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PSYCHOMETRIC PROPERTIES OF THE HEXACO-PI-R THAI VERSION AND RELATIONSHIPS BETWEEN HEXACO AND FIVE FACTOR PERSONALITY MODEL

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Abstract

This research aimed to examine psychometric properties and factor structure of HEXACO PI-R Thai version as well as investigate relationships between personality factors based on HEXACO model and Five Factor model measured by an International Personality Item Pool (IPIP-NEO) Thai version. Data was collected online from 1097 participants (mean age 27.82, SD 5.96). Results show that HEXACO PI-R has acceptable internal consistency (Cronbach's alphas .68 to .86). Result from Confirmatory Factor Analysis supports six-factor HEXACO model with acceptable fit indices (100-item version: CFI = .84, NNFI = .83, RMSEA [90%CL] = .066 [.066, .067], 60-item version: CFI = .82, NNFI = .82, RMSEA [90%CL] = .066[.065, .068]). Correlation levels are relatively low within six factors of HEXACO (correlation coefficients ranged from .08 to .42). Extraversion, Openness, Agreeableness and Conscientiousness from HEXACO PI-R correlated strongly with these factors based on Five Factors Model measured from IPIP-NEO Thai version (correlation coefficients ranged from .74 to .78) while Neuroticism moderately correlated with Emotionality (r = .52). Honesty-humility, a new model, correlated poorly with the five factors. Results from this study support HEXACO model of personality and indicate that HEXACO PI-R both full (100 items) and short (60 items) versions have acceptable psychometric properties and are applicable for personality measurement. Limitation and suggestion for future study are discussed.

Keywords: *internal consistency reliability, construct validity, confirmatory factor analysis, personality inventory*

1. INTRODUCTION

Personality has always been one of the main topics in psychology as it contributes to human behavior. Among the personality theories, Five Factor

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Model emerged from lexical analysis appears to be the most robust and universal model (McCrae & Costa, 1997). The five traits include Openness to experiences, Conscientiousness, Extraversion, Agreeableness and Neuroticism. A latter study on personality traits also employed the same method proposes a different model. According to Ashton and Lee (2017), personality can be classified into six traits; Honesty-Humility (H), Emotionality (E), Extraversion (X), Agreeableness (A), Conscientiousness (C), and Openness to Experience (O), shorten as HEXACO (Ashton & Lee, 2009; Ion et al., 2017; Lee & Ashton, 2013). In Ashton and Lee's study, they included sample from various languages and cultural background. Honesty-Humility (H) is first introduced from this cross-cultural research. Personality based on HEXACO model can be measured by HEXACO-PI-R which was developed by Ashton and Lee (2004, 2005). This measure has been translated and examined in many countries with different languages. It was found that HEXACO model was replicated in some cultures (Ion et al., 2017).

In Thailand, HEXACO model of personality is considered a new model and not widely used. So far, there has been only one original research that studied the psychometric property and HEXACO personality traits of the Thai people. Such research was a part of a larger cross-cultural investigation. Sample was 210 Thais who were between 17 – 25 years of age. The six personality traits; HEXACO, is supported by the result of this study. However, given a small sample size of such study, replication is needed to investigate whether the six personality factors would be confirmed in a larger sample size or not.

2. OBJECTIVE AND HYPOTHESES

The purposes of this study were to replicate and expand the original work by investigating the factor structure and psychometric property of the HEXACO-PI-R 100 and 60- item version in the Thai language. Additionally, relationship between HEXACO personality factors and five personality traits from Big Five were also examined.

3. METHOD

This research was ethically approved by Siriraj Institutional Review Board of Research in Human, SIRB code 144/2560(EC4). Participants were recruited from the Internet. Data was collected online from April through October 2017. Research advertisement and a link to an online questionnaire were posted on the authors' institution official Facebook page; https://www.facebook.com/siclinpsy/. Participants who were between 18-40 years old, Thai native speakers were eligible to take part in the study. Participants were informed about the study procedure.

Participants were also informed that the result will be published but their identity will be kept anonymously. After the participants had been informed, they were asked to give their consent before continue taking part. Participation was voluntary.

Participants: Over a thousand participants took part in this research. Responses with greater than 10% missing data were excluded. As a result, data from 1097 participants were included in data analysis processes. Descriptive data were yielded. Mean age of the sample was 27.82 (SD 5.96). Female participants outnumbered male participants (female 86.2%, male 13.8%). The majority of the sample hold bachelor's degree as a highest educational level (63.6%) and 21.6% of the sample hold master's degree. Additionally, 31.4% of the sample were studying in graduate and post graduate level (31.4%) while and 28.4% were company employees.

Measures: **HEXACO PI-R**: A self-report; HEXACO-PI- R consists 100 items measuring personality based on HEXACO model (Lee & Ashton, 2004). It is a 5-point Likert's scale ranging from 1 (strongly disagree) to 5 (strongly agree). Participants were required to read each item and rate the accuracy of each sentence on explaining themselves. This measure, developed by Lee and Ashton (2004), measures six factors of personality which are Emotionality (E), Extraversion (X), Agreeableness (A), Conscientiousness (C), and Openness to Experience (O), and Honesty-Humility (H) dimension. Examples of the items are "I wouldn't use flattery to get a raise or promotion at work, even if I thought it would succeed." (H), "I don't mind doing jobs that involve dangerous work." (E), "I feel reasonably satisfied with myself overall." (X), "I generally accept people's faults without complaining about them." (A) and "I would like a job that requires following a routine rather than being creative." (O). The six facets of personality are the results of the cross-cultural lexical study (Ion et al., 2017). Although the factors are partially overlapped with the FFM but these six factors are not the expansion of the FFM (Ion et al., 2017).

For the Thai Version, the scale was translated by Kattiya Ratanadilok as a part of the larger cross-cultural research and back translated by a blind translator (Ion et al., 2017). The measure was tested by 210 Thai participants (73% male, 27% female, overall mean age 19.56, SD 1.33). The original paper reported acceptable internal consistency of the six facets (Cronbach's alpha .75 for H, .70 for E, .74 for X, .73 for A, .79 for C, and .67 for O). Results from Confirmatory Factor Analysis revealed acceptable goodness-of-fit indexes (CFI= .888, RMSEA= .053, respectively). Based on the same set of items, it can be scored as a full version (using 100 items) and short version (using 60 items).

For this particular sample, the internal consistency is .82 for H, .73 for E, .86 for X, .81 for A, .78 for C and .79 for O indicating that data from this sample is reliable for further analysis.

International Personality Item Pool (IPIP-NEO): This 50-item self-report scale measures five personality traits based on Five-Factor Model of personality which are Openness to Experience, Conscientiousness, Extraversion, Agreeableness and Neuroticism. Participants were asked to read 50 sentences and rate how accurate each sentence describe themselves and behaviors. Examples of the IPIP-NEO Thai version are "Believe in the importance of art" (O), "Make plans and stick to them" (C), "Keep in the background" (E), "Accept people as they are" (A), "Have frequent mood swings" (N). The original version of the IPIP-NEO was developed in English. Thai version of the IPIP-NEO was translated and back-translated as a part of the previous research by Yomaboot and Cooper (2016). Internal consistency analysis of the IPIP-NEO for this particular sample showed moderate to good reliability (Cronbach's Alpha .76 for O, .80 for C, .64 for E, .75 for A and .52 for N) (Yomaboot & Cooper, 2016). In this study, authors used an original scoring from 50 items (Lim & Ployhart, 2006).

Data Analysis: This research aims to examine factor structure and psychometric properties of the full and short version of the HEXACO-PI-R Thai. Confirmatory Factor Analysis was analyzed using Lisrel (version 8.72) with Maximum Likelihood estimation. Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA) and Non-Normed Fit Index (NNFI) indices were ascertained to test global fit of the priori HEXACO model. Furthermore, correlations between six factors from HEXACO and five factor personality traits were analyzed in order to examine the convergent correlation or criterion validity of the HEXACO model.

4. RESULTS

Preliminary data analysis was conducted to examine sampling adequacy and distribution of the data. It was found that this data set is appropriate for factor analysis (KMO = .873) which is accordance with the notion that the Kaiser-Meyer-Olkin (KMO) greater than 0.8 indicates sampling adequacy. Skewness and Kurtosis were also ascertained in order to examine the distribution of the data. Skewness of the six factors ranged from -.379 to -.025 while the Kurtosis ranged from -.297 to .168. Skewness of the five factor personality traits yielded from the IPIP-NEO Thai ranged from -.213 to -.023 and the Kurtosis ranged from -.545 to -.115. According to Tabri and Elliott (2012), Skewness < 3 and Kurtosis < 10 are considered acceptable for normal distribution (Tabri & Elliott, 2012). Thus, the data yielded from this sample is considered normally attributed and statistically

appropriate for further analysis. An examination of gender differences revealed there was significant different in Emotionality. Female participants had higher score then male sample ($p < .05$).

Reliability Analysis

Internal consistency of HEXACO PI-R 60-item and 100-item version were analyzed using Cronbach's alpha coefficient. Results showed that both versions of HEXACO PI-R have good reliability. Cronbach's alpha of the 60-item version is .78 and is .85 for the 100 item-version. This value indicates that the 100 item-version has slightly higher reliability. Reliability analysis for subscales also show satisfactory results. Each factor of HEXACO PI-R has the Cronbach's alpha ranged from .73 to .86 for 100-item version and from .68 to .81 for 60-item version which are in acceptable level.

Table 1 - Cronbach's Alpha of HEXACO PI-R scales

	100-item version	60-item version
Factor	.85	.78
H	.82	.77
E	.73	.68
X	.86	.81
A	.81	.70
C	.78	.71
O	.79	.74

Correlation between HEXACO and Big Five personality

Correlation analyses were analyzed firstly to examine relationships between factors within HEXACO model. From Table 2, it was found that correlations between the six factors of both HEXACO PI-R 60- and 100-item versions were relatively low (correlations coefficients ranged from .08 to .42 for 100-item version and ranged from .10 to .39 for 60-item version). These small correlations coefficients between within HEXACO imply that the six factors measure different aspects of personality.

Table 2 - Correlation between HEXACO personality factors

	H	E	X	A	C	O
H		-.11**	.18**	.27**	.22**	.10**
E	-.08*		-.30**	-.26**	-.17**	-.13**
X	.10*	-.26**		.34**	.39**	.18**
A	.23**	-.33**	.39**		.16**	.17**
C	.18**	-.17**	.42**	.21**		.13**
O	.12**	-.11**	.17**	.17**	.14**	

*p < .05, **p < .01. Note: Values below diagonal is correlation coefficients of 100-item version and values above diagonal are correlation coefficients of 60-item version of HEXACO PI-R.

In terms of correlations between five factors of personality from IPIP-NEO and six factors from HEXACO PI-R, results reveal similar finding as found in previous studies (Ashton, Lee, & de Vries, 2014). From this present study, Extraversion, Openness, Agreeableness, and Conscientiousness show high correlations between the scores yielded from IPIP-NEO and HEXACO PI-R both 100 and 60 items version. From Table 3, high correlations were found between Conscientiousness from IPIP-NEO and HEXACO PI-R in both 100- and 60-item version (r = .78 and .74, respectively). Agreeableness from IPIP-NEO had high correlation with Agreeableness from HEXACO PI-R 100-item (r = .74) and 60 item (r = .73). Extraversion scores from IPIP-NEO and HEXACO PI-R had high correlation with each other in both 100 and 60 item version (r = .74 and .70 respectively). Openness to experience from IPIP-NEO also showed significant relation with Openness from HEXACO PI-R score in both 100 and 60 item version (r = .76 and .78 respectively). However, similar to the findings from previous study (Ashton & Lee, 2009; Ion et al., 2017), Neuroticism from IPIP-NEO correlated moderately with Emotionality from HEXACO PI-R both 100-item version (r = .52) and 60-item version (r = .51). Interestingly, a new factor emerged from HEXACO study, Honesty-humility had small relationship with personality factors from IPIP-NEO, Agreeableness and Conscientiousness (Agreeableness r = .33 (100 item), .35 (60 item), Conscientiousness r = .21 (100 item), .26 (60 item). Honesty-humility also had small correlation coefficient values with all other factors from Five Factor Model.

Table 3 - Correlations between subscales of the IPIP-NEO and HEXACO

IPIP-NEO Scales	HEXACO Scales					
	Honesty-humility	Emotionality	Extraversion	Openness	Agreeableness	Conscientiousness
Neuroticism	-.19**/-.24**	.52**/.51**	-.58**/-.59**	-.06/-.08**	-.49**/-.46**	-.36**/-.32**
Extraversion	-.12**/-.07*	-.10**/-.14**	.74**/.70**	.16**/.17**	.25**/.21**	.25**/.22**
Openness	.04/.05	-.05/-.09**	.13**/.13**	.76**/.78**	.11**/.10**	.10*/.10**
Agreeableness	.33**/.35**	-.17**/-.15**	.42**/.41**	.14**/.15**	.74**/.73**	.28**/.24**
Conscientiousness	.21**/.26**	-.21**/-.22**	.57**/.58**	.18**/.18**	.29**/.26**	.78**/.74**

*p < .05, **p < .01. Note: The former values are correlation coefficients of the 100-item version/ the latter values are correlation coefficients of the 60-item version.

Construct Validity

Confirmatory factor analysis (CFA) was performed to examine factor structure of HEXACO model of personality measured from HEXACO PI-R. Given that the data from this sample is normally distributed, Maximum Likelihood estimation was used (Kline, 2005). From table 4, results from CFA indicate that the

model fit indices are acceptable (RMSEA) or slightly less than the good fit values (CFI and NNFI). The model fit indices are as following: HEXACO PI-R 100-item version, CFI = .84, NNFI = .83, RMSEA [90%CL] = .066[.066, .067] and for the HEXACO PI-R 60-item version, CFI = .82, NNFI = .82, RMSEA [90%CL] = .066 [.065, .068].

Theoretically, goodness of fit is affected by correlated errors. Therefore, authors adjusted the model based on modification indices as can be seen in Table 4.

Table 4 - Goodness-of-fit statistics of six-factor model of HEXACO

Model	χ^2 (df)	CFI	NNFI	RMSEA [90%CL]
100-item version				
- 6-factor model	25922.72 (4449)	.84	.83	.066 [.066,.067]
- 6-factor model (15 correlated errors)	20878.86 (4434)	.87	.87	.058 [.057,.059]
60-item version				
- 6-factor model	9884.33 (1695)	.82	.82	.066 [.065,.068]
- 6-factor model (12 correlated errors)	7857.69 (1683)	.87	.86	.058 [.057,.059]

Discussion

HEXACO model is considered a relatively new model emerged from lexical method studied in samples with various languages and cultural background. It is claimed that this model is somewhat overlap but not the extension of Five Factor Model (Ion et al., 2017). This present study aimed to replicate a previous study (Kibeom Lee & Ashton, 2013) to examine factor structure of HEXACO PI-R full and short versions in Thai sample. Authors also aimed to investigate psychometric properties by looking at internal consistency of this personality questionnaire, relationships between the six HEXACO factors and the Big Five factors were also ascertained to examine criterion validity.

Results from internal consistency analyses show that HEXACO PI-R Thai language, translated by Kattiya Ratanadilok as a part of the larger cross-cultural research (Ion et al., 2017) has satisfactory results. Cronbach's alphas of HEXACO PI-R subscales 100-item and 60-version of HEXACO PI-R ranged from .68 to .86. In Ion et.al study (2017) internal consistency values of HEXACO PI-R studied in Thai sample (N = 210) ranged from .67 to .75. It can be seen that results from this study have slightly better reliability. It might be the case that this study employed bigger sample size which, at the same time, indicates that results are more representative and provides better generalizability. When consider its relationships with personality scores from Five Factor Model measure, it was found that Extraversion, Agreeableness, Openness to Experiences and Conscientiousness from Five Factor Model have high correlation with those factors from HEXACO model ($r > .7$) which indicates that these four factors measure relatively comparable constructs.

However, Emotionality factor shows moderate association with Neuroticism from Five Factor Model. Although these two factors, Emotionality and Neuroticism are superficially similar but there is a substantial difference. To clarify, Emotionality is more related to the idea of being able to maintain emotionally stable and balance toward stressor, physical harms, and a need for support from others while Neuroticism is related to a tendency of experiencing negative emotion (Ashton & Lee, 2007; Kibeom Lee & Ashton, 2004).

These findings consistent with a study by Bashiri (2011) where the sample was undergraduate students in Iran. In Bashiri's study, it was found that Emotionality factor of HEXACO moderately correlated with Neuroticism from IPIP-NEO (r = .41) (Bashiri, Barahmand, Saeed, Hossein, & Vusugi, 2011). It also congruent with a study by Ashton (2014) which found moderate correlation between Neuroticism and Emotionality measured from 60-item version of HEXACO PI-R (r = .55). This significant partial association between the two personality factors from two personality model seems to be found cross-culturally.

In terms of Honesty-humility; an individual's sincerity, fairness, greed avoidance, and modesty, results revealed small correlation with the personality traits based on Five Factor model. According to Ashton (2014), this factor is partially overlapped with Agreeableness from Five Factor but it is largely distinct from Five Factors measure. This present study found significant relationship between Honesty-humility and Agreeableness from Five Factor but the coefficient is small (r = .3) which is similar to the coefficient value ascertained by Ashton's study (r = .28). Thus, these findings support the HEXACO model of personality.

The HEXACO model of personality can also be supported by the confirmatory factor analysis results from this present study. Results from the CFA confirm the six personality factors as proposed in HEXACO model (Ashton & Lee, 2009; Bashiri et al., 2011; Ion et al., 2017; Lee & Ashton, 2018). In Ashton and Lee's study (2009), the fit indices from their Thai sample were CFI = .888, RMSEA [90%CL] = .053 [.040, .066]. However, the p-value of Chi-Square statistic is significant, this might be the case that the authors employed Maximum Likelihood method which is sensitive to a large sample size (Bentler & Bonett, 1980; Joreskog & Sorbom, 1993). So, authors sought alternative indices to assess model fit. One of a statistic that diminishes the impact of sample size on the Model Chi-Square is relative/normed chi-square ($\chi 2/df$) (Wheaton, Muthen, Alwin, & Summers, 1977). According to Wheaton (1977), this value should not exceed 5 (Wheaton et al, 1977). In this study, result showed that the relative chi-square values were 4.7 after modifying the model by letting the errors within the facets to be correlated. In general, RMSEA values less than 0.05 is considered good, values between 0.05 and 0.08 are acceptable, values between 0.08 and 0.1 are marginal, and values greater than 0.1 is poor (Fabrigar L. R., et al, 1999). It can be seen that RMSEA value of this sample is acceptable (.066). Moreover, the CFI value is close

to 0.9 which is good fit. Additionally, according to Bentler (1990), NNFI index should be over .9. The result from this found that NNFI is lower than .9 but it is slightly and after modifying the model by allowing items errors within the factors to be correlated, the goodness-of-fit indices improved.

5. CONCLUSIONS

To summarized, results from this study support the HEXACO model in Thai sample. Results also indicate that the HEXACO PI-R both full and short version (100 items, 60 items) could be a useful tool for measuring personality traits. Additionally, using this model might be more beneficial over using the Five Factor model as it provides more insight into personality by being able to measure an individual sense of honesty and humility. However, although sample size of this study is considerably large, generalization of findings still is limited due to an imbalance of the sample's genders and educational background. Moreover, this study was conducted online; finding might not be applied to non-internet users. Further study should try to eliminate this limitation by balancing male and female sample as well as research in sample with more variety educational and socioeconomic background.

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Declaration of interest

The authors declare that they do not have any conflict of interest.

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