

An Overview of the Trait Truthful Communication Scale: Conceptual Foundations and Psychometric Properties

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Purpose:

The purpose of this document is to present the Trait Truthful Communication (T-TCS) scale, to describe its conceptual foundation, and to provide initial evidence of its psychometric quality. This document is brief and is intended for researchers who are considering using the T-TCS scale in their own work. At some point, the material summarized briefly in this document will (hopefully) be presented in detail in a full article.

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I. Conceptual basis

The T-TCS was designed to assess a construct defined as:

The tendency toward expressing one's beliefs accurately and faithfully. People with high levels of this trait tend toward expressing their beliefs accurately, truthfully, and in a way that avoids being misleading (about those beliefs) when communicating with others. Even in situations that might make such truthfulness difficult, uncomfortable, or costly, they are relatively oriented toward truthful expression. People with lower levels of this trait are less oriented toward expressing their beliefs accurately and truthfully, perhaps even tending toward deception.

As a trait construct, the construct includes several components*:

- a) an **evaluative** component (the belief that truthful/non-misleading communication is “correct” and “the right thing”, morally speaking)
- b) an **affective** component (experiencing guilt and/or shame in instances where one fails to express their beliefs faithfully, or anticipating those feelings if one were to fail to express beliefs faithfully)
- c) a **motivational** component (desiring that others know one's actual beliefs, when those beliefs are expressed)
- d) a **behavioral** component (actually expressing one's beliefs faithfully and non-misleadingly, not intentionally misleading others)

* Initially, we also included a component related to self-perception/reputation. However, we dropped this in part because we believe that self-perception/reputation arise largely from one's pattern of cognition, emotion, motivation, and behavior as reflected in a through d above. We thus focused on only those components.

In terms of “*expressing one's beliefs accurately and faithfully*” the term “beliefs” is used broadly here, to reflect issues including:

- a) one's understanding of objective physical or temporal facts (e.g., what day of the week it is)
- b) one's interpretation/evaluation of physical or temporal facts (e.g., whether the weather is “warm”)
- c) one's recollection of events (e.g., what happened during an argument)
- d) one's understanding of other people's psychological states and traits (e.g., whether Mischel argues that personality does not exist)
- e) one's opinions or attitudes (e.g., whether one enjoyed a dinner, how one feels about Joe Biden)

Note that, on this view, if your beliefs are wrong (objectively speaking) but you express them accurately, then you are “truth-speaking” according to this definition. This does push up against a situation in which one intentionally remains ignorant of the truth, in order to remain committed to a belief that is preferred but factually incorrect. By the current definition, that person (if she/he truly does hold that incorrect belief) is “truth-speaking” in the sense of faithfully expressing his/her beliefs. That person might be seen to fall short of full-fledged “honesty” in some sense but would be seen as truth-speaking.

II. Item generation and initial refinement

A. Item generation (Item pool 1, 148 items)

- The definition of the construct was given to seven Honesty Project team members. Each person wrote 10-20ish items, for a total of 148 items in item pool 1.

B. Review of Item pool 1, reduce to Item pool 2 (75 items)

- The three project leaders independently reviewed all 148 items, evaluating the conceptual fit and clarity of each. The leaders discussed their reviews and retained 75 items in item pool 2.

C. Content Validity evaluation of Item pool 2, reduce to pool 3 (49 items)

- Ten members of the interdisciplinary Honesty Project team received rating instructions (written and videorecorded) and the definition/description of the construct. Each member (independently) reviewed all items in pool 2, and each item was rated on conceptual fit (to the definition of the construct), likely clarity (to respondents), and psychological component (which component each item reflected). Team members represented psychology and philosophy, and they included faculty, postdoctoral fellows, and graduate students.
- Based on these ratings, we retained items, revised items, and added a handful of items. Item pool 3 thus included 49 items. These items were administered to respondents in Study 1.

III. Study 1 – Internal structure (exploratory), reliability, and final scale refinement

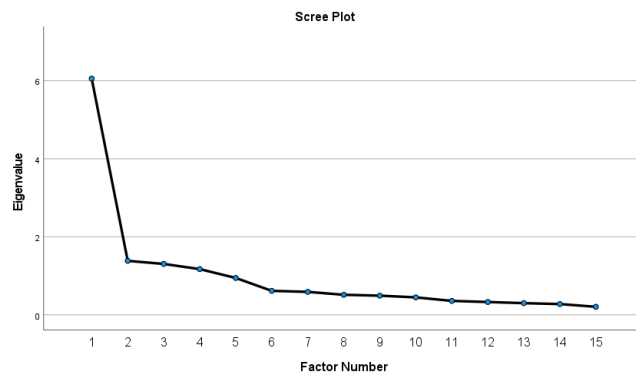
Recruited through Qualtrics Panels, participants (N = 500) responded to the 49 items in pool 3. They used a 5-point scale of agreement (strongly disagree to strongly agree). Participants were instructed to *Please read the statements below and rate how much you agree or disagree with each one.*

A. Internal Structure and final scale refinement

We conducted a series of Exploratory Factor Analyses (EFA), and trimmed items based on statistical and conceptual considerations. For example, it was at this point that we dropped several items that were written to reflect self-perceptions/reputations. In addition, we selected items that both: a) strongly represented a general factor common to all items, and b) strongly represented several more subtle factors that largely mapped onto the psychological components outlined in the definition/description presented earlier in Section I.

Ultimately, we trimmed to 15 items. EFA of these items reveals a strong first factor, as seen in the scree plot. Notably, the first eigenvalue was 5.5 times larger than the second.

In terms of factor loadings, all 15 items load $\geq .45$ in a one-factor structure.



When forcing a 5-factor structure, clear results emerge as intended, with 3 items per factor and no meaningful cross-loadings. Underscoring the fact that all items strongly share a common core, the factors inter-correlated at $|.45|$ to $|.59|$

- Factor 1 – Truth-speaking Values (negatively-keyed items, e.g., “White lies are sometimes OK”)
- Factor 2 – Truth Motivation (e.g., “If someone asks for my opinion, I want that person to know what I truly believe”)
- Factor 3 – Moral Emotions (e.g., “If I lie (or if I were to lie), I feel some shame or guilt”)
- Factor 4 – Truth-speaking Behavior (e.g., “Even if the truth might be hard for someone to hear, I tell the truth”)
- Factor 5 – Lying or Misleading (Deceptive) Behavior (i.e., negatively keyed items e.g. “I often deceive people about my real beliefs”)

The table on the next page presents the item content and factor loadings from the one-factor solution. Based on conceptual considerations and the existence of a strong first factor, we will proceed by **focusing on the T-TCS as producing a single score reflecting moral truth speaking**. The presence of five more subtle factors is conceptually important as it attests to the breadth of content of the T-TCS and its convergence with conceptual considerations. However, in practice, we generally intend to extract a single truthful communication score from the items.

(Trait) Truthful Communication Scale (T-TCS)		Factor Loading
1	In some situations, lying is the right thing to do. (N)	-.687
2	In some situations, it is OK to tell a lie. (N)	-.734
3	White lies are sometimes OK. (N)	-.718
4	If someone asks for my opinion, I want that person to know what I truly believe.	.606
5	It is important to me that I share my honest beliefs with others when I'm asked about them.	.617
6	In situations where I'm asked for information, I want other people to know the information as I truly see it.	.621
7	If I were to successfully lie or mislead someone intentionally, I would feel guilty.	.576
8	Even if I got away with it, I would feel bad about lying to someone.	.575
9	If I lie (or if I were to lie), I feel some shame or guilt.	.486
10	Even if the truth might be hard for someone to hear, I tell the truth.	.669
11	I tell the truth even if it might hurt someone's feelings.	.608
12	I tell the truth, even when it could cause problems for me.	.629
13	I often deceive people about my real beliefs. (N)	-.446
14	I often say something that's not true. (N)	-.474
15	I occasionally misrepresent my thoughts and beliefs when speaking with people. (N)	-.501

Note. N = negatively-keyed item. Items were rated on a 5-point scale (1 = Strongly disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree). Instructions: *Please read the statements below and rate how much you agree or disagree with each one*

B. Reliability

The alpha reliability estimate for the 15-item scale was $\alpha = .89$.

IV. Study 2 – Internal structure (confirmatory), reliability, and convergent/discriminant validity

Recruited through Qualtrics Panels, a second sample of participants (N = 500) responded to the 15 final T-TCS items. In addition, they responded to 32 scales and/or subscales selected for convergent and discriminant validity.

A. Internal Structure

We conducted confirmatory factor analyses (CFA) of the T-TCS items (after reverse-scoring negatively-keyed items).

Recall that we finalized the scale by including sets of items representing subtle but systematic psychological differences (e.g., 3 items for motivation, 3 items for emotion, etc.). Therefore, we did not expect a simple unidimensional model to fit the data well, as it fails to account for residual associations within sets of items that were known to share common psychological content. Indeed, a simple unidimensional model did not fit the data well – $\chi^2(90) = 3007.33$, $p < .001$; CFI = .43, TLI = .33, RMSEA = .25, SRMR = .18.

To adequately account for the subtle but intended systematic differences across sets of items, we evaluated a bifactor model. All items loaded on a single common factor ostensibly reflecting trait truthful communication. In addition, each item loaded on a second factor that was common only to the items within each set. In total, this model includes six factors – a general trait truthful communication factor, a value factor, a motivation factor, an emotion factor, a truthful behavior factor, and a deceptive behavior factor (the latter five each having three items loading on them). All factors were orthogonal. The bifactor model fit well – $\chi^2(75) = 295.39$, $p < .001$; CFI = .96, TLI = .94, RMSEA = .075, SRMR = .09.

Standardized factor loadings are in this table.

- All hypothesized loadings are statistically significant.
- Loadings on the general truthful communication factor range from .27 to .72
- Loadings on the “psychological component” factors range from .33 to .89.
- Not surprisingly, negatively keyed items (1-3, 12-15) loaded lower on the general factor (and higher on their specific factors) than did the positively-keyed items (4-11). This type of slight factorial separation between positively-keyed and negatively-keyed items is common

Item	Factor					
	TC	Val	Mot	Emo	(Truth) Beh	(Decept) Beh
1	.37***	.80***	.00	.00	.00	.00
2	.34***	.89***	.00	.00	.00	.00
3	.38***	.78***	.00	.00	.00	.00
4	.56***	.00	.59***	.00	.00	.00
5	.66***	.00	.62***	.00	.00	.00
6	.52***	.00	.48***	.00	.00	.00
7	.56***	.00	.00	.55***	.00	.00
8	.63***	.00	.00	.69***	.00	.00
9	.66***	.00	.00	.50***	.00	.00
10	.72***	.00	.00	.00	.41***	.00
11	.62***	.00	.00	.00	.63***	.00
12	.71***	.00	.00	.00	.33***	.00
13	.28***	.00	.00	.00	.00	.80***
14	.27***	.00	.00	.00	.00	.82***
15	.32***	.00	.00	.00	.00	.77***

(e.g., Biderman et al. 2011, *J of Research in Personality*).

- Overall, this pattern of loadings suggests that the TCS items share a robust commonality (i.e., truthful communication), and that they also systematically tap into subtle but detectable differences between different types of psychological manifestations (i.e., behavior, motivation, etc.).

B. Reliability

Based on the bifactor structure revealed by our CFA, we estimated reliability via the omega index. The omega value for the T-TCS scale was very high, at .95. High omega values of this kind reveal “a highly reliable multidimensional composite - a composite that reflects variation on the weighted combination of latent factor(s) underlying it” (p. 224, Rodriguez, Reise, & Haviland, 2016, *J of Personality Assessment*).

C. Convergent and Discriminant Validity

As noted earlier, participants completed the T-TCS scale along with 32 additional criterion scales/subscales. These criterion scales were carefully selected to reflect a range of constructs expected to have strong, moderate, or weak association with the trait truthful communication. The next table lists the scales/subscales, the number of items on each, and their correlations with the T-TCS scale.

As this table indicates, these correlations generally seem to make good sense in terms of reflecting truthful communication. For example, the SPI Honesty scale, the VIA Integrity Scale, and the CIVIC Honesty/Authenticity scale were all correlated with the T-TCS at $r = .43$ or above (with all $p < .001$). In contrast, the Bullshitting scales and the Revised Lie Acceptability scale were negatively correlated with the T-TCS at $r = -.45$ or below. Such results provide evidence of convergent validity. Discriminant validity is shown in part by the fact that the T-TCS is uncorrelated or very weakly correlated with other socially desirable characteristics such as Humor and Creativity (as measured by the CIVIC).

However, simply “eyeballing” a pattern of correlations and declaring that they “make good sense” is an unsystematic and potentially biased way of evaluating evidence (e.g., biased by post-hoc theorizing). For a more rigorous and systematic approach, we implemented the Quantifying Construct Validity procedure (QCV; Furr & Heuckeroth, 2019 *Assessment*; Westen & Rosenthal, 2003 *J of Personality and Social Psychology*).

For the QCV procedure, the set of “actual” convergent/discriminant validity correlations is statistically compared to a set of hypothesized convergent/discriminant validity correlations. Researchers develop a priori hypotheses (prior to computing the actual correlations) regarding the correlations that they would expect to find between a focal scale (e.g., the T-TCS) and a set of criterion scales.

Six members of the Honesty Project team independently generated hypotheses for each of the 32 criterion scales. Again, this was done before the actual correlations had been computed, thus eliminating the possibility of post hoc theorizing and similar biases. Agreement among the six raters was extremely high ($ICC = .96$). We therefore averaged across raters to obtain the set of hypothesized correlations presented in the next table. These correlations represent the pattern of convergent/discriminant validity correlations that we *should* observe if the T-TCS scale is indeed validly interpretable as a measure of truthful communication (given our definition of truthful communication).

Two effect sizes are computed as part of the QCV procedure. They are similar in that both reflect the degree to which the pattern of actual validity correlations generally matches the pattern of hypothesized validity correlations (see Furr & Heuckeroth 2019 for details and differences).

Results provide strong support for the convergent and discriminant validity of the T-TCS. Both effect sizes are extremely large and statistically significant ($r_{\text{alerting-CV}} = .96, p < .001$; $r_{\text{contrast-CV}} = .97, p < .001$). According to QCV logic, these results suggest that the actual pattern of convergent and discriminant validity correlations that we obtained is extremely consistent with the pattern of correlations that we should obtain if the T-TCS is a valid measure of the truthful communication construct. These results thus suggest that the T-TCS is validly interpretable as a measure of truthful communication (as defined/described in Part I).

The reliance on self-reports to assess truthful communication raises further questions of validity. That said, previous research reveals significant self-other agreement on traits related to this construct (e.g., Cohen et al., 2013 *J of Research in Personality*; Helzer et al., 2014, *Personality and Social Psychology Bulletin*). Such convergence suggests that self-reports of honesty-related traits are not without validity. In future work, we aim to go beyond basic concurrent self-reports in the examination and evaluation of the T-TCS.

Criterion Scale		# of items	Actual r	Hyp r
1	Externalizing Symptom Inv-100 - Honesty	2	.40***	.56
2	Reyson Honesty Scale	8	.55***	.61
3	SPI-Honesty	5	.61***	.58
4	CIVIC honesty/authenticity	6	.43***	.56
5	CIVIC creativity	4	.10*	.06
6	CIVIC humor	4	.04	.05
7	VIA Integrity (IPIP version)	9	.55***	.44
8	Realness Scale	12	.49***	.51
9	Authenticity Scale: Authentic Living	4	.45***	.43
10	Authenticity Scale: Accepting External Influences	4	-.22***	-.19
11	Authenticity Scale: Self-alienation	4	-.25***	-.24
12	HEXACO-HH: Sincerity	4	.32***	.43
13	HEXACO-HH: Modesty	4	.33***	.25
14	HEXACO-HH: Greed Avoidance	4	.22***	.18
15	HEXACO-HH: Fairness	4	.45***	.29
16	MCQ: Honesty	4	.65***	.59
17	Short Dark Triad: Psychopathy	9	-.43***	-.26
18	Short Dark Triad: Machiavellianism	9	-.39***	-.33
19	Short Dark Triad: Narcissism	9	-.15***	-.15
20	Bullshitting – Persuasive BSing	8	-.45***	-.48
21	Bullshitting – Evasive BSing	4	-.47***	-.50
22	HEXACO-24: Emotionality	4	.10*	-.03
23	HEXACO-24 Extraversion	4	.29***	.13
24	HEXACO-24: Openness	4	.00	.10
25	HEXACO-24: Agreeableness	4	.18***	-.10
26	HEXACO-24: Conscientiousness	4	.38***	.19
27	Intellectual Humility Scale	11	.22***	.28
28	Moral Relativism	10	-.20***	-.03
29	Moral Tolerance	10	.19***	-.07
30	Lying in Everyday Situations	14	-.57***	-.61
31	Revised Lie Acceptability Scale	11	-.72***	-.61
32	Intrinsic Honesty Value measure	12	.70***	.63

*** p < .001, ** p < .01, * p < .05