introduce item-content validity as a precursor to test for convergent-discriminant validity, two forms of validity yet to be associated with the scale. Next, we formulate research questions specific to whether item-content domains (if any) can be interpreted and represented as item-subcales (if any), asking whether subscale scores and scores yielded from selected scales related to other constructs show expected convergent and discriminant coefficients, and if so, whether convergent-discriminant validity can be claimed for the subscales. Our sampling of employees is documented, as is our procedure and the scales themselves used to calculate the coefficients.

## 2. Humility at Work Construct

Circa 2000, humility became a variable of interest in management studies that focus on macro-level predicted outcomes such as team effectiveness and firm performance [21,22]. Defined in dispositional terms as a personality trait, researchers amassed data to suggest that team leaders should be encouraged to express humility in meetings with team members (e.g., appreciate the contributions of others, admit mistakes, acknowledge limitations, demonstrate openness to learn), and thereby, as leader-models, engender more willingness among subordinates to share ideas and to work cooperatively [23]. Although this focused line of research is ongoing [24] and has spawned a vast number of humility measures to identify future leaders so disposed [25], our construct of humility at work departs from this line in two important ways.

First, rather than being conceived in dispositional or trait-like terms, our humility construct is guided by Baumeister's [26] dictum that a construct that is linked to elements that are both inherently interpersonal (i.e., elements that indicate how one relates one's self to others) and equally intrapersonal (i.e., elements that relate to how one views one's self) cannot be disentangled from awareness of self. As such, we extracted self-referential elements from prior humility constructs [27,28] that could be contextualized as experienced at work and that could be equally applied to supervisors and subordinates, team leaders and team members, and union employees and nonunion employees.

Second, our humility construct is not intended for prediction models with a focus on aggregated outcomes such as team-level or firm-level performance but rather is intended for prediction models aimed at individual-level outcomes (i.e., micro-level outcomes rather than macro-level outcomes). In self-referential terms, one's experience of self at work may or may not correspond to aggregated outcomes that reflect the collective experience of others at work (for clarification of levels of analysis in reference to predictor measures and outcomes, see [29,30]).

### 3. Humility at Work Scale

Construction of the humility at work scale began with a collection of 64 items drawn from published self-attribute and other-attribute measures of humility found in journal articles, book appendices, manuals, and online websites, selecting 18 items that included a reference to work.<sup>1</sup> Next, the selected items were reworded or revised appropriate for a self-attribute measure using first-person present-tense pronouns such as “I” and “me”.

Guided by specific recommendations for item wording to offset over-generalized item content [31] and by criteria recommended to address the problem of overclaiming and underclaiming, a common concern voiced by critics of self-attribute measures [32,33], items were further revised based on the following criteria:

1. *Heightened specificity*; a referent to “my job” or “my work” was inserted into every item to remove item content that might be mistaken as a truism, a moral imperative, or a normative expectation.
2. *Omitted qualifiers*; omitted were qualifiers such as “all in all” or “the average person” in favor of item content that focused on self and others at work that might be viewed by possible overclaimers as too self-effacing or, if enacted, perhaps risking criticism from others—and equally might be viewed by possible underclaimers as “just about right”, even perhaps putting at risk a misrepresentation of self if not claimed.
3. *Framed for yes-no responses*; a scaling strategy used to counteract response leniency (i.e., overly favorable responses, especially relevant to overclaiming), as well as errors of central tendency (i.e., noncommittal responses, especially relevant to underclaiming).

To further arrest the prospect of over/underclaiming, an *attentional set of instructions* was constructed for item responses as recommended by Sutton [34], wherein respondents are asked to focus their attention on their “present self” rather than on their “aspirational self”—a request for responses that reflect “the person who you are now” rather than “the person who you might strive to be in the future”.

Next, to represent the content domain as outlined by the construct with the fewest possible items, sought and received were item-construct reviews from subject-matter experts who have authored publications on humility as a variable (two academics, two practitioners), along with item-soundness reviews from measurement experts who have authored publications on item construction [35,36]. Item reduction from 18 to a final set of 10 items was further facilitated by asking eight industrial-organizational psychology graduate students—with the construct, items, and criteria in hand—to rate items for redundancy, clarity (low ambiguity), plausibility, contextual fit, interdependence (across items), leading (suggesting a preferred view), and peripheral (in reference to the construct).

As part of two published predictor-outcome studies, concurrent validity was suggested in both, in which scores yielded by the scale showed *expected* covariation with scores yielded by other measures. In the first study [11], nonunion supervisors’ humility scale scores calculated as average yes-no responses to the scale items were inversely associated with scores yielded by a measure of union intolerance specific to intolerance of unions in the work environment. In the second study [14], nonunion subordinates’ humility scale scores using the same scoring method yielded two distinctive item-content domains. The first item-domain was labeled as expressive humility (willingness to express humility at work), and the second domain was labeled as effective humility (willingness to enact humility at work). Both item-domains were represented by subscale scores and were positively associated with scores yielded by a measure of willingness to join a union, in which the covariation was mediated by reverse scores yielded by a measure of union tolerance (i.e., humility at work was indirectly related to willingness to join through tolerance of unions).

## 4. Scale Validity

### 4.1. Item-Content Validity

To demonstrate the construct validity of a scale, questions must be answered about the item-content validity of the scale (for standard and recent treatments of this thesis, see [35,37–39]). The question of item-content validity is whether the content domain as outlined by the construct is well represented by the items that comprise the scale, and as a subsequent question, whether responses to the items of the scale show more than one content domain. Answers to the latter question may also suggest latent elements of the construct, in which identified elements may widen scale usability.

To discern one or more content domain, component analyses can be performed on item responses. In reference to the humility at work scale, response data in the present study were drawn from samples of union and nonunion supervisors and subordinates, in which, as a combined sample of published and unpublished data, case selection was specific to complete records (i.e., recorded responses to all 10 items of the scale). If components are seen in the data (i.e., distinctive linear combinations of items), and if components can be interpreted based on item-content, then components can be labeled as item-content domains and represented by item-subscales, scores of which can be used to further analyze the construct validity of the scale.

### 4.2. Convergent-Discriminant Validity

Convergent-discriminant validity is a demonstration of construct validity (for standard and recent treatments of this thesis, see [39–42]). Convergent validity is shown if scores yielded by a focal scale—in this case, the humility at work scale—show covariation with scores yielded by a measure of a variable that is thought to be related to the variable of the focal scale. That is, given two variables with constructs that outline related elements, scores yielded by the scales of the variables should show covariation. In kind, discriminant validity is shown if scores yielded by a focal scale do not show covariation with scores yielded by a measure of a variable that is thought to be unrelated to the variable of the focal scale. That is, given two variables with constructs that outline unrelated elements, scores yielded by the scales of the variables should show weak to absent covariation. In this context, it is also possible with respect to convergent validity to suggest that two variables thought to be related are positively or inversely related, in which scores yielded by the scales of the variables should show expected positive or negative covariation.

To the extent that weak covariation in this context may induce disagreement about what is weak, evoked is statistical probability to separate random from nonrandom covariation [39,41]. That is, assuming linear covariation, a stated minimum low probability can be set (e.g.,  $p < 0.05$ ) to indicate the presence or absence of covariation.

In reference to the convergent validity of the scale in question, scalable variables were selected to demonstrate positive and negative covariation with scores yielded by the scale. Selected variables were based on constructs that relate to elements as outlined by the humility at work construct, viz., expressed humility (e.g., displaying acts of appreciation of others' strengths and contributions; [28]), modesty (e.g., downplaying one's contributions in collaborative work; [27]), empathy (e.g., considering the consequences of one's actions for others; [43,44]), and narcissism (e.g., assuming a sense of entitlement in relation to others; [45,46]).

To show convergent validity, nonzero and positive coefficients are expected between humility scale scores and expressed humility, modesty, and empathy scale scores (i.e., more humility at work is associated with more expressed humility, modesty, and empathy). Also, a nonzero and negative coefficient is expected between humility scale scores and narcissism scale scores (i.e., more humility at work is associated with less narcissism).

In reference to the discriminant validity of the scale in question, scalable variables were selected to demonstrate neither positive nor negative covariation with scores yielded by the scale. Selected variables were based on constructs that *do not* relate to elements as outlined by the humility at work construct, viz., self-esteem competence (e.g., esteeming one's self in relation to one's sense of usefulness; [47]) and self-deception enhancement (e.g., engaging in unrealistic self-evaluations to heighten one's self-confidence; [48]).

To show discriminant validity, near-zero coefficients are expected between humility scale scores and self-esteem competence and self-deception enhancement scale scores (i.e., more humility at work is neither associated with self-esteem competence nor associated with self-deception enhancement).

## 5. Research Questions

Whether data from samples of union and nonunion supervisors and subordinates will be sufficient to discern item-content validity and subsequent convergent-discriminant validity for the humility at work scale is represented by three research questions.

*Research Question 1:* Based on responses to the items of the scale, do component analyses indicate one content domain or more than one content domain?

If one domain, a claim of item-content validity can be made for scale scores based on the items of the scale.

If more than one domain, a claim of item-content validity can be made for subscale scores based on item-content.

*Research Question 2:* Based on the construct for the scale, do scores yielded by the scale show expected nonzero positive and negative covariation with scores of other measures with related construct elements?

If so, a claim of convergent validity for the scale can be made.

*Research Question 3:* Based on the construct for the scale, do scores yielded by the scale show expected near-zero covariation with scores of other measures with unrelated construct elements?

If so, a claim of discriminant validity for the scale can be made.

## 6. Method

### 6.1. Sample and Procedure

The data for the study are extracted from samples of American union and nonunion supervisors and subordinates. Collected between September 2022 and October 2024, the data were used to test hypothesized models, in which humility at work was positioned as a predictor variable [11,14,49].

For the present study, the samples were combined into one sample based on a selection of variables: age, gender, supervisory status, union status, and items that comprise the humility at work scale. The combined sample N was 1002 (hereafter referred to as the Combined Sample).

Two subset samples within the Combined Sample included items that comprised six other measures. The measures were used to address the convergent-discriminant validity of the humility at work scale. One subsample included scale items for expressed humility, narcissism, and self-esteem competence and is marked as Subsample A (N = 56). The other subsample included scale items for modesty, empathy, and self-deception enhancement and is marked as Subsample B (N = 55).

In reference to the Combined Sample, the data were collected at non-work community sites (e.g., farmers' markets, commuter train stations) by undergraduate researchers trained in survey field research. With permission obtained at each site, the researchers circulated flyers with the following information:

*Can you volunteer to take this survey? You can if you are employed in the United States and not a full-time student. The survey is anonymous—no names. The survey takes less than 10 min to complete. The survey cannot be mailed. \$5 is given for taking the survey. Please ask the researcher for a survey.*

Employees who responded to the flyer were given a no-name informed consent form, a survey, a pencil, and an unmarked envelope. The researchers collected sealed envelopes, paid participants, and conducted onsite debriefing.<sup>2</sup>

Employees who completed surveys were employed in the District of Columbia and 22 U.S. States: Alabama, California, Connecticut, Georgia, Louisiana, Maine, Maryland, Massachusetts, Michigan, Mississippi, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Tennessee, Texas, Vermont, Virginia, Washington, and Wisconsin.

### 6.2. Measures for the Combined Sample

**Demographics.** Age was indicated in years. Gender was coded as either man (0) or woman (1). Supervisory status was coded as either subordinate (0) or supervisor (1). Union status was coded as either nonunion employee (0) or union employee (1).

For the Combined Sample, the median age was 42 (the mean was 42.78). Fifty-three percent were women employees. Forty-eight percent reported supervisory duties. Eighteen percent were union employees.

For Subsample A, the median age was 42 (the mean was 44.27). Sixty-six percent were women employees. Forty-three percent reported supervisory duties. Sixteen percent were union employees.

For Subsample B, the median age was 42 (the mean was 41.91). Fifty-six percent were women employees. Thirty-two percent reported supervisory duties. Twenty-four percent were union employees.

**Humility at work.** Humility at work was assessed with the 10 items of the Humility at Work Scale (see [11] and Appendix A).

The items were prefaced with the following statements:

*“We are interested in **the person you are now**—**not** the person you might strive to be in the future.*

*Please read each item carefully”.*

The statements were followed with a response instruction:

*“If this is **the person you are now**, check (✓) the blank.*

*If this is **not the person you are now**, do **not** check (✓) the blank”.*

The items were followed with an additional item asking whether all the items had been read.

The responses were coded as follows: check = 1, no check = 0.

Scale scores are based on average item responses, yielding continuous scores from 0 (less humility at work) to 1.00 (more humility at work).

### 6.3. Measures for Subsamples A and B

Items for Subsamples A and B measures were presented in a random order and prefaced with the following statements:

*“We are interested in how you would describe yourself at work.*

*For every item, write in one number using the following scale.*

*Please read each item carefully”.*

Responses were based on a Likert scale: *Never* = 1, *Sometimes* = 2, *As often as not* = 3, *Often* = 4, *Always* = 5.

**Expressed humility.** Expressed humility was indexed with four items adapted from the Expressed Humility Scale [28].

Two example items are given below:

*"I am someone who often compliments others on their strengths".*

*"I am someone who actively seeks feedback, even if it is critical".*

To assess inter-item response consistency, Cronbach's alpha ( $\alpha$ )—a coefficient estimate of the average inter-item covariance set on a metric of 0.00 to 1.00—was calculated. The  $\alpha$  was 0.88.

Scale scores are based on average item responses, yielding continuous scores from 0 (less expressed humility) to 1.00 (more expressed humility).

**Modesty.** Modesty was measured with four items adapted from the Modest Behavior Scale [27].

Two example items are given below:

*"I am someone who likes to tell others about my accomplishments". (reversed scored)*

*"I am someone who likes to show off around others". (reversed scored)*

The  $\alpha$  was 0.85.

Scale scores are based on average item responses, yielding continuous scores from 0 (less modesty) to 1.00 (more modesty).

**Empathy.** Empathy was indexed with four items adapted from the Perspective-Taking Subscale, with additional items drawn from the Empathy Scale [43,44].

Two example items are given below:

*"I am someone who is comfortable with "walking around" in another person's shoes".*

*"I am someone who is really interested in how other people feel".*

The  $\alpha$  was 0.88.

Scale scores are based on average item responses, yielding continuous scores from 0 (less empathy) to 1.00 (more empathy).

**Narcissism.** Narcissism was measured with four items adapted from the Narcissistic Personality Inventory [45,46].

Two example items are given below:

*"I am someone who thrives on having power over others".*

*"I am someone who likes being the center of attention".*

The  $\alpha$  was 0.86.

Scale scores are based on average item responses, yielding continuous scores from 0 (less narcissism) to 1.00 (more narcissism).

**Self-esteem competence.** Self-esteem competence was assessed with four items adapted from the Self-Esteem Scale [47,50].

Two example items are given below:

*"I am someone who certainly feels useless at times". (reversed scored)*

*"I am someone who is able to do things as well as most people".*

The  $\alpha$  was 0.83.

Scale scores are based on average item responses, yielding continuous scores from 0 (less self-esteem competence) to 1.00 (more self-esteem competence).

**Self-deception enhancement.** Self-deception enhancement was measured with four items adapted from the Self-Deceptive Enhancement Scale, a subscale of the Balanced Inventory of Desirable Responding [48,51].

Two example items are given below:

*“I am someone who is 100% honest with myself”.*

*“I am someone who is a completely rational person”.*

The  $\alpha$  was 0.87.

Scale scores are based on average item responses, yielding continuous scores from 0 (less self-deception enhancement) to 1.00 (more self-deception enhancement).

## 7. Results

### 7.1. Item-Content Validity

To determine distinctive item-domains (if any), principal component analyses (PCAs) were performed. PCA applied to items as variables considers the full variance in the data (unlike common factor analysis), in that the diagonal of the inter-item correlation matrix consists of unities (1.00s), bringing the full variance into the factor matrix. The matrix contains the factor loadings of items on extracted factors, in which the loadings are the correlations between factors and items. Assuming linear relationships and some correlated factors, calculated eigenvalues ( $\lambda$ s) represent the total variance explained by each factor, in which factors with eigenvalues greater than or equal to 1.00 are considered distinctive linear combinations of shared item-factor variance.

### 7.2. PCAs for the Combined Sample

**Initial PCA (One-Factor).** To test whether the construct has no distinctive item-domains (i.e., is a one-domain construct), a PCA was performed on the items limited to one factor. The analysis produced four factors with eigenvalues greater than 1.00,  $\lambda$ s = 2.115, 1.905, 1.548, and 1.129, respectively, suggesting the presence of four factors.

Forced onto a single factor, the factor loadings ranged from 0.415 to 0.649 (see Table 1), in which three items failed to load on the factor (loadings < 0.300) due to near-zero extraction values (<0.050), values that indicate the proportion of explained variance for an item in reference to an extracted factor (or extracted factors) with initial extraction values set at 1.00.

**Table 1.** Principal component analysis: loadings limited to one-factor.

	Factor
Item	1
H7	0.649
H4	0.606
H2	0.604
H6	0.520
H8	0.447
H5	0.425
H10	0.415
H1	
H9	
H3	

Note. N = 1002. Blank = loading < 0.300.

The items that failed to load on the single factor were H1, H3, and H9 (see Appendix A).

**Second PCA (Two-Factors).** To test whether the construct has two distinctive item-domains (i.e., is a two-domain construct), a second PCA was performed in which factors



were limited to two factors. The cumulative percent of variance explained by the two factors was 40.196.

Forced onto two factors, all items loaded on a factor (see Table 2).

**Table 2.** Principal component analysis: loadings limited to two factors.

Item	Factors	
	1	2
H7	0.866	
H4	0.807	
H2	0.798	
H6		0.690
H8		0.631
H10		0.569
H1		0.550
H5		0.532
H9		0.335
H3		0.311

Note. N = 1002.

After Oblimin rotation—an axis rotation for assumed correlated factors to clarify factor loadings—the loadings for the first factor ranged from 0.798 to 0.866. The three items that loaded on the factor were the following:

**H2.** *I tell others at work that my ability to do my job is linked to teachers, mentors, supervisors, and coworkers who took the time to show me the way.*

**H4.** *I am more than happy to let others at work take the limelight for accomplishments that have included my work.*

**H7.** *I tell others at work that “I am no one to apologize to”—that I have made similar mistakes.*

Based on the item content, the three-item component is interpreted as reflected willingness to express humility. As such, the item-domain was labeled as *expressive humility at work*.

The factor loadings for the second factor ranged from 0.311 to 0.690, in which all remaining items loaded on the factor.

**Third PCA (Three-Factors).** To test whether the construct has three distinctive item-domains (i.e., is a three-domain construct), a third PCA was performed in which factors were limited to three factors. The cumulative percent of variance explained by the three factors was 55.674.

Forced onto three factors, all items loaded on a factor (see Table 3).

After Oblimin rotation, the factor loadings for the first factor ranged from 0.798 to 0.839. The three items that loaded on the factor were the same three items that comprised the labeled expressive humility item-domain (viz., H2, H4, and H7).

The factor loadings for the second factor ranged from 0.513 to 0.719, in which items H1, H5, H6, H8, and H10 loaded on the factor.

The factor loadings for the third factor were 0.877. The two items that loaded on the factor were the following:

**H3.** *If offered a promotion, I would inquire about whether those who have supported my work can be offered a promotion too.*

**H9.** *If offered a pay raise, I would inquire about whether those who have supported my work can be offered a raise too.*

**Table 3.** Principal component analysis: loadings limited to three factors.

Item	Factors		
	1	2	3
H7	0.839		
H4	0.813		
H2	0.798		
H6		0.719	
H8		0.663	
H10		0.569	
H5		0.522	
H1		0.513	
H3			0.877
H9			0.877

Note. N = 1002.

Based on the item content, the two-item component is interpreted as reflected willingness to enact humility. As such, the item-domain was labeled as *effective humility at work*.

**Fourth PCA (Four-Factors).** To test whether the construct has four distinctive item-domains (i.e., is a four-domain construct), a fourth PCA was performed in which factors were limited to four factors. The cumulative percent of variance explained by the four factors was 66.960.

All the items loaded on a factor (see Table 4).

**Table 4.** Principal component analysis: loadings for four factors.

Item	Factors			
	1	2	3	4
H7	0.850			
H4	0.808			
H2	0.813			
H5		0.801		
H6		0.738		
H10		0.663		
H9			0.884	
H3			0.878	
H1				0.840
H8				0.807

Note. N = 1002.

After Oblimin rotation, the factor loadings for the first factor ranged from 0.813 to 0.850. The three items that loaded on the factor were the same three items that comprised the labeled expressive humility item-domain (viz., H2, H4, and H7).

The factor loadings for the second factor ranged from 0.663 to 0.801. The three items that loaded on the factor were the following:

**H5.** *It is not hard for me to admit to others at work when I run up against the limits of my abilities.*

**H6.** *When asked to discuss my accomplishments at work, I make it a point to name those who have contributed to my work.*

**H10.** *When asked by others to listen to ideas or suggestions about work, I make it a point to ignore status, tenure, and position—I simply listen.*

Based on the item content, the three-item component is interpreted as reflected willingness to engage in supportive humility. As such, the item-domain was labeled as *supportive humility at work*.

The factor loadings for the third factor ranged from 0.878 to 0.884. The two items that loaded on the factor were the same two items that comprised the labeled effective humility item-domain (viz., H3 and H9).

The factor loadings for the fourth factor ranged from 0.807 to 0.840. The two items that loaded on the factor were the following:

**H1.** *When I think about how many qualified individuals could hold my job, I feel thankful to have it.*

**H8.** *Ever mindful of the years of sacrifice and preparation to qualify for my job, I still feel lucky to have it.*

Based on the item content, the two-item component is interpreted as reflected willingness to appreciate one's good fortune. As such, the item-domain was labeled as *appreciative humility at work*.<sup>3</sup>

### 7.3. PCAs for Supervisors and Subordinates

The PCAs were rerun with supervisors and subordinates considered separately (Ns = 481, 521, respectively). The results of these analyses were nearly identical to the results for the Combined Sample, with the four-factor PCA showing the same items loaded on the same factors.

For supervisors, produced eigenvalues greater than 1.00 were 2.137, 1.713, 1.571, and 1.171, respectively, suggesting the presence of four factors. The cumulative percent of variance explained was 65.925.

For subordinates, produced eigenvalues greater than 1.00 were 2.137, 2.074, 1.514, and 1.097, respectively, suggesting the presence of four factors. The cumulative percent of variance explained was 68.222.

### 7.4. PCAs for Union and Nonunion Employees

The PCAs were rerun with union and nonunion employees considered separately (Ns = 180, 822, respectively). The results of these analyses were nearly identical to the results for the Combined Sample, with the four-factor PCA showing the same items loaded on the same factors.

For union employees, produced eigenvalues greater than 1.00 were 2.114, 1.948, 1.627, and 1.126, respectively, suggesting the presence of four factors. The cumulative percent of variance explained was 68.148.

For nonunion employees, produced eigenvalues greater than 1.00 were 2.141, 1.931, 1.517, and 1.107, respectively, suggesting the presence of four factors. The cumulative percent of variance explained was 66.956.

### 7.5. Summary of PCAs

In reference to *Research Question 1*, for the Combined Sample, for supervisors and subordinates considered separately, and for union and nonunion employees considered separately, four interpretable factors were identified, in which four distinctive item-domains may be represented as subscales of the humility at work scale (for a list of items by domains, see Appendix A).

### 7.6. Subscale Reliabilities

With an eye on item-subscale usability,  $\alpha$ s were calculated to indicate average inter-item covariance within subscales based on the Combined Sample, based on supervisors

and subordinates considered separately, and based on union employees and nonunion employees considered separately (see Table 5).

**Table 5.** Scale reliabilities ( $\alpha$ s).

Subscale	$\alpha$
Combined Sample <sup>a</sup>	
Expressive humility	0.75
Supportive humility	0.59
Effective humility	0.73
Appreciative humility	0.58
Supervisors <sup>b</sup>	
Expressive humility	0.71
Supportive humility	0.61
Effective humility	0.73
Appreciative humility	0.49
Subordinates <sup>c</sup>	
Expressive humility	0.79
Supportive humility	0.56
Effective humility	0.72
Appreciative humility	0.63
Union Employees <sup>d</sup>	
Expressive humility	0.70
Supportive humility	0.57
Effective humility	0.79
Appreciative humility	0.66
Nonunion Employees <sup>e</sup>	
Expressive humility	0.77
Supportive humility	0.59
Effective humility	0.71
Appreciative humility	0.56

Note. <sup>a</sup>N = 1002; <sup>b</sup>N = 481; <sup>c</sup>N = 521; <sup>d</sup>N = 180; <sup>e</sup>N = 822.

For the Combined Sample,  $\alpha$ s greater than 0.70 were observed for expressive humility and effective humility subscales, with 0.75 and 0.73, respectively.

For supervisors,  $\alpha$ s greater than 0.70 were observed for expressive humility and effective humility subscales, at 0.71 and 0.73, respectively. For subordinates,  $\alpha$ s greater than 0.70 were observed for the same two subscales, with 0.79 and 0.72, respectively.

For union employees,  $\alpha$ s greater than (or equal to) 0.70 were observed for expressive humility and effective humility subscales, at 0.70 and 0.79, respectively. For nonunion employees,  $\alpha$ s greater than 0.70 were observed for the same two subscales, with 0.77 and 0.71, respectively.

### 7.7. Convergent-Discriminant Validity

Zero-order correlations ( $r$ s) for Subsamples A and B variables are presented in Table 6; Table 7, first by all employees within samples and then by supervisors and subordinates considered separately.<sup>4</sup>

In the tables, expected convergent coefficients (i.e., coefficients expected to be significantly greater than zero;  $p$ s < 0.05) and expected discriminant coefficients (i.e., coefficients not expected to be significantly different from zero;  $p$ s > 0.05) are presented within rectangular frames.

**Table 6.** Zero-order correlations (*r*s) for Subsample A.

Variable	1	2	3	4	5	6	7	8	9	10	11
All Employees <sup>a</sup>											
1. Age	—										
2. Gender	0.01	—									
3. Supervisory status	0.12	−0.22	—								
4. Union status	−0.29 *	0.11	−0.08	—							
5. Expressed humility	−0.06	−0.20	0.48 **	0.04	—						
6. Narcissism	0.06	0.07	−0.30 *	−0.01	−0.64 **	—					
7. Self-esteem competence	−0.12	−0.00	−0.02	0.13	0.31 *	−0.13	—				
8. Expressive humility	−0.02	−0.22	0.41 **	0.21	<b>0.61 **</b>	<b>−0.58 **</b>	<b>0.34 *</b>	—			
9. Supportive humility	0.03	0.06	0.09	−0.02	0.12	−0.10	0.24	0.21	—		
10. Effective humility	−0.27 *	0.15	−0.08	0.13	−0.03	0.10	0.19	0.11	−0.17	—	
11. Appreciative humility	0.05	−0.14	0.20	−0.12	<b>0.38 **</b>	<b>−0.29 *</b>	0.18	0.34 **	0.08	0.04	—
Supervisors <sup>b</sup>											
1. Age	—										
2. Gender	0.16	—									
3. Supervisory status	—	—	—								
4. Union status	−0.18	0.10	—	—							
5. Expressed humility	−0.42 *	0.04	—	0.10	—						
6. Narcissism	−0.22	−0.19	—	0.15	−0.33	—					
7. Self-esteem competence	−0.10	0.07	—	−0.04	0.05	0.07	—				
8. Expressive humility	0.05	−0.10	—	0.00	0.29	−0.20	0.18	—			
9. Supportive humility	0.09	−0.08	—	0.18	−0.1	−0.05	<b>0.56 **</b>	0.48 *	—		
10. Effective humility	−0.52 **	0.41 *	—	0.10	−0.03	0.09	0.06	−0.22	−0.25	—	
11. Appreciative humility	−0.07	0.30	—	−0.27	<b>0.46 *</b>	<b>−0.34 *</b>	0.27	0.43 *	0.17	−0.04	—
Subordinates <sup>c</sup>											
1. Age	—										
2. Gender	−0.05	—									
3. Supervisory status	—	—	—								
4. Union status	−0.34	0.09	—	—							
5. Expressed humility	−0.04	−0.19	—	0.09	—						
6. Narcissism	0.25	0.13	—	−0.12	−0.68 **	—					
7. Self-esteem competence	−0.13	−0.05	—	0.24	0.48 **	−0.24	—				
8. Expressive humility	−0.12	−0.18	—	0.38 *	<b>0.57 **</b>	<b>−0.63 **</b>	<b>0.46 **</b>	—			
9. Supportive humility	−0.02	0.22	—	−0.13	0.01	−0.09	0.02	0.07	—		
10. Effective humility	−0.10	−0.12	—	0.15	0.06	−0.07	0.30	0.34	−0.11	—	
11. Appreciative humility	0.09	−0.42 *	—	−0.01	<b>0.29 *</b>	−0.22	0.12	0.24	−0.01	0.13	—

Note. <sup>a</sup>N = 56; <sup>b</sup>N = 24; <sup>c</sup>N = 32. Age: in years; gender: *man* = 0, *woman* = 1; supervisory status: *subordinate* = 0, *supervisor* = 1; union status: *nonunion employee* = 0, *union employee* = 1; expressed humility, narcissism, self-esteem competence: *never* = 1, *always* = 5; expressive humility, supportive humility, effective humility, appreciative humility: *less* = 0, *more* = 1. \* *p* < 0.05. \*\* *p* < 0.01.

**Table 7.** Zero-order correlations (*r*s) for Subsample B.

Variable	1	2	3	4	5	6	7	8	9	10	11
All Employees <sup>a</sup>											
1. Age	—										
2. Gender	−0.13	—									
3. Supervisory status	0.16	−0.33 *	—								
4. Union status	−0.28 *	0.14	−0.33 *	—							
5. Modesty	−0.11	0.17	−0.03	0.01	—						
6. Empathy	−0.02	0.03	0.27 *	−0.23	−0.04	—					
7. Self-deception	−0.03	−0.12	0.09	−0.29 *	−0.08	0.54 **	—				
8. Expressive humility	−0.25	0.12	0.14	−0.25	<b>0.50 **</b>	<b>0.41 **</b>	0.12	—			
9. Supportive humility	0.04	−0.13	0.25	−0.09	<b>0.26 *</b>	<b>0.29 *</b>	−0.02	0.29 *	—		
10. Effective humility	−0.09	−0.16	0.01	−0.23	−0.07	−0.13	0.13	0.20	−0.11	—	
11. Appreciative humility	−0.10	−0.01	0.13	0.11	<b>0.22 *</b>	0.12	−0.13	0.26	0.08	0.12	—
Supervisors <sup>b</sup>											
1. Age	—										
2. Gender	−0.10	—									
3. Supervisory status	—	—	—								
4. Union status	0.09	0.31	—	—							
5. Modesty	0.00	0.39	—	0.03	—						
6. Empathy	−0.05	0.26	—	0.18	−0.01	—					
7. Self-deception	0.13	−0.15	—	0.01	−0.25	0.22	—				
8. Expressive humility	−0.14	0.36	—	−0.09	<b>0.65 **</b>	0.35	−0.21	—			
9. Supportive humility	0.32	0.02	—	0.12	0.22	<b>0.47 *</b>	−0.30	0.19	—		
10. Effective humility	0.29	−0.08	—	−0.14	0.09	−0.02	0.25	−0.01	−0.14	—	
11. Appreciative humility	−0.26	0.14	—	0.16	0.22	0.15	−0.02	0.04	0.09	−0.03	—
Subordinates <sup>c</sup>											
1. Age	—										
2. Gender	−0.07	—									
3. Supervisory status	—	—	—								
4. Union status	0.42 *	−0.03	—	—							
5. Modesty	−0.14	0.07	—	−0.01	—						
6. Empathy	−0.07	0.09	—	−0.22	−0.04	—					
7. Self-deception	−0.12	−0.08	—	−0.35 *	−0.02	0.65 **	—				
8. Expressive humility	−0.32	0.08	—	−0.26	<b>0.47 **</b>	<b>0.41 *</b>	0.25	—			
9. Supportive humility	−0.13	−0.09	—	−0.04	<b>0.30 *</b>	0.17	0.07	0.30	—		
10. Effective humility	−0.24	0.20	—	−0.29	−0.12	−0.04	0.08	0.28	−0.10	—	
11. Appreciative humility	−0.06	−0.03	—	0.18	0.23	0.07	−0.19	0.34 *	0.03	0.19	—

Note. <sup>a</sup>N = 55; <sup>b</sup>N = 20; <sup>c</sup>N = 35. Age: in years; gender: *man* = 0, *woman* = 1; supervisory status: *subordinate* = 0, *supervisor* = 1; union status: *nonunion employee* = 0, *union employee* = 1; modesty, empathy, self-deception [enhancement]: *never* = 1, *always* = 5; expressive humility, supportive humility, effective humility, appreciative humility: *less* = 0, *more* = 1. \* *p* < 0.05. \*\* *p* < 0.01.

### 7.8. Coefficients for Subsample A

For all employees within Subsample A, expected convergent coefficients were seen between expressive humility and expressed humility ( $r = 0.61, p < 0.01$ ) and narcissism ( $r = -0.58, p < 0.01$ ), and between appreciative humility and expressed humility ( $r = 0.38, p < 0.01$ ) and narcissism ( $r = -0.29, p < 0.05$ ).

Also, for all employees within Subsample A, expected discriminant coefficients were seen between three of four of the humility subscales and self-esteem competence ( $r$ s between 0.18 and 0.24,  $p$ s  $> 0.05$ ), with expressive humility as the exception ( $r = 0.34, p < 0.05$ ).

For supervisors within Subsample A, an unexpected discriminant coefficient was seen between supportive humility and self-esteem competence ( $r = 0.56, p < 0.01$ ). Also, for subordinates within Subsample A, an unexpected discriminant coefficient was seen between expressive humility and self-esteem competence ( $r = 0.46, p < 0.01$ ).

### 7.9. Coefficients for Subsample B

For all employees within Subsample B, expected convergent coefficients were seen between expressive humility and modesty ( $r = 0.50, p < 0.01$ ) and empathy ( $r = 0.41, p < 0.01$ ), between supportive humility and modesty ( $r = 0.26, p < 0.05$ ) and empathy ( $r = 0.29, p < 0.05$ ), and between appreciative humility and modesty ( $r = 0.22, p < 0.05$ ).

Also, for all employees within Subsample B, expected discriminant coefficients were seen between all four humility subscales and self-deception enhancement ( $r$ s = between  $-0.13$  and  $0.13, p$ s  $> 0.05$ ).

For supervisors and subordinates within Subsample B, unexpected convergent and discriminant coefficients were not seen.

### 7.10. Summary of Convergent and Discriminant Coefficients

In reference to *Research Question 2*, for all employees within Samples A and B, scores yielded by the humility at work subscales showed expected nonzero positive and negative covariation with scores of other measures with elements related to the humility construct, with the exception of scores yielded by the effective humility subscale.

In reference to *Research Question 3*, for all employees within Samples A and B, scores yielded by the humility at work subscales showed expected near-zero covariation with scores of other measures with elements unrelated to the humility construct.

### 7.11. Subscale Post Hoc Descriptive Analyses

Excluding expected convergent coefficients, coefficients significantly different from zero seen for all employees within Subsample A were not seen for all employees within Subsample B (e.g., the coefficient between expressive humility and supervisory status,  $r = 0.41, p < 0.01$ ), and likewise, coefficients significantly different from zero seen for all employees within Subsample B were not seen for employees within Subsample A (e.g., the coefficient between expressive humility and supportive humility,  $r = 0.29, p < 0.05$ ).

To discern subscale mean differences within the Combined Sample and within Subsamples A and B for supervisors versus subordinates and for union employees versus nonunion employees,  $t$ -tests were performed.

On average, within the Combined Sample, supervisors were more likely to indicate more supportive humility and more appreciative humility than subordinates,  $t_{s(1000)} \geq 3.205$ ,  $p$ s  $< 0.01$ , mean differences = 0.064, 0.098, 95% confidence intervals (CIs) [0.025, 0.103], [0.049, 0.147], Cohen's standardized effect sizes ( $d$ s) = 0.317, 0.394, respectively.

On average, within the Combined Sample, union employees were more likely to indicate more supportive humility than nonunion employees,  $t_{s(1000)} = 2.826, p < 0.01$ , mean difference = 0.074, 95% CI [0.023, 0.125], Cohen's  $d = 0.317$ .

On average, Subsample A supervisors were more likely to indicate more expressive humility than Subsample A subordinates,  $t(54) = 3.342$ ,  $p < 0.01$ , mean difference = 0.233, 95% CI [0.093, 0.372], Cohen's  $d = 0.258$ .

## 8. Overall Summary

In reference to our research questions about the item-content validity and convergent-discriminant validity of the humility at work scale, published and unpublished data collected across samples of employees provide answers. First, item-content validity is suggested for more than one content domain, each of which is interpretable in reference to the humility at work construct and, in keeping with the intent of the performed analyses, can be suggested as linear item-content domains. The four distinctive item-domains are identified as willingness to express humility (expressive humility at work), willingness to engage in supportive humility (supportive humility at work), willingness to enact humility (effective humility at work), and willing to appreciate one's good fortune (appreciative humility at work). As such, a claim of item-content validity can be made for item-subscale scores that represent the item-domains. Second, convergent-discriminant validity is suggested for item-subscales in reference to scores yielded by measures of constructs that are thought to be related to the humility at work construct and by measures thought to be unrelated to the construct. Notably, based on all subsampled employees, convergent coefficients were shown for expressive humility, supportive humility, and appreciative humility subscale scores. Convergent coefficients were not shown for effective humility subscale scores. Also notably, based on all subsampled employees, discriminant coefficients were consistent with all subscale scores, exempting one coefficient. As such, a claim of convergent-discriminant validity can be made for three of the four item-subscales.

### 8.1. What's Valid, What's Not?

Inspection of the item-content of the effective humility subscale may provide clues for future studies as to why the subscale did not show the expected convergent validity and how research questions might be asked to examine the deficient validity claim.<sup>5</sup> Like the items of the other humility subscales identified in the study to examine convergent validity, the items of the effective humility subscale ask respondents to present their estimate of low to modest self-importance at work, and notably in regard to their experience at work. However, in contrast to the item-content of the other humility subscales—wherein there is no suggestion or hint of possible unwanted consequences for self or others—a second look at the item-content of the effective humility subscale suggests the possibility that respondents might weigh their responses against the prospect of unwanted consequences—especially unwanted consequences for oneself at work.

To elaborate, we think it is possible that the effective humility subscale items that ask respondents to indicate whether they are willing to enact their low to modest self-importance by asking whether others who have contributed to their work might also be given a promotion or a pay raise might be seen by respondents as asking them to endorse a position on personnel decisions that might be “out-of-step” with how actual decisions are made in their organization. Due to this possibility and possibly others, we encourage future studies to introduce and test interactive (i.e., moderated) relationships between responses to the effective humility items and perceptual and situational characteristics of the work environment. In the case of effective humility items and personnel decisions, to be checked as a moderator is whether such decisions are strictly top-down (e.g., exclusive to management) or partially bottom-up (e.g., open to subordinate and/or peer nominations), and whether one's endorsement of the effective humility items might correspond to an out-of-step concern. Perhaps as seed information for such an interactive study and others,



using interviews and focus groups with respondents might shed light on a host of other unwanted perceptual consequences that reveal why respondents might endorse effective humility items differently in contrast to other like scale items.

More generally, we think future validation studies are warranted to examine the convergent-discriminant validity of all four item-subcales, in that our study is limited by small subsamples that reduce the ability to detect meaningful relationships (i.e., detect nonrandom covariation). In such studies, we suggest added attention to stratified sampling of supervisors and subordinates within broader workforces to address issues of limited generalization of results seen in any one study, and, equally important, added attention to sampling across diverse industries, organizational cultures, and organizational structures. In reference to the latter, yet to be detected are cross-level associations, in which workplace variables such as team-level psychological safety [52] or industry-level norms [53] may be linked to perceptions of humility at work, in that, for example, in top-down organizations such as law firms, finance, and the military, it is possible that humility may be seen as a weakness, whereas in collaborative fields such as healthcare, education, and non-profits, it is possible that humility may be more encouraged.<sup>6</sup>

### 8.2. *What's Suggestive, What's Supportive?*

The item-content validity and the partial convergent-discriminant validity for the item-subcales suggest the prospect of latent elements of the humility at work construct, two of which were detected in a prior study. Specifically, expressive, supportive, effective, and appreciative humility as elements of the construct were not detected in a published subsample of the present data, in which humility scale scores were used to test a prediction model with union outcomes [11]. In contrast, expressive and effective humility as elements of the construct were detected in a published subsample of the present data, in which as identified components, subscale scores were included in a prediction model test with willingness to join a union as an outcome [14]. As such, in light of the present study, supportive and appreciative humility as elements of the construct may be considered as suggestive and targeted for exploratory modeling in future studies. And, in contrast, expressive and effective humility as elements of the construct may be considered as supportive and targeted for confirmatory modeling in future studies.

### 8.3. *What's Applicable?*

The prospective identification of four latent elements of the humility at work construct and item-subcales for each element widens scale usability. For example, consider the use of the expressive humility subscale items to stimulate discussions among new hires positioned to work as team members (e.g., *"happy to let others take the limelight for accomplishments that have included my work"*), and aligned with the same purpose, the use of the supportive humility subscale items for new hires positioned as team leaders (e.g., *"make it a point to ignore, status, tenure, and position—I simply listen"*), the use of the effective humility subscale items for team members and leaders to prioritize team rewards over (or make equitable with) individual rewards (e.g., *"inquire about whether those who have supported my work can be offered a promotion too"*), and the use of the appreciative humility subscale items for members and leaders to dampen the disruptive effects of individual-level narcissism on team-level cooperation and cohesion (e.g., *"when I think about how many individuals could hold my job, I feel thankful to have it"*).<sup>7</sup>

## 9. Conclusions

Offered for consideration is further evidence of construct validity for the humility at work scale, adding item-content validity and convergent-discriminant validity to concur-

rent validity in reference to four emergent and interpretable item-content domains, each of which may suggest a latent element of the humility at work construct, and each of which may be represented as an item-subscale. Suggested for further consideration are validation studies to explore and confirm the item-subscales to support their use in prediction models in which psychological elements are thought to bear on the experience of supervisor and subordinate employees in union and nonunion work environments.

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## Appendix A

### Humility at Work Scale by Distinctive Item-Domains (Four Factors)

#### Expressive Humility

**H2.** *I tell others at work that my ability to do my job is linked to teachers, mentors, supervisors, and coworkers who took the time to show me the way.*

**H4.** *I am more than happy to let others at work take the limelight for accomplishments that have included my work.*

**H7.** *I tell others at work that "I am no one to apologize to"—that I have made similar mistakes.*

#### Supportive Humility

**H5.** *It is not hard for me to admit to others at work when I run up against the limits of my abilities.*

**H6.** *When asked to discuss my accomplishments at work, I make it a point to name those who have contributed to my work.*

**H10.** *When asked by others to listen to ideas or suggestions about work, I make it a point to ignore status, tenure, and position—I simply listen.*

#### Effective Humility

**H3.** *If offered a promotion, I would inquire about whether those who have supported my work can be offered a promotion too.*

**H9.** *If offered a pay raise, I would inquire about whether those who have supported my work can be offered a raise too.*

### Appreciative Humility

**H1.** *When I think about how many qualified individuals could hold my job, I feel thankful to have it.*

**H8.** *Ever mindful of the years of sacrifice and preparation to qualify for my job, I still feel lucky to have it.*

Note. H = Humility item; # = order in which item was presented.

## Notes

<sup>1</sup> For a reference list of sources, see [11].

<sup>2</sup> Payment for participation was intended as a form of gratitude (i.e., as a way of saying “thank you”). Against the prospect that payment may have induced nonvoluntary participation, true to the italicized wording on the flyer and on the informed consent form, payment was offered for “*taking the survey*” rather than for completing the survey. Notably, many participants chose to forgo the payment.

<sup>3</sup> In reference to the four factors, coefficients in the component correlation matrix (a matrix of coefficients between factors) ranged from 0.007 to 0.155, with an average coefficient of 0.057.

<sup>4</sup> Correlation tables for Subsamples A and B union employees and nonunion employees are available from the first author via email. The tables are not included in the article due to extremely low Ns for union employees (N = 9 in Subsample A; N = 13 in Subsample B).

<sup>5</sup> As a demonstration of construct validity, to be noted is that evidence of discriminant validity without evidence of convergent validity or vice versa represents a deficient validity claim (for deficient examples and noted issues, see [40]).

<sup>6</sup> Another study limitation to be noted is the less than 0.70 alphas for the supportive and appreciative humility subscales, and in particular caution is suggested for the use of these two subscales in prediction model tests. However, as a helpful reminder, alpha increases as a function of number of scale items (i.e., the numerator of the coefficient is calculated as the average inter-item covariance among the items multiplied by the number of items). In this light, it can be suggested that under conditions of first-study identification of component scales with 3 items (the supportive humility subscale) and 2 items (the appreciative humility subscale), alphas in the 0.49 to 0.66 range represent notable covariance. In that we encourage the use of the supportive and appreciative humility subscales in future exploratory model tests, perhaps to be settled is where alphas for these component scales tend to plateau across samples and by type of employment status.

<sup>7</sup> For other applied examples of scale items use to facilitate cooperative work, see Duhigg [54] and Rozovsky [55].

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