Psychometric Properties of Indonesian HEXACO-100: A Facet Level Analysis

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Abstract. The HEXACO personality model is a six-dimensional personality model that is partially independent from the Big Five personality model (Zettler et al., 2020). Measurement using the HEXACO Personality Inventory-Revised, its sixth dimension, Honesty-Humility, can capture previously unexplored images of personality. This study aimed to adapt the HEXACO Personality Inventory-Revised 100 items version (HEXACO-100) into the Indonesian language and examine its psychometric properties. A purposive sample of 605 participants responded to Indonesian HEXACO-100 (67,2% female; mean age: 25,1 years). The result showed that all six factors have good alpha reliability (all factors α > .7), and the exploratory factor analysis and correlation analysis between the dimensions support the validity of the six-dimensional personality model. It can be concluded that this study successfully adapted the HEXACO-100 personality inventory into the Indonesian language, strengthens the existence of a six-dimensional personality model in Indonesia, and underlines that the HEXACO personality inventory is a useful and reliable personality inventory for investigating personality structure in cross-cultural settings.

Keywords: exploratory factor analysis; HEXACO; honesty-humility; personality model; six-dimensional

Research on personality models has been conducted since 1884. To begin with, Sir Francis Galton introduced the importance of personality research using adjectives that describe individual characteristics (or psycholexical research). The research to find this personality model was continued by many researchers, but only in the 1980s, did researchers begin to narrow down their research to a single personality model (Goldberg, 1993). To date, a large number of researchers and psychologists have believed that the variations of human personality can be summarized in five independent personality dimensions. Such a conviction has led to a belief that there are five and there will be only five personality factors. A belief that is considered "an empirical fact, such as the fact that there are seven continents or eight American presidents who come from Virginia'' (McCrae & John, 1992). This personality model is known as the Big-Five (B5)/ Five-Factor Model (FFM) which consists of 1) Surgency (or Extraversion); 2) Agreeableness; 3) Conscientiousness (or Dependability); 4) Emotional Sility (vs Neuroticism); and 5) Culture (or Intellect, or Openness to Experience) (Goldberg, 1990, 1993).

Although the fundamental theory of personality dimensions has been considered resolved by the existence of the Big Five theory, in the 2000s, several psycholexical studies began to emerge and

attempted to re-examine the search for these fundamental personality dimensions (Ashton & Lee, 2001; Ashton et al., 2000; Boies et al., 2001; Hahn et al., 1999). The research was then conducted thoroughly by Ashton et al. (2004). Similar to the previous studies, the research by Ashton was also a psycholexical study that examined personality dimensions in eight languages, namely English, Dutch, French, German, Hungarian, Italian, Korean, and Polish. The research was then continued by adding Turkish, Greek, Filipino, and Croatian languages (Ashton & Lee, 2007). Psycholexical studies of the twelve languages consistently produce six personality dimensions.

These six dimensions are called the HEXACO personality model, which consists of Honesty-Humility (H), Emotionality (E), eXtraversion (X), Agreeableness (vs. Anger), Conscientiousness (C), and Openness to Experience (O). Although it was not developed by using any modification of the Big Five personality theory, the six dimensions represent the adaptation and development of the B5 / FFM personality model with several variations. Three of the HEXACO dimensions - eXtraversion (X), Conscientiousness (C), and Openness to Experience (O) - reflect the dimensions of the B5 / FFM personality model. The other three dimensions show big changes to the HEXACO personality model obtained by implementing shifts of factor contents of Neuroticism (Emotionality in HEXACO) and Agreeableness and adding a sixth dimension called Honesty-Humility (Ashton & Lee, 2007).

The sixth dimension (Honesty-Humility) measures individual differences in sincerity, fairness, greed-avoidance, and modesty (Ashton & Lee, 2005; Thielmann et al., 2019). The advantages of HEXACO with its sixth dimension are 1) its ability to better predict several individual personality traits such as individual preferences in dealing with sex, power, money, and Dark Triad behavior when compared to NEO-PI-R and Big 5. (Ashton et al., 2000; Lee et al., 2013); 2) cheating in 6 behavioral experiments devoted to that behavior (Hilbig & Zettler, 2015); 3) workplace delinquency when compared to the Big 5 (Lee et al., 2005); 4) leadership and integrity in conjunction with Three Nightmare Traits (TNT) in leader behavior (de Vries, 2018); and 5) academic performance when compared with grade point average (GPA) and counterproductive academic behavior (CBA) (de Vries & Born, 2011).

HEXACO personality model is measured using HEXACO Personality Inventory-Revised (HEXACO-PI-R), consisting of three versions, namely HEXACO-200 (Lee & Ashton, 2004), HEXACO-100 (Lee & Ashton, 2016), and HEXACO-60 (Ashton & Lee, 2009). The items of the 100-items version are a subset of the items of the 200-items version and the items of the 60-items version are also a subset of the items of the 100-items version. However, the items are not simply the first 100 or 60 items of the 200-items version. The item numbers are not the same across versions. There is also a 24-items version called Brief HEXACO Inventory (BHI) developed by de Vries (2013) and a simplified version that is suitable for children and people with lower levels of (language) education called HEXACO Simplified Personality Inventory (HEXACO-SPI) developed by de Vries and Born (2011). None of the BHI and HEXACO-SPI items are the same as the HEXACO-PI-R items. Each version consists of 24 facets with four facets per dimension scale and only HEXACO-200 and HEXACO-100 have an extra interstitial facet called Altruism. HEXACO-200 consists of eight items per facet, HEXACO-100 and

HEXACO-SPI consist of four items per facet, HEXACO-60 consists of two or three items per facet, and BHI only has one item per facet. All items were rated on a 1-5 (strongly disagree – strongly agree) scale.

From a psychometric point of view, HEXACO-PI-R has high internal reliability (Ashton & Lee, 2009; Ashton et al., 2004; Lee & Ashton, 2016). Considering its high reliability, HEXACO-PI-R has been translated into 30 languages (Lee & Ashton, 2009a) and since has been widely used in many studies. One meta-analysis study of 549 independent studies that provided information on 316,133 research subjects conducted by Moshagen et al. (2019) concluded that each version of HEXACO-PI-R in these various languages had relatively high reliability and low correlation with age and education level.

As all HEXACO-PI-R translations must be approved by the creators (Lee & Ashton, 2009b) and there is no official Indonesian translation posted at the time this research was conducted (Lee & Ashton, 2009a), researchers contacted the creators to seek permission to adapt HEXACO-100 to the Indonesian language. During researchers' personal communication with the creators, Lee and Ashton (12 August 2019) explained that they did have an Indonesian version of HEXACO-PI-R that was used in one study (Ion et al., 2017) but deemed this version unsatisfactory because its psychometric properties are not good. The creators suspected that the problem could be caused by an inaccurate translation or the participant sample to which the inventory was administered. This also has been discussed in a study by Thielmann et al. (2019) although it only addressed the sample problem. Since its inception, Ion et al. Indonesian adaptation has also been used in other studies (Koswara et al., 2020; Widyanti & Talha, 2017).

The researchers were also aware that there are studies that tried to adapt and use HEXACO-PI-R but failed to mention the creators' approval or Indonesian translation source albeit its successful results. To name a few, Hayati and Nuqul (2020) adapted HEXACO-60 and successfully linked Honesty-Humility with intention of corruption behavior on students; Natasha et al. (2017) used Indonesian HEXACO-60 and found that Honesty-Humility, Emotionality, Agreeableness, and Conscientiousness had linkage to smoking behavior; Mardhiah and Lutfi (2019) adapted Indonesian Brief HEXACO Inventory and found that extraversion personality type has a significant influence on the tendency of using social media for seeking information; Primawestri and Prasetyo (2016) used HEXACO-100 as its base to adapt and modify Honesty-Humility factor scale that consists of 29 items and found that Honesty-Humility has a 26.6% effective contribution to Impression Management behavior, which indicates that Impression Management behavior is determined by the interaction of individual factors with situational and organizational factors.

Considering that there is a relatively new development of personality theory, no substantial research about the HEXACO model in Indonesia, unsatisfactory adaptation of this personality model in the Indonesian language, and the ability of this personality model to explain psychological phenomena that the B5 / FFM personality model cannot explain, the researchers intend to adapt HEXACO-PI-R 100 item version (HEXACO-100) into Indonesian language and study its psychometric properties. In doing so, researchers will be focusing the analysis on facet level as performing item-level factor analysis on personality inventories tend to yield problems (over-extraction of the factor numbers, factors based on item similarity) and thus can produce misleading or un-interpretable results (Hopwood & Donnellan,

2010; Newgent et al., 2004; Vassend & Skrondal, 1997).

Methods

This research was a quantitative method with a survey approach study. There were several steps in this study: 1) Adaptation process of English HEXACO-100 to the Indonesian language; 2) Administration of the adapted instrument to sample population; and 3) Data analysis procedure using Exploratory Factor Analysis.

Instrument: Indonesian HEXACO-100

HEXACO-100 was translated into Indonesian by one of the researchers. The translation was then checked by a bilingual psychologist to see if the translation matched the original items. A certified English teacher then back-translated the Indonesian version to English. The back-translation was then reviewed by the creators to see if the translation was compatible with the original items (Hambleton, 2005; International Test Commission, 2010). Sample items in this process could be seen in Table 1. The Indonesian HEXACO-100 in this study was deemed adequate for use by the creators.

Table 1
Adaptation Process Item Samples

No.	Original English	Indonesian Translation	English Back Translation
1	If I want something from a person I dislike, I will act very nicely toward that person in order to get it.	*Saya akan memperlakukan orang yang tidak saya sukai dengan sangat baik jika saya menginginkan sesuatu darinya.*	I will treat people I don't like very well if I want something from them.
2	I would feel afraid if I had to travel in bad weather conditions.	*Saya akan merasa takut jika harus bepergian dalam cuaca yang buruk.*	I will be scared if I have to travel in bad weather.
3	I feel reasonably satisfied with myself overall.	*Saya merasa cukup puas dengan keadaan diri saya secara keseluruhan.*	I feel quite satisfied with my whole condition.
4	I rarely hold a grudge, even against people who have badly wronged me.	*Saya jarang menyimpan dendam, bahkan terhadap mereka yang telah menyakiti saya.*	I rarely hold grudges, even to those who have hurt me.
5	I clean my office or home quite frequently.	*Saya cukup sering membersihkan kantor atau rumah saya.*	I quite often clean up my office or house.
6	I would be quite bored by a visit to an art gallery.	*Saya akan cukup bosan ketika mengunjungi sebuah pameran seni.*	I will be quite bored when visiting an art exhibition.

Indonesian HEXACO-100 consists of 100 items in the form of statements and measures the personality dimensions of Honesty-Humility (H), Emotionality (E), eXtraversion (X), Agreeableness (A), Conscientiousness (C), and Openness to Experience (O), and its facets. There are a total of 25 facets with each facet consisting of four items. Every participant was instructed to read each statement carefully and choose the answer that best shows the suitability of the participant. All items were rated on a 1 to 5 (strongly disagree – strongly agree) scale.

Participants

A total of 605 people, late adolescents and adults, residing in Indonesia participated in this study. Participants were selected using maximum variation sampling to record as many variations of the personality profile as possible and all participants

voluntarily gave informed consent to participate in the study. There were 404 women and 197 men (four respondents did not indicate gender). Mean age = 25.1 years, SD = 9.39 years, range = 17-85 years (three respondents did not indicate age). Most respondents were ≤ 21 years old (53.6%).

Data Analysis Procedure

Cronbach's alpha internal scale reliability was calculated for the facets and factor-scale scores with the expected value of above .70 suggested by Nunnally and Bernstein (1994). Exploratory factor analysis on the facet level was calculated using the maximum likelihood extraction method. On deciding which rotation method will be used, original studies conducted by the creators displayed that the correlations between the HEXACO factor scale were generally low, indicating that these constructs are roughly independent (Ashton & Lee, 2009; Ashton et al., 2004; Lee & Ashton, 2016). Other language psychometric studies are also in line with this finding (Boies et al., 2004; Wakabayashi, 2014). Thus, this study was also expected to have the same result but for more robust analysis, oblique rotation (oblimin) that allows for correlation between factors was used. To decide the number of factors to be extracted, the researchers used several parameters. 1) The scree-test that retain factors that lie above the elbow (abrupt or gradual transition of eigenvalue from vertical to horizontal) of the plot (DeVellis, 2017); 2) and parallel analysis that retains factors as long as the ith eigenvalue from the actual data is greater than the ith eigenvalue from the simulated data (O'connor, 2000); in combination with 3) Tucker Lewis Index (TLI) and 4) Root-Mean-Square Error of Approximation (RSMEA) with criteria on the more liberal side, TLI > .90 and RMSEA < .07, indicating acceptable fit (Hooper et al., 2008; Hopwood & Donnellan, 2010). All statistical analyses were carried out in JAMOVI version 1.1.9.0.

Result

The scores of the 25 facets were subjected to maximum likelihood factoring followed by oblimin rotation. On deciding on the number of factors to be retained, the scree-test in Figure 1 shows a clear transition of eigenvalue from vertical to horizontal or an elbow formed after the sixth factor. Parallel analysis sixth eigenvalue from actual data was greater than the sixth eigenvalue from simulated data. These six factors yield RMSEA .0598 and TLI .836, which suggested that six factors could be maintained.

Figure 1
Eigenvalues from parallel analysis
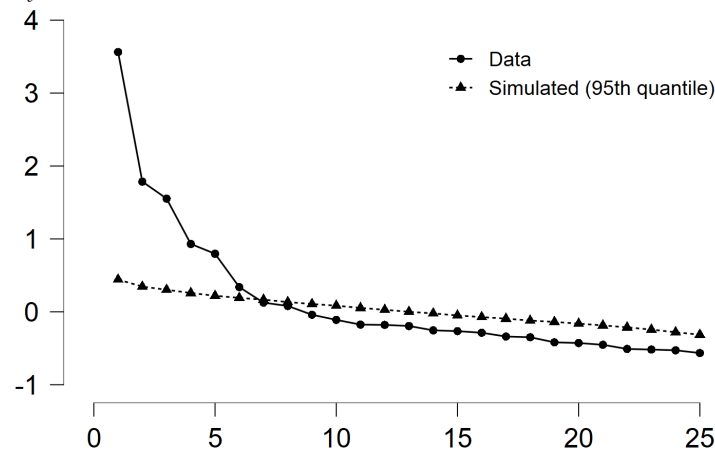
By maintaining the 6-factor solution, the factor loading pattern in accordance with the HEXACO structure was clear (see Table 2). All facets had primary loading (> .30) on their intended factor, and there was low cross-loading (< .30) on other factors. The

exceptions were Anxiety with a negative cross-loading on eXtraversion (-.54), Sociability with cross-loading on Emotionality (.40), and Creativity with cross-loading on eXtraversion (.30). Altruism itself has a primary loading on Emotionality (.42). These six factors explain 42.94% of the variance of HEXACO facets. Internal consistency at the factor level ranges from α = .82 for eXtraversion to α = .73 for Emotionality. At the facet level, internal consistency ranges from α = .31 for Unconventionality to α = .73 for Forgivingness. Based on reliability criteria by DeVellis (2017), all scales at the factor level fall into good and very good categories, while at the facet level most of them fall below the .70 threshold.

Table 2

Psychometric Properties of Indonesian HEXACO-100

Scale (facet)	α	M	SD	H	E	X	A	C	O	Skewness
Honesty-Humility	0.74	3.76	0.45							
Sincerity	0.50	3.63	0.67	**0.62**	-0.15	0.03	-0.15	0.10	0.02	-0.10
Fairness	0.64	4.41	0.63	**0.49**	0.28	0.11	-0.02	0.14	-0.13	-1.25
Greed-Avoidance	0.66	3.28	0.77	**0.55**	-0.07	0.06	0.16	-0.11	0.00	-0.33
Modesty	0.43	3.71	0.56	**0.51**	0.12	-0.23	0.12	-0.08	0.12	-0.19
Emotionality	0.73	3.41	0.47							
Fearfulness	0.57	3.39	0.72	-0.12	**0.44**	-0.09	-0.12	0.13	-0.29	-0.36
Anxiety	0.44	3.38	0.67	-0.05	**0.34**	**-0.54**	-0.17	0.16	0.11	-0.10
Dependence	0.61	3.16	0.74	-0.16	**0.55**	0.04	-0.10	-0.10	-0.06	0.01
Sentimentality	0.53	3.72	0.60	0.09	**0.66**	-0.04	0.03	0.07	0.06	-0.28
eXtraversion	0.82	3.21	0.54							
Social Self-Esteem	0.55	3.42	0.67	0.06	0.06	**0.67**	0.00	0.15	0.02	-0.11
Social Boldness	0.72	3.03	0.80	-0.08	-0.01	**0.64**	-0.02	0.11	0.16	0.10
Sociability	0.59	3.24	0.71	-0.14	**0.40**	**0.46**	0.08	-0.10	0.06	-0.28
Liveliness	0.65	3.17	0.69	0.06	0.01	**0.65**	0.05	0.08	0.06	0.06
Agreeableness	0.80	3.19	0.51							
Forgivingness	0.73	3.25	0.81	0.04	0.09	0.19	**0.59**	0.02	0.01	-0.32
Gentleness	0.38	3.13	0.59	0.03	0.10	-0.16	**0.58**	-0.13	-0.03	-0.06
Flexibility	0.47	3.24	0.60	0.03	0.13	0.07	**0.57**	-0.01	-0.07	0.12
Patience	0.68	3.15	0.75	-0.05	-0.12	-0.04	**0.79**	0.08	0.03	-0.07
Conscientiousness	0.77	3.63	0.45							
Organization	0.50	3.72	0.61	0.01	-0.01	0.13	0.00	**0.69**	-0.14	-0.29
Diligence	0.59	3.76	0.62	-0.05	0.07	0.18	0.03	**0.54**	0.21	-0.29
Perfectionism	0.61	3.58	0.65	0.00	0.12	-0.21	-0.02	**0.60**	0.10	-0.20
Prudence	0.45	3.46	0.60	0.16	-0.14	0.08	0.14	**0.55**	0.01	0.13
Openness to Experience	0.74	3.33	0.47							
Aesthetic Appreciation	0.43	3.49	0.65	-0.01	0.18	-0.10	-0.05	0.02	**0.56**	-0.22
Inquisitiveness	0.64	3.20	0.73	-0.04	-0.12	0.15	0.03	0.08	**0.56**	0.17
Creativity	0.62	3.36	0.74	0.02	0.08	0.30	-0.04	0.00	**0.44**	-0.19
Unconventionality	0.31	3.26	0.53	0.05	-0.09	0.01	0.01	-0.07	**0.61**	0.22
Altruism (interstitial)	0.54	4.02	0.59	0.29	**0.42**	0.10	0.16	0.21	0.03	-0.25

Note. N = 605; Male = 404; Female = 197; Sex Unknown = 4; α = Cronbach's alpha; M = Mean; SD = Standard Deviation; Factor Loading ≥ .30 in bold; H = Honesty-Humility; E = Emotionality; X = eXtraversion; A = Agreeableness; C = Conscientiousness; O = Openness to Experience

Oblimin rotation from this study factor analysis produced a correlation matrix that displayed a generally low correlation between factors ($\leq$ .35) as can be seen in Table 3. It showed that each factor tends to be independent although it still has a weak correlation with other factors. Honesty-Humility has a weak correlation with Agreeableness and Conscientiousness (.34 and .35); Emotionality has a weak correlation with Conscientiousness (.30); eXtraversion has a weak correlation with Agreeableness, Conscientiousness, and Openness to Experience (.32; .35; and .29); and, Conscientiousness has a weak correlation with Openness to Experience (.20).

Table 3
Intercorrelation Among HEXACO Factor Scales

	H	E	X	A	C	O
Honesty-Humility	—					
Emotionality	0,03	—				
eXtraversion	0,07	-0,06	—			
Agreeableness	0,34	-0,08	0,32	—		
Conscientiousness	0,35	0,30	0,35	0,05	—	
Openness to Experience	0,04	0,02	0,29	0,07	0,20	—

Discussion

Internal consistency for the factor level was in line with the original study although a bit lower. Scale reliability at the facet level however showed low internal consistency for most of the facets. According to Lee and Ashton (2016), low internal consistency at facet levels is not exclusive to the Indonesian version but rather an inherent feature in the HEXACO personality inventory that measures broad construct using a short scale. Furthermore, based on the research conducted by Romero et al. (2015), de Vries (2013), and McCrae et al. (2011) showed that a scale could still produce test-retest reliability and validity and that was acceptable even though it had low alpha reliability.

To provide evidence that a personality inventory is the optimal cross-culturally replicated representation of personality structure, it would be necessary to use variable sets that are indigenous to the cultures in question (not imported from other cultures) and representative of the personality domain (not selected as markers of a specified set of factors) (Ashton & Lee, 2007). With that in mind, the factor analysis of Indonesian HEXACO-100 in this research generated a factor structure that is in accordance with the HEXACO personality model. All facets have the highest factor loading values on their supposed factors with low factors inter-correlation, where most of it is above .40 with three meaningful cross-loading.

The first cross-loading is the Anxiety facet on eXtraversion factor, the second is the Sociability facet on Emotionality factor, and the third is the Creativity facet on eXtraversion factor. The first and second cross-loading were also observed in Lee and Ashton's research data (personal communication, 20 May 2020) but the third one is a specific case occurring only in this study sample.

The Anxiety facet has a moderate negative cross-loading of -.54 on the eXtraversion factor. The reason for this negative cross-loading is the Social Self-Esteem facet and Liveliness facet of the eXtraversion factor. The Social Self-Esteem facet and Liveliness facet have a moderate negative relation to the Anxiety facet (r = -.308 and r = -.366 respectively) and therefore was responsible for the common variance of the Anxiety facet and eXtraversion factor. This finding is in line with the theory because a person who scored high in Social Self-Esteem and Liveliness has tendencies to have positive self-regards and be more optimistic, therefore feeling little stress in response to difficulties (low Anxiety).

The Sociability facet has a moderate cross-loading of .40 on the Emotionality factor. Correlation analysis between the Sociability facet and facets of Emotionality revealed that the Sociability facet has a low positive relation to the Dependence facet of Emotionality (r= .224). According to the theory, people who scored high in Sociability have tendencies to enjoy talking, visiting, and celebrating with others. To some extent, people with this kind of tendency could feel comfortable sharing their

difficulties with those who will provide encouragement and comfort (high Dependence). Looking through the theory and the correlation analysis, this is the most possible explanation and thus responsible for the common variance of the Sociability facet and the Emotionality factor.

The Creativity facet has a moderate cross-loading of .30 on the eXtraversion factor. Based on the correlation analysis between the Creativity facet and facets of eXtraversion, the reason for this cross-loading is the Social Self-Esteem facet, the Social Boldness facet, and the Liveliness facet of eXtraversion factor. These three facets have a moderate positive relation to the Creativity facet (r= .323, r= .305, r= .320 respectively). These findings are in line with several studies that show more creative artists expressed more extraversion than the less creative ones (Hoseinifar et al., 2011; Singh & Kaushik, 2015) and thus responsible for the common variance of the Creativity facet and the eXtraversion factor.

The results of this study appear to be decent when compared to data from non-Western regions provided to the researchers by Lee and Ashton (personal communication, 20 May 2020). The factor structure looks good, and although the internal consistency reliability is lower than commonly seen in Lee and Ashton's data, it is still in the good category.

Conclusion

The factor analysis in this study resulted in a 6-factor solution according to the structure of the HEXACO personality model. Each aspect is loaded on its supposed factor with a loading value above .30. There is a positive cross-loading (> .30) on the Sociability and Creativity facet as well as negative cross-loading (-.54) on the Anxiety. These cross-loadings have also been observed in other studies. The exception is Creativity which is a specific case that only appears in this research sample. The results of the factor analysis in this study also appear stronger when compared to the results of previous research. Correlation between factors scales was low, indicating a roughly independent construct. Cronbach's alpha reliability at the factor level is in a good category and because this personality inventory measures broad constructs using a short scale, low alpha reliability at the facet level is normal and is not exclusive to Indonesian HEXACO-100. However, low alpha reliability at facet levels suggests caution in its use. In general, the results of this study are satisfactory when compared with other non-western research data. Therefore, the researchers conclude that this study has successfully adapted the Indonesian HEXACO-100, emphasized the existence of six personality dimensions in Indonesia, and underlined that the HEXACO personality model is a useful and reliable personality inventory for investigating personality structure in cross-cultural settings.

Recommendation

There are several suggestions that the researchers can provide for further research. First, Cronbach's alpha reliability at the facet level in this study is low. Therefore, further research needs to use other reliability testing methods such as test-retest reliability to ensure that these facets can be used independently for research or applicative purposes. Second, the sample in this study is homogeneous with most respondents being college students and may not generalize to other populations. Therefore, more research with heterogeneous samples is desirable to strengthen result generalisability. Third, in the context of developing personality theory in Indonesia, the HEXACO personality theory is relatively new. Further testing of the feasibility of this HEXACO personality inventory is necessary. Future research can make comparisons between this personality inventory and other personality inventories that have become standard in Indonesia or explore this personality inventory using another factorial method, e.g., a bifactor model.

Declarations

Authors' Contributions

The first author contributed to the literature review, study design, inventory adaptation process, data collection, analysis, report of findings, and development of the manuscript. The second and third authors, as supervisors, provided support, guidance, and advice related to the research method, data collection, analysis process, and writing process. All authors read and approved the final version of the manuscript.

Conflict of Interest

The authors declare no conflict of interest in this study.

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