

Psychometric Properties of the HEXACO-100

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- The HEXACO model of personality structure was first proposed in the early 2000s, and it has been increasingly widely used as an organizing framework in personality research.
- This model posits that personality traits can be summarized by six dimensions: Honesty–Humility (H), Emotionality (E), Extraversion (X), Agreeableness (A), Conscientiousness (C), and Openness to Experience (O).
- The most widely used measure of these six personality dimensions is the HEXACO Personality Inventory–Revised (HEXACO-PI-R), a self- or observer report instrument that is available in 200-, 100-, and 60-item versions.
- In the present research, we report the psychometric properties of the HEXACO-100 using two large data sets cumulated in the past few years.

The HEXACO Model of Personality Structure

- As with the five-factor model (FFM), the HEXACO model originated from research based on the lexical approach to personality structure.
- In typical lexically based studies of personality structure, researchers compile a comprehensive list of familiar personality-descriptive adjectives of a given language.
- Self- or observer ratings on the adjectives, as provided by a large sample of participants, are then factor analyzed to identify a few major dimensions that explain much of the covariation among those terms.

- The theoretical interpretation of the six HEXACO personality factors categorizes them into two broad conceptual groups.
 1. The Extraversion, Conscientiousness, and Openness to Experience dimensions represent individual differences in engagement within three different domains of endeavor: social, work-related, and idea-related.
 2. The Honesty–Humility, Emotionality, and Agreeableness dimensions represent individual differences in three different forms of altruistic tendencies.

- Specifically, Honesty–Humility represents a tendency to treat others fairly, even when one could successfully exploit them, and Agreeableness represents a tendency to be patient with others even when one may be treated unfairly by them.
- In this way, Honesty–Humility and Agreeableness represent two forms of reciprocal-altruistic tendency.
- Emotionality is conceptualized to represent a tendency to prevent harms to self and kin and is thereby relevant to kin altruism.
- The latter three personality dimensions (Honesty–Humility, Emotionality, and Agreeableness) distinguish the HEXACO model from the FFM.

- In this article, we provide psychometric information on the 100-item English-language version of the HEXACOPI-R.
- The results reported here are based on two large data sets.
 1. We collected self-reports through the HEXACOPI-R online survey site. We used here the data collected through this online survey site cumulated over its first full year.
 2. We also obtained self-reports on the HEXACO-100, as well as observer reports from closely acquainted persons, as part of ongoing research in university student samples; for the present report, we combined these latter data as cumulated from 2007 up until the end of 2014.

Method

Participants and Procedures

Online Sample

- Between October 19, 2014, and October 18, 2015, 104,467 individuals submitted responses on the self-report form of the English-language HEXACO-100 on a recently launched online survey site (<http://hexaco.org>).
- Of these, 100,639 participants responded to all of the 100 items and made correct responses to all of the three attentiveness-check items interspersed throughout the inventory (e.g., “This is an attentiveness check; please indicate ‘neutral’”).

- The participants were further screened out on the basis of two additional checks for data quality.
 1. To screen out the respondents who provided extremely incoherent responses, we computed a standard deviation of the item responses on each of the six factor-level scales (i.e., after recoding of reverse-keyed items), and calculated for each respondent an average of the six standard deviations.
 2. To screen out persons who overused the same response option (or otherwise showed very little variation in use of response options), we computed for each respondent a standard deviation of responses on all HEXACO-100 items before recoding of reverse-keyed items.
- After the application of these three screening criteria, a sample of 100,318 respondents remained.

- Of the 100,318 respondents included in the final online sample, 48.4% were female and 50.2% were male (the remaining 1.4% did not provide gender information).
- With regard to the age of participants, 1,373 participants did not indicate their age; of the remaining participants, the mean age was 37.1 years and the standard deviation was 14.1.
- A majority of the participants indicated their highest level of completed education as high school (19.2%), university/college (41.6%), or graduate/professional school (32.8%).
- Of those who indicated high school, 47% indicated that they are currently attending a postsecondary education.

Undergraduate Student Sample

- In ongoing research since 2007, the HEXACO-100 has been administered to undergraduate students and their close acquaintances (typically friends, romantic partners, or relatives, with most of the acquaintances also being students).
- In this research, participants attended sessions in pairs of two closely acquainted persons, both of whom provided self-reports and observer reports of the other dyad member on the HEXACO-100.
- The final sample included 2,868 participants (hereafter the student sample); 64.3% were female and 34.9% were male (0.8% did not indicate their sex).
- The average age of the participants was 20.9 (SD = 3.9).
- The length of time that the participants indicated having known each other ranged from 6 months to 37 years (M = 5.0 years, SD = 4.7), and the median subjective rating as to how well they feel they know their participating partners was 8 on a scale from 0 to 10 (M = 8.1, SD = 1.4).

HEXACO-100

- The paper-and-pencil format of the inventory was used for the student sample.
- For all HEXACO-100 items, a 1-to-5 response scale was used, with response options given as 1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral (neither agree nor disagree)*, 4 = *agree*, and 5 = *strongly agree*.
- Within each facet-level scale, between one and three of the four items are reverse-scored; within each factor-level scale, between 7 and 10 of the 16 items are reverse-scored.
- A respondent's scale score is computed as the average of his or her responses across all items belonging to the scale, after recoding of reverse-scored items.

Results

Descriptive Statistics and Alpha Reliabilities

- Table 1 shows means, standard deviations, and alpha reliabilities of the HEXACO-100 scales from the two samples.
- Alpha reliabilities of the self- and observer reports of the HEXACO-100 factor-level scales all fell in the .80s.
- At the facet level, alpha reliabilities of the self-report scales (in the order of the student and online samples) ranged from .52 and .59 for Unconventionality to .81 and .83 for Greed Avoidance, with a mean of .70 and .73.
- Alpha reliabilities of the observer report facet scales ranged from .45 (Unconventionality) to .82 (Fairness), with a mean of .72.

- Table 1 also provides means and standard deviations for self- and observer report scales in the student sample and for the self-report scales in the online sample.
- The means and standard deviations are also reported separately for each sex within each sample, and d statistics indicate the sex differences in standardized units.
- Mean scale scores were in most cases fairly close to the scale midpoint of 3.0, but ranged as high as about 3.7 (for Openness in the online sample).
- Scale standard deviations were typically around 0.60 for factor-level scales and around 0.80 for facet-level scales, and thus equaled about 15% and 20%, respectively, of the possible range of scores (i.e., 4.0).
- Within the student sample, self-reports averaged slightly higher than did observer reports for Emotionality ($d = 0.20$) and Openness to Experience ($d = 0.31$), but observer reports averaged slightly higher than did self-reports for Agreeableness ($d = 0.24$).

Table 1. Means, Standard Deviations, and Alpha Reliabilities of the HEXACO-100 Scales

	Student sample: Self-reports					Student sample: Observer reports					Online sample: Self-reports				
	Total (N = 2,868)		Women (N = 1,843)	Men (N = 1,001)	Sex diff.	Total (N = 2,863)		Women (N = 1,839)	Men (N = 1,000)	Sex diff.	Total (N = 100,318)		Women (N = 48,562)	Men (N = 50,397)	Sex diff.
	M (SD)	α	M (SD)	M (SD)	d_{w-m}	M (SD)	α	M (SD)	M (SD)	d_{w-m}	M (SD)	α	M (SD)	M (SD)	d_{w-m}
<i>Factor-level scales</i>															
Honesty–Humility	3.24 (0.60)	.82	3.34 (0.56)	3.06 (0.62)	0.49	3.22 (0.63)	.84	3.32 (0.60)	3.04 (0.64)	0.45	3.30 (0.74)	.89	3.45 (0.69)	3.15 (0.76)	0.42
Emotionality	3.42 (0.61)	.84	3.66 (0.50)	3.00 (0.57)	1.23	3.30 (0.61)	.83	3.54 (0.51)	2.87 (0.53)	1.28	3.12 (0.63)	.84	3.38 (0.56)	2.86 (0.58)	0.92
Extraversion	3.47 (0.58)	.85	3.46 (0.59)	3.51 (0.56)	−0.09	3.52 (0.59)	.88	3.50 (0.59)	3.55 (0.60)	−0.09	3.22 (0.64)	.86	3.21 (0.64)	3.23 (0.64)	−0.03
Agreeableness	2.97 (0.59)	.84	2.95 (0.58)	3.03 (0.60)	−0.13	3.12 (0.66)	.89	3.12 (0.65)	3.12 (0.67)	0.01	2.78 (0.63)	.86	2.78 (0.62)	2.78 (0.64)	0.01
Conscientiousness	3.45 (0.58)	.84	3.51 (0.56)	3.35 (0.59)	0.28	3.45 (0.63)	.89	3.55 (0.59)	3.27 (0.65)	0.46	3.52 (0.55)	.82	3.55 (0.55)	3.49 (0.56)	0.11
Openness	3.32 (0.61)	.81	3.31 (0.62)	3.34 (0.61)	−0.04	3.14 (0.62)	.82	3.15 (0.61)	3.11 (0.63)	0.07	3.69 (0.57)	.82	3.65 (0.60)	3.73 (0.55)	−0.14
<i>Facet-level scales</i>															
<i>(Honesty–Humility)</i>															
Sincerity	3.20 (0.77)	.66	3.21 (0.77)	3.18 (0.78)	0.05	3.16 (0.78)	.68	3.16 (0.78)	3.16 (0.78)	0.00	3.24 (0.91)	.78	3.31 (0.89)	3.17 (0.92)	0.16
Fairness	3.44 (0.95)	.76	3.63 (0.85)	3.08 (1.02)	0.59	3.43 (0.96)	.82	3.61 (0.89)	3.09 (1.0)	0.56	3.53 (1.06)	.83	3.73 (0.98)	3.33 (1.11)	0.39
Greed Avoidance	2.74 (0.93)	.81	2.81 (0.89)	2.60 (0.97)	0.22	2.74 (0.92)	.80	2.85 (0.89)	2.55 (0.94)	0.33	3.00 (1.01)	.83	3.11 (0.98)	2.88 (1.01)	0.24
Modesty	3.59 (0.75)	.68	3.71 (0.71)	3.37 (0.78)	0.47	3.56 (0.75)	.70	3.65 (0.71)	3.38 (0.78)	0.37	3.42 (0.87)	.79	3.63 (0.79)	3.22 (0.90)	0.49
<i>(Emotionality)</i>															
Fearfulness	3.11 (0.86)	.70	3.38 (0.78)	2.62 (0.81)	0.95	3.19 (0.83)	.70	3.48 (0.73)	2.67 (0.76)	1.08	2.81 (0.84)	.70	3.12 (0.80)	2.52 (0.77)	0.76
Anxiety	3.70 (0.78)	.64	3.88 (0.68)	3.36 (0.84)	0.68	3.33 (0.77)	.66	3.51 (0.72)	2.99 (0.76)	0.71	3.54 (0.86)	.73	3.76 (0.79)	3.32 (0.87)	0.53
Dependence	3.32 (0.91)	.80	3.55 (0.85)	2.90 (0.86)	0.75	3.28 (0.83)	.74	3.51 (0.76)	2.86 (0.80)	0.83	2.84 (0.88)	.76	3.08 (0.87)	2.61 (0.83)	0.55
Sentimentality	3.57 (0.79)	.70	3.82 (0.69)	3.12 (0.76)	0.96	3.41 (0.78)	.73	3.65 (0.70)	2.97 (0.71)	0.97	3.28 (0.85)	.73	3.58 (0.78)	2.99 (0.81)	0.74

Table 1. Means, Standard Deviations, and Alpha Reliabilities of the HEXACO-100 Scales, Cont'd

	Student sample: Self-reports					Student sample: Observer reports					Online sample: Self-reports					
	Total (N = 2,868)		Women (N = 1,843)		Men (N = 1,001)	Total (N = 2,863)		Women (N = 1,839)		Men (N = 1,000)	Total (N = 100,318)		Women (N = 48,562)		Men (N = 50,397)	Sex diff.
	M (SD)	α	M (SD)	M (SD)	Sex diff. d_{w-m}	M (SD)	α	M (SD)	M (SD)	d_{w-m}	M (SD)	α	M (SD)	M (SD)	d_{w-m}	
(Extraversion)																
Social Self-Esteem	3.81 (0.68)	.67	3.78 (0.68)	3.85 (0.68)	-0.09	3.82 (0.63)	.69	3.81 (0.63)	3.85 (0.65)	-0.06	3.56 (0.77)	.70	3.51 (0.76)	3.61 (0.76)	-0.13	
Social Boldness	2.99 (0.88)	.76	2.91 (0.90)	3.15 (0.82)	-0.27	3.08 (0.88)	.78	3.00 (0.89)	3.22 (0.84)	-0.26	3.05 (0.87)	.72	2.99 (0.88)	3.10 (0.86)	-0.12	
Sociability	3.58 (0.78)	.71	3.60 (0.78)	3.54 (0.77)	0.07	3.57 (0.81)	.77	3.57 (0.80)	3.56 (0.83)	0.01	3.02 (0.88)	.77	3.07 (0.89)	2.97 (0.87)	0.11	
Liveliness	3.52 (0.76)	.76	3.53 (0.76)	3.50 (0.76)	0.04	3.61 (0.74)	.76	3.62 (0.74)	3.59 (0.73)	0.05	3.26 (0.83)	.78	3.28 (0.83)	3.24 (0.84)	0.05	
(Agreeableness)																
Forgivingness	2.75 (0.82)	.74	2.71 (0.80)	2.82 (0.84)	-0.13	2.86 (0.78)	.69	2.83 (0.76)	2.92 (0.80)	-0.12	2.42 (0.83)	.78	2.42 (0.81)	2.41 (0.84)	0.01	
Gentleness	3.22 (0.72)	.66	3.21 (0.71)	3.22 (0.74)	-0.01	3.35 (0.81)	.78	3.34 (0.80)	3.36 (0.84)	-0.02	2.95 (0.81)	.72	2.99 (0.79)	2.92 (0.82)	0.09	
Flexibility	2.79 (0.74)	.61	2.78 (0.74)	2.81 (0.73)	-0.04	2.95 (0.87)	.77	2.99 (0.85)	2.86 (0.88)	0.15	2.71 (0.75)	.64	2.75 (0.74)	2.68 (0.75)	0.09	
Patience	3.15 (0.88)	.79	3.09 (0.86)	3.26 (0.92)	-0.19	3.34 (0.84)	.76	3.33 (0.81)	3.34 (0.89)	0.00	3.04 (0.90)	.80	2.97 (0.87)	3.10 (0.92)	-0.14	
(Conscientiousness)																
Organization	3.28 (0.93)	.74	3.34 (0.94)	3.16 (0.91)	0.20	3.33 (0.91)	.77	3.44 (0.90)	3.13 (0.91)	0.34	3.36 (0.88)	.73	3.45 (0.89)	3.27 (0.86)	0.21	
Diligence	3.79 (0.69)	.70	3.84 (0.68)	3.69 (0.71)	0.21	3.80 (0.74)	.76	3.87 (0.70)	3.66 (0.79)	0.29	3.79 (0.73)	.71	3.81 (0.72)	3.77 (0.74)	0.06	
Perfectionism	3.53 (0.77)	.69	3.60 (0.76)	3.39 (0.78)	0.27	3.45 (0.81)	.79	3.60 (0.75)	3.20 (0.84)	0.50	3.55 (0.76)	.69	3.59 (0.74)	3.51 (0.77)	0.12	
Prudence	3.20 (0.74)	.69	3.24 (0.71)	3.13 (0.78)	0.15	3.23 (0.78)	.72	3.31 (0.75)	3.09 (0.81)	0.27	3.40 (0.75)	.70	3.36 (0.74)	3.44 (0.75)	-0.10	
(Openness to Experience)																
Aesthetic Appreciation	3.27 (0.89)	.66	3.38 (0.86)	3.08 (0.92)	0.34	3.01 (0.90)	.68	3.13 (0.87)	2.79 (0.91)	0.37	3.52 (0.82)	.65	3.64 (0.80)	3.41 (0.83)	0.29	
Inquisitiveness	3.09 (0.91)	.66	2.97 (0.89)	3.30 (0.89)	-0.36	2.91 (0.88)	.65	2.80 (0.85)	3.11 (0.89)	-0.35	3.84 (0.80)	.70	3.64 (0.84)	4.04 (0.71)	-0.52	
Creativity	3.53 (0.90)	.75	3.54 (0.91)	3.50 (0.88)	0.04	3.47 (0.84)	.73	3.55 (0.83)	3.32 (0.85)	0.28	3.72 (0.84)	.73	3.72 (0.86)	3.72 (0.82)	0.00	
Unconventionality	3.40 (0.65)	.52	3.36 (0.64)	3.48 (0.66)	-0.19	3.16 (0.66)	.45	3.12 (0.63)	3.21 (0.69)	-0.13	3.69 (0.67)	.59	3.61 (0.68)	3.76 (0.66)	-0.22	
(Interstitial Scale)																
Altruism	3.89 (0.66)	.59	4.03 (0.60)	3.62 (0.68)	0.64	3.79 (0.68)	.62	3.89 (0.65)	3.61 (0.70)	0.43	3.76 (0.74)	.66	3.97 (0.66)	3.56 (0.75)	0.57	

- Consistent with the findings of previous studies, appreciable gender differences were found for self-reports on Honesty–Humility (women higher than men, with d s = 0.49 and 0.42 for the student and online samples, respectively) and Emotionality (women higher than men, with d s = 1.23 and 0.92 for the student and online samples, respectively) as well as, in the student sample, observer reports on Honesty–Humility ($d = 0.45$) and on Emotionality ($d = 1.28$).

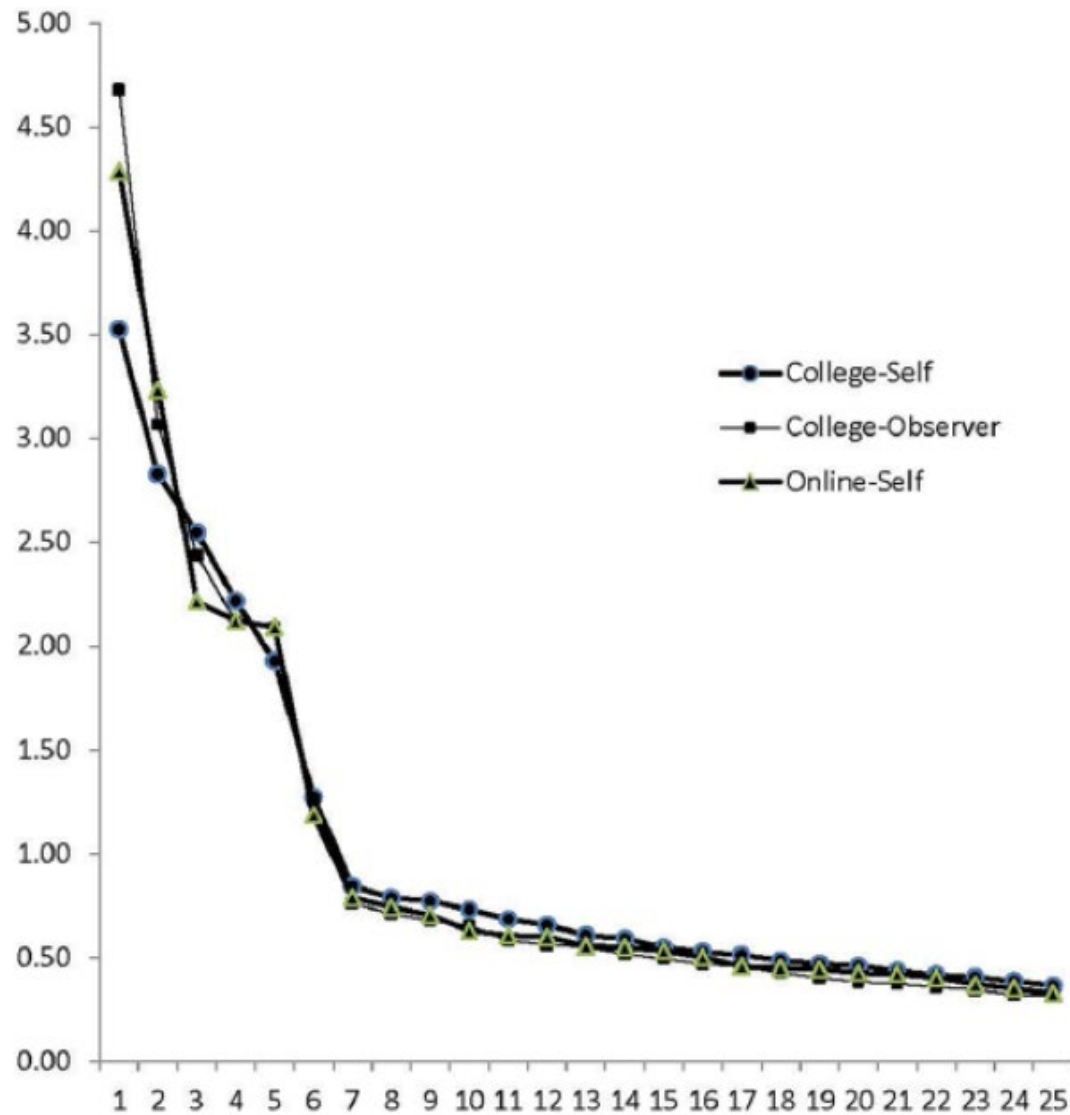
Factor Structure of the HEXACO-100

- Within each sample, we conducted principal components analyses both at the facet level (with the aim of recovering the six broad factors) and at the item level (with the aim of recovering the 25 narrower facets).
- With regard to the latter analyses, we are not aware of any previous studies in which the items of an omnibus personality inventory have been analyzed with the aim of recovering separate factors for each of the facets of the inventory.

Facet-Level Analysis

- Three principal components analyses involving the 25 facet scales were conducted: self-reports from the student sample, observer reports from the student sample, and self-reports from the online sample.
- The scree plots of eigenvalues in all three data sets clearly suggested a break between the seventh and sixth dimensions (see Figure 1).

Figure 1. Eigenvalues of the three principal components analyses



- Table 2 shows the results of the six-component solution after varimax rotation as obtained in each of the three data sets.
- Within each analysis, all of the 24 facets that are assigned to a single dimension showed their highest loadings on their designated components.
- As expected, the Altruism scale divided its loadings on Honesty–Humility, Emotionality, and Agreeableness in all three analyses, with loadings in the .30s and .40s on those dimensions.
- We should also note that many of the other 24 facet scales showed one or more appreciable and theoretically meaningful secondary loadings.
- As seen in Table 2, the pattern of secondary loadings was found to be very similar across three analyses.

Table 2. Loadings of HEXACO-100 Facet Scales on Six Varimax-Rotated Components

	Honesty–Humility			Emotionality			Extraversion			Agreeableness			Conscientiousness			Openness to Experience		
	St: Self	St: Obs.	On: Self	St: Self	St: Obs.	On: Self	St: Self	St: Obs.	On: Self	St: Self	St: Obs.	On: Self	St: Self	St: Obs.	On: Self	St: Self	St: Obs.	On: Self
Sincerity	.72	.73	.78	-.15	-.17	-.04	.02	-.08	-.05	.00	.06	.04	.09	.11	.05	-.01	.04	.03
Fairness	.64	.67	.68	.21	.19	.17	-.03	.04	.10	.11	.13	.17	.30	.31	.27	.00	.03	.02
Greed Avoidance	.67	.72	.75	-.02	.02	-.02	-.10	-.07	-.08	.16	.13	.18	-.07	.00	-.04	.24	.21	.13
Modesty	.65	.65	.70	.20	.16	.20	-.09	.02	-.11	.21	.36	.32	-.08	.00	-.05	-.06	.00	-.06
Fearfulness	-.10	-.06	.01	.67	.68	.64	-.24	-.21	-.27	.02	.04	.04	.14	.18	.05	-.17	-.14	-.20
Anxiety	.02	-.02	-.06	.57	.65	.64	-.35	-.31	-.42	-.28	-.16	-.21	.15	.24	.08	.05	.08	.03
Dependence	-.01	.02	.01	.75	.79	.75	.10	.11	.12	-.08	-.06	-.04	-.04	-.05	-.13	-.03	.03	-.03
Sentimentality	.19	.21	.28	.78	.78	.74	.13	.13	.09	.02	.10	.10	.00	.04	-.02	.02	.11	.09
Social Self-Esteem	-.06	-.02	.01	-.09	-.16	-.22	.71	.73	.71	.11	.10	.15	.23	.18	.21	-.07	-.11	-.03
Social Boldness	-.06	-.06	-.09	-.16	-.16	-.07	.70	.75	.74	-.17	-.16	-.17	.06	-.02	.00	.19	.20	.19
Sociability	-.06	-.07	-.11	.26	.18	.32	.70	.79	.72	.05	.10	.12	-.06	-.13	-.12	-.03	.04	.02
Liveliness	.02	.06	.05	.01	.03	-.06	.78	.76	.79	.20	.25	.19	.05	.04	.13	-.02	.06	.01
Forgivingness	.21	.09	.27	-.09	-.09	.00	.18	.11	.18	.61	.74	.63	.02	-.01	-.08	.07	.10	.08
Gentleness	.18	.21	.22	.06	.03	.09	.05	.09	.00	.73	.77	.76	-.04	-.03	-.10	.03	.06	.03
Flexibility	.00	.14	.15	.04	.07	.08	-.05	-.01	.06	.74	.78	.74	-.02	-.01	.03	-.02	.01	-.01
Patience	.07	.10	.03	-.13	-.06	-.21	.06	.06	.03	.78	.81	.78	.11	.14	.13	.07	.04	.07
Organization	-.01	.00	.03	.06	.08	.01	.11	-.01	.15	.05	.05	.00	.69	.74	.69	-.12	-.07	-.19
Diligence	.11	.15	.06	.03	.08	-.02	.32	.30	.37	-.10	-.04	-.07	.71	.72	.65	.13	.16	.19
Perfectionism	.06	.07	.01	.14	.19	.14	.00	-.02	-.15	-.12	-.07	-.12	.74	.80	.69	.12	.15	.15
Prudence	.04	.17	.08	-.04	-.05	-.21	-.10	-.12	-.03	.19	.15	.17	.74	.75	.73	-.04	-.04	-.02
Aesthetic Appreciation	.11	.15	.17	.13	.17	.15	-.09	-.08	-.02	.08	.13	.13	.07	.11	.09	.79	.78	.71
Inquisitiveness	.01	.04	.03	-.21	-.23	-.24	-.08	.00	.02	.06	.02	.02	.12	.20	.13	.64	.70	.64
Creativity	.06	.13	.03	.09	.18	.08	.18	.17	.16	.02	.06	.02	-.07	-.07	-.03	.70	.68	.73
Unconventionality	-.02	.00	-.04	-.09	-.03	-.06	.03	.07	.01	-.02	.03	.00	-.06	-.06	-.11	.76	.77	.78
Altruism	.37	.45	.46	.49	.38	.47	.22	.21	.20	.27	.41	.37	.17	.14	.08	.13	.15	.15

Note. St: Self = Student sample: Self-reports (N = 2,868); St: Obs. = Student sample: Observer reports (N = 2,863); On: Self = Online sample: Self-reports (N = 100,318). Absolute factor loadings that are greater than .30 are shown in bold; see text for expected loadings of Altruism facet.

Item-Level Analysis

- We conducted a principal components analysis at the item level separately for each of the three data sets.
- The scree plots obtained from the two self-report samples showed a clear elbow after the first seven factors, whereas the scree plot from observer report sample showed it after the first six factors.
- The item-level principal components analyses support the distinctness of the 25 facet scales.

Correlations Between the HEXACO Factor Scales

- Consistent with the findings from previous studies, the correlations between the HEXACO factor scales were generally low (see Table 3).
- Within the student sample, the strongest correlation was that between Honesty–Humility and Agreeableness, both in self-reports ($r = .30$) and in observer reports ($r = .39$).
- In self-reports from the student sample, no other correlation between factor scales had an absolute value exceeding .20. With respect to observer reports in the student sample, three other correlations had absolute values exceeding .20, but none reaching .30.
- In the online sample (based on self-reports), the highest correlation was again that between Honesty–Humility and Agreeableness ($r = .42$); all other correlations had absolute values below .20.
- Interestingly, the correlation between Honesty–Humility and Agreeableness in the online sample was found to be noticeably higher than that in the student sample self-reports (.42 vs. .30).

Table 3. Correlations Among the HEXACO-100 Factor Scales

	1	2	3	4	5	6
Student sample: Self-reports (<i>N</i> = 2,868)						
1. Honesty–Humility	1.00					
2. Emotionality	.13	1.00				
3. Extraversion	–.08	–.10	1.00			
4. Agreeableness	.30	–.14	.13	1.00		
5. Conscientiousness	.15	.13	.17	.06	1.00	
6. Openness	.14	–.07	.05	.10	.04	1.00
Student sample: Observer reports (<i>N</i> = 2,863)						
1. Honesty–Humility	1.00					
2. Emotionality	.15	1.00				
3. Extraversion	–.02	–.11	1.00			
4. Agreeableness	.39	–.02	.15	1.00		
5. Conscientiousness	.27	.22	.04	.09	1.00	
6. Openness	.24	.07	.13	.15	.14	1.00
Online sample: Self-reports (<i>N</i> = 100,318)						
1. Honesty–Humility	1.00					
2. Emotionality	.17	1.00				
3. Extraversion	–.03	–.16	1.00			
4. Agreeableness	.42	–.05	.17	1.00		
5. Conscientiousness	.14	–.06	.17	.03	1.00	
6. Openness	.12	–.05	.13	.12	.07	1.00
Online sample: Excluding media-directed respondents (<i>N</i> = 8,233)						
1. Honesty–Humility	1.00					
2. Emotionality	.11	1.00				
3. Extraversion	–.05	–.12	1.00			
4. Agreeableness	.28	–.17	.20	1.00		
5. Conscientiousness	.17	–.05	.15	.02	1.00	
6. Openness	.16	–.08	.08	.11	.04	1.00

- One possible reason for the difference in correlations involves the way by which many of the online participants found the HEXACO website.
- Many of the early participants in the online sample had likely visited the HEXACO-PI-R website with an intrinsic interest in learning about their personality profile.
- However, beginning on June 9, 2014, an article about Machiavellianism appeared in a popular science magazine, and that article included a link to the online HEXACO-PI-R.
- Shortly thereafter, several online newspapers, including mass-market tabloids, published articles with eye-catching headlines (e.g., *How Machiavellian Are You?*) and links to the online HEXACO-PI-R.

- The “posttabloid article” participants tended to show lower means than the earlier participants in Honesty–Humility ($d = -0.23$), Agreeableness ($d = -0.37$), and Openness to Experience ($d = -0.16$), as well as a higher standard deviation in Honesty–Humility (by 10%) and lower standard deviations in Extraversion (by 10%) and Conscientiousness (by 7%).
- When we calculated the correlations among the HEXACO factor scales using only the sample of 8,233 respondents who completed the inventory before the massive influx of the media-directed respondents (see Table 3), the correlation between Honesty–Humility and Agreeableness was only .28, which is very similar to what was observed in the student self-report data.
- The correlation between self-reports of Honesty–Humility and Agreeableness was thus around .30 for the online pretabloid article participants and the student participants, but increased to around .40 for online participants who mainly were attracted by tabloid newspaper articles about assessing one’s manipulative tendencies.

Self/Observer Agreement

- The student sample includes 2,863 pairs of well-acquainted persons who provided self- and observer reports on the HEXACO-100, and we examined self/observer agreement in the HEXACO-100 variables among these persons.
- As shown in Table 4, the self/observer agreement correlations for the factor scales were .61 for Emotionality, .56 for Extraversion and Openness to Experience, .52 for Conscientiousness, .47 for Agreeableness, and .46 for Honesty–Humility.
- In contrast, the self/observer discriminant correlations between factor scales all fell below .20 except for that between self-report Emotionality and observer report Conscientiousness ($r = .20$).
- Table 4 also shows self/observer agreement correlations for the 25 facet scales. These values ranged from .20 (Sincerity) to .53 (Social Boldness) with a mean of .42.
- Note that the Sincerity scale showed a noticeably lower agreement relative to other facet scales, as the next two lowest self/observer agreement correlations were .30 and .33, for Modesty and Prudence, respectively.

Table 4. Self/Observer Agreement for HEXACO-100 Factor and Facet Scales

	<i>r</i>		<i>r</i>
Honesty–Humility	.46	Agreeableness	.47
Sincerity	.20	Forgivingness	.35
Fairness	.45	Gentleness	.35
Greed Avoidance	.47	Flexibility	.35
Modesty	.30	Patience	.43
<i>Mean WFCC/mean WFDC</i>	.36/.19	<i>Mean WFCC/mean WFDC</i>	.37/.25
Emotionality	.61	Conscientiousness	.52
Fearfulness	.51	Organization	.52
Anxiety	.40	Diligence	.37
Dependence	.44	Perfectionism	.42
Sentimentality	.47	Prudence	.33
<i>Mean WFCC/mean WFDC</i>	.46/.30	<i>Mean WFCC/mean WFDC</i>	.41/.25
Extraversion	.56	Openness to Experience	.56
Social Self-Esteem	.38	Aesthetic Appreciation	.49
Social Boldness	.53	Inquisitiveness	.45
Sociability	.45	Creativity	.50
Liveliness	.45	Unconventionality	.36
<i>Mean WFCC/mean WFDC</i>	.45/.28	<i>Mean WFCC/mean WFDC</i>	.45/.26
Interstitial facet			
Altruism	.36		

Note. *N* = 2,863. WFCC = within-factor convergent correlation (self/observer correlation for same facet scale); WFDC = within-factor discriminant correlation (self/observer correlation for different facet scales within same factor).

Discussion

Summary of Results

- The results showed that across data sets and sources, the scales showed appropriate score distributions, with mean scores not far from scale midpoints and with the standard deviations about 15% (factor scales) or 20% (facet scales) of the possible range of scores.
- Alpha reliabilities were in the .80s for factor-level scales and averaged above .70 for the facet-level scales.
- Principal components analyses of the 25 facet-level scales produced six components that were clearly interpretable as the HEXACO dimensions; also, principal components analyses of the 100 items produced 25 components that corresponded quite closely to the facets.
- Self/observer agreement between closely acquainted persons averaged in the .50s for factor-level scales and above .40 for the facet-level scales; moreover, self/observer correlations for the same facet averaged at least 50% higher than self/observer correlations for different facets from the same factor-level scale.
- Thus, the results supported the construct validity of both factor- and facet-level scales in the HEXACO-100.

Alpha Reliabilities

- As noted above, we obtained alpha reliabilities in the .80s for the factor-level scales and averaging above .70 (but ranging from the .50s to the .80s) for the facet-level scales.
- It is sometimes claimed, without explanation, that an alpha of .70 represents a minimally acceptable level of alpha reliability.
- We note, however, for the brief (four-item) facet-level scales of the HEXACO-100, even a moderately high mean interitem correlation of .30 would produce an alpha reliability of only .63.

- We think that even the HEXACO-100 facets having relatively low reliability are useful for research purposes, given the evidence of their convergent and discriminant validity as shown in Table 4.
- In a similar way, McCrae, Kurtz, Yamagata, and Terracciano (2011) have demonstrated that for the NEO-PI-R, facet scales with lower alpha reliability (i.e., $\alpha < .60$) tend to show similar levels of validity to those of other facet scales with higher alpha reliability.
- However, because of the brevity of the HEXACO-100 facet scales, a considerable fraction of the scale variance will be attributable to the individual items; therefore, we recommend that researchers who examine the associations of these scales with various external criteria also check the item-level associations with those criteria, to ensure that the facet-level associations are not due to the variance of a particular item.

*Correlations Between the HEXACO-100
Factor-Level Scales*

- As with the findings from the previous studies, the correlations between the HEXACO factor scales were found to be much lower than what has typically been observed for Big Five measures.
- Within self-report data, an absolute correlation exceeding .20 was observed for only one pair of scales, Honesty–Humility and Agreeableness.
- In contrast, correlations between self-report scales measuring the Big Five are typically much higher, with about half of the 10 scale intercorrelations falling between .20 and .40 (or higher) for widely used Big Five measures such as the NEO Five-Factor Inventory and the NEO-PI-R, the Big Five Inventory, and the Big Five Aspect Scales.
- We note that the relatively weak correlations between HEXACO-100 factor-level scales, as compared with the correlations between Big Five scales, would leave little room for any higher-order factor(s) of considerable size, regardless of whether such factors were to reflect real personality variation or merely response biases.

- In each of our samples, the highest correlating pair of factor-level scales was Honesty–Humility and Agreeableness.
- We believe that the modest positive correlation between these two scales can be understood in relation to our interpretation of their underlying dimensions as representing the personality bases of reciprocally altruistic tendencies.
- That is, although Honesty–Humility and Agreeableness represent two different forms of reciprocal-altruistic tendencies, the combination of high Honesty–Humility and high Agreeableness (vs. low Honesty–Humility and low Agreeableness) is of particular importance in everyday interactions with others because it is this blend that determines an overall tendency to cooperate with (vs. defect against) others.
- For this reason, coherent personality traits (or single personality descriptors) tend to be densely located in this region, whereas opposite-signed blends are scarce.

*Self/Observer Agreement of the Factor-Level
Scales*

- The levels of self/observer agreement of the HEXACO-100 scales are rather high, ranging from the middle .40s to the low .60s.
- It is of some interest that the two factor-level scales having self/observer correlations below .50—Honesty–Humility and Agreeableness—are those that we interpret as being relevant to reciprocal-altruistic or cooperative tendencies.
- We suspect that observer reports on these dimensions will tend to be influenced by the current level of harmony or conflict in the relationship between the observer and the target person, and thus will often tend to overestimate or underestimate the target person’s levels of these dimensions.
- This possibility is consistent with the finding that the correlations between these two scales are higher within observer reports than within self-reports, but we cannot test this possibility directly in the current data.

- Self/observer agreement for the HEXACO-PI-R scales is typically slightly higher than is found for Big Five or FFM scales of comparable length.
- This fact, in combination with the typically lower scale intercorrelations within each source, means that self-reports on HEXACO-PI-R scales are able to equal self-reports on Big Five scales in the prediction of observer reports on the latter, whereas self-reports on HEXACO-PI-R scales substantially exceed self-reports on Big Five scales in the prediction of observer reports on the former.
- Such results imply that measures of the HEXACO factors capture essentially all of the valid variance in measures of the Big Five, but that measures of the Big Five miss much of the valid variance in measures of the HEXACO factors.

Distinctness of the Facet-Level Scales

- Many omnibus personality inventories are organized hierarchically such that many narrow facet scales are subsumed in a few broad factors.
- The factor structure of these personality inventories has frequently been examined through analyses in which the few broad factors are extracted from the facet scales (or occasionally, from the items), but never through analyses in which the many narrower facet-level factors are extracted from items.
- That is, the conceptualized differences among the facet scales have been assumed but have not been empirically evaluated.

- In the present research, we conducted a principal components analysis involving 100 items and examined 25 components defined by those items.
- The 25 components rotated to a predetermined target structure showed a fairly close correspondence to that target structure.
- That is, nearly all of the components were loaded most strongly by the four items making up the facet scale.
- These results were recovered across online and student samples as well as across self- and observer reports within the latter sample, and thereby strongly support the empirical distinctness of the HEXACO-100 facet scales.
- In addition, results involving self/observer correlations also support the empirical distinctness of the facet scales.

- When we compare convergent correlations of facet scales (i.e., self/observer agreement) with the “semidiscriminant” correlations between facet scales within the same factor, no convergent correlation other than that of the Sincerity facet was exceeded by any of the within-factor discriminant correlations, and even Sincerity had a convergent correlation exceeding its own semidiscriminant correlations.
- One potential explanation for the variation across facet scales in self/observer agreement correlations is that the scales are differentially influenced by socially desirable responding.
- Recent analyses by de Vries, Realo, and Allik (2016) showed that across HEXACO items, self/observer agreement showed a modest negative correlation with the absolute value of item evaluativeness ($r = -.21$), and thus suggest at least some role of scale (un)desirability in self/observer agreement.

*Relations With the HEXACO-60 and
HEXACO-200*

- We recommend the HEXACO-60 for research in which time constraints do not allow administration of the HEXACO-100.
- The HEXACO-60, whose items are a subset of the HEXACO-100 (but not simply the first 60 such items), shows very high correlations at the factor-scale level with the HEXACO-100: in the present online sample, all six convergent correlations exceeded .95.
- The present findings support the validity of the HEXACO-100 facet scales, and as explained earlier, we recommend this inventory for many contexts in which researchers are interested in facet-level as well as factor-level measurement.
- The HEXACO-200 is preferable when the researcher wants to measure the facets with high reliability and when a long administration time is available.

*Other Inventories Measuring Similar Sets of
Six Personality Factors*

- There are currently some other measures of six factors similar to those of the HEXACO-PI-R:
 1. The Brief HEXACO Inventory (24 items) provides a shorter measure of the six HEXACO constructs and is suitable when administration time is extremely limited.
 2. The Questionnaire Big Six Scale (QB6) operationalizes the lexical six factors that are broadly similar to the six HEXACO constructs. The QB6 appears to be a psychometrically sound short measure, but researchers should note the conceptual differences between the two models in relation to the latter two personality dimensions.
 3. The Mini-IPIP6 adds an Honesty–Humility scale to the Mini-IPIP5 previously developed by Donnellan, Oswald, Baird, and Lucas (2006) to measure the classic Big Five. We should note that the factors assessed by the Mini-IPIP6 are not isomorphic to the six HEXACO constructs.

Future Research Directions

- First, no studies yet have been conducted to examine to the extent that psychometric properties of the HEXACO-PI-R generalize across various demographic groups (e.g., sex, age, nationality, etc.), across rating conditions (e.g., supervised face-to-face administration vs. unsupervised online administration, or low-stakes research conditions vs. high-stakes job application conditions, etc.), and across different language versions.
- As such, investigating measurement invariance issues would be desirable.
- Exploratory structural equation modeling might be particularly useful for this purpose.

- Second, in the years to come, we may attempt to improve the validity of the inventory by identifying and replacing items that are culturally less generalizable or are outdated.
- Third, it is important to continue to assess to what extent and in what ways the HEXACO-PI-R can add to personality inventories widely used in the literature. Although studies have shown that the Honesty–Humility, Emotionality, and Agreeableness dimensions contain much valid variance not captured by the Big Five factors, it is of interest to identify important criterion variables and personality phenomena (e.g., age trends, similarity between social partners, etc.) that are associated with that variance.
- Thus far, such studies have been primarily focusing on the Honesty–Humility dimension, with some attention to Emotionality, but future research might examine Emotionality and Agreeableness in more detail.

Conclusion

- Our results showed strong psychometric properties for the 100-item version of the HEXACO-PI-R, as examined in self-reports from an online sample and in both self- and observer reports from a student sample.
- Descriptive statistics and alpha reliabilities were appropriate.
- The 25 facets showed the expected pattern of loadings on six broad dimensions, and the 100 items also defined their intended 25 facet-level dimensions.
- Correlations between the factor-level scales were rather weak.
- Strong convergent correlations and weak discriminant correlations were obtained between self-reports and observer reports from closely acquainted persons.
- We recommend the HEXACO-100 for use in research settings whenever a measure of the major personality dimensions is desired.