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Two-Year Stability and Change among the Honesty-Humility, Agreeableness, and
Conscientiousness Scales of the HEXACO100 in an Australian Cohort, Aged 24-29 Years

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Abstract

A surge in longitudinal personality research has yielded insights into how our personalities change over life stages. Very little of this research, however, has employed the HEXACO model of personality, and thus little is known about the life-course of, especially, the honesty-humility dimension, nor of the longitudinal psychometric properties of the HEXACO personality inventories. In this study, we investigate the stability and change over two years amongst three of the HEXACO dimensions (honesty-humility, agreeableness, and conscientiousness) using the HEXACO-100, in a sample of 214 members of an Australian cohort study (the Raine Study) in the later stage of early adulthood (ages 24-27 to ages 26-29). We found that the test-retest stability of the dimension and facet scales was generally high (.80 for honesty-humility, .75 for agreeableness, and .74 for conscientiousness; mean for facets = .67), and that maturation in the sample was evidenced by increases in honesty-humility ($d = .19$), conscientiousness ($d = .23$), and to a lesser extent, agreeableness ($d = .12$) over the two years.

Keywords: HEXACO-100, test-retest reliability, stability, change, personality, honesty-humility, agreeableness, The Raine Study

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1. Introduction

Two major developments in the study of personality have been advances in the understanding of personality over the lifespan, and the evolution of the HEXACO personality model (Ashton & Lee, 2007). Regarding the former, findings from many large-scale and long-term longitudinal studies of personality have been integrated, leading to theoretical and empirical insights into how and why our personalities change over the lifespan (Graham et al., 2020). Meanwhile, meta-analyses have illustrated the utility of the HEXACO model, beyond the Five Factor Model (FFM), for understanding cooperative and exploitative behaviors (e.g., Zettler, Thielmann, Hilbig, & Moshagen, 2020). Thus far, however, very little longitudinal personality research has employed the HEXACO model. Further, that which has done so (Milojev & Sibley, 2014) used a brief IPIP-derived measure of the HEXACO dimensions rather than an original HEXACO inventory. In the current two-year lagged study of Australians aged from mid-to-late 20s, we examine stability and change among three of the major HEXACO dimensions: honesty-humility, agreeableness, and conscientiousness. In so doing, we move beyond extant cross-sectional studies of age with HEXACO personality to contribute new insights into the within-person psychometric properties of one of the HEXACO inventories, and into stability and change over a two-year slice in the later point of the emerging adulthood life stage (Arnett, 2001).

1.1 Personality Change in Emerging Adulthood

Emerging adulthood describes the lifecycle stage (from 18 to late 20s) where people move through a period of exploration of their individuality and identity (Arnett, 2001). In typical (i.e., normative) circumstances, the emerging adulthood period concludes as people invest in major social identities and take on adult social roles. In so doing, they *anticipate* a

need to conform to expectations about mature adult behavior (e.g., being responsible, able to work with others, and emotionally stable) and *discover* that conforming to these expectations is rewarded by influential others (Nye & Roberts, 2019). Accordingly, the ‘maturity principle’ (Caspi, Roberts, & Shiner, 2005), states that normative changes on certain traits will form a predictable pattern, caused by the aforementioned mechanisms. As people progress through the late phase of emerging adulthood, longitudinal studies have revealed corresponding increases in traits that describe increasing maturity, namely conscientiousness, agreeableness, and emotional stability (e.g., Damian, Spengler, Sutu, & Roberts, 2019).

In contrast to the more dominant FFM, which has been studied extensively with longitudinal designs, much of what is known about the associations of age with HEXACO personality dimensions is garnered from a cross-sectional study by Ashton and Lee (2016; see also Kawamoto, 2016). Consistent with the maturity principle, Ashton and Lee found a modest positive linear relation of conscientiousness with age from about age 24, a trend we expected to observe in this study. In an apparent contradiction with the maturity principle, however, Ashton and Lee (2016) found that mean HEXACO agreeableness was weakly *negatively* associated with age from 20 to about the 40s before becoming positive again during the 40s and beyond. Ashton and Lee speculated that the negative trend may reflect the challenges of raising children giving rise to self-perceived proneness to anger and argumentativeness. Given the conflict in the observations of Ashton and Lee and the maturity principle, in our study, we adopted an exploratory approach to investigating within-person changes in agreeableness.

Finally, relatively little is known about the impact of the maturation process on the honesty-humility dimension. Maturation would likely include being able to cooperate with people despite opportunities being present to exploit them, and trust those others to cooperate as well, when one is vulnerable to exploitation. Indeed, the criminalization of many

exploitative behaviors implies a strong normative expectation to avoid these behaviors. Consistent with this, Ashton and Lee (2016) observed a strong near-linear and positive association of age with honesty-humility from the early 20s until retirement age. Milojev and Sibley (2014) also observed positive associations in a New Zealand sample of age with an IPIP-derived measure of honesty-humility from emerging adulthood, and an increase in honesty-humility over time in their age-diverse cohort. We therefore expected to observe positive within-person changes over time in honesty-humility.

2. Method

2.1 Participants

Participants of this study were “Gen2” members of the Raine Study (<http://rainestudy.org.au>), which is an ongoing Western Australian-based cohort study that commenced in 1989 (Straker et al., 2017). Over a two-year period, 2900 pregnant women (“Gen1”), approximately 18 weeks from gestation, were invited to join the cohort study. For our study, 1239 “Gen2” participants, the adult children of Gen1, were invited to participate in March 2016 (aged 24-27) and in May 2018 (aged 26-29) over five-month windows. In total, 471 participants completed the 2016 survey, 327 completed the 2018, and 214 (65% female) both surveys; this latter group is the focus of this study (mean age \approx 25.2 and 27.4 years, $SD = 0.74$). In 2016, slightly over half of this group had completed university education (55%), with a further 28% enrolled, and 86% were in some form of paid employment.

2.2 Procedure and Measures

Each participant was sent an invitation to complete an online questionnaire via the university’s Qualtrics platform. In 2016, the questionnaire included all six 16-item measures of the major HEXACO personality dimensions from the HEXACO-100 (Lee & Ashton, 2018). As this project was part of a larger study, to reduce overall survey’s length in 2018, only the honesty-humility, agreeableness, and conscientiousness scales were retained.

Cronbach's alphas for the dimension and facet scores are shown in Table 1. Alphas among facets were generally above .60, however sincerity and prudence fell below this threshold in the 2016 assessment.

3. Results

3.1 Preliminary Analyses

Prior to final analyses, we compared the HEXACO dimension and facet scores of those who participated in both surveys to those who only participated in the 2016 survey. We also undertook measurement invariance tests. Neither analysis identified any major concerns so we proceeded with our final analyses (see details in the online supplement, <https://osf.io/ybfa7>).

3.2 Stability and Change Analyses

We first investigated both the test-retest correlations from 2016 to 2018, reported in Table 1. The test-retest correlations among the dimensions were .80 (honesty-humility), .75 (agreeableness), and .74 (conscientiousness). Among the facet scales, the test-retest correlations ranged from .58 (prudence) to .78 (greed avoidance), with a mean of .67.

To examine changes in scores observed from ages 26/27 to 28/29, we undertook a series of *t*-tests, which are reported in Table 1, along with Cohen's *d* effect size estimates. We observed a near-exclusively positive trend among the score changes; the one exception was sincerity which declined slightly, though we note that this scale exhibited the lowest alpha reliability. Further, statistically significant changes were observed on eight out of twelve facets and all three of the dimension scales, with changes being approximately one-eighth to one-fifth of a pooled standard deviation.

---Table 1 here---

Table 1.

Means, Standard Deviations, Cronbach's Alphas observed among HEXACO Facets and HEXACO Dimension Scales in 2016 and 2018, and Mean Score Comparisons and Test-Retest Correlations.

	2016			2018			Difference (2018-2016)	<i>t</i> (<i>df</i> = 213)	<i>p</i>	Pooled SD	Cohen's <i>d</i>	Test-Retest Correlation
	Mean	SD	Alpha	Mean	SD	Alpha						
Honesty-Humility facets												
Sincerity	3.48	0.66	.560	3.45	0.68	.619	-0.03	-0.73	.467	0.67	-0.05	.588
Fairness	3.74	0.78	.673	3.85	0.75	.678	0.11	2.92**	.004	0.76	0.15	.730
Greed Avoidance	3.11	0.89	.818	3.27	0.83	.777	0.16	4.20***	.000	0.86	0.19	.784
Modesty	3.77	0.69	.695	3.90	0.63	.767	0.13	3.75***	.000	0.66	0.20	.691
Agreeableness facets												
Forgivingness	2.56	0.78	.788	2.66	0.78	.787	0.09	2.24*	.026	0.78	0.12	.695
Gentleness	3.21	0.70	.653	3.22	0.68	.645	0.01	0.30	.763	0.69	0.02	.593
Flexibility	3.01	0.72	.631	3.07	0.71	.663	0.07	1.49	.137	0.72	0.09	.599
Patience	3.26	0.87	.827	3.37	0.80	.797	0.11	2.67**	.008	0.84	0.13	.744
Conscientiousness facets												
Organized	3.77	0.83	.757	3.94	0.69	.693	0.17	4.32***	.000	0.76	0.22	.730
Diligence	3.87	0.69	.739	3.95	0.60	.671	0.08	2.19*	.030	0.64	0.13	.647
Perfectionism	3.66	0.68	.687	3.72	0.64	.642	0.07	1.82	.070	0.66	0.10	.686
Prudence	3.47	0.61	.563	3.59	0.66	.690	0.12	2.98**	.003	0.64	0.19	.578
Dimension Scales												
Honesty-humility	3.52	0.52	.798	3.62	0.48	.773	0.09	4.36***	.000	0.50	0.19	.801
Agreeableness	3.01	0.58	.855	3.08	0.55	.845	0.07	2.57*	.011	0.56	0.12	.749
Conscientiousness	3.69	0.51	.820	3.80	0.46	.801	0.11	4.58***	.000	0.48	0.23	.743

Notes.

$N = 214$; The denominator of Cohen's d is the pooled standard deviation. * $p < .05$, ** $p < .01$, *** $p < .001$.

4. Discussion

This study sought to examine stability and change in relation to the honesty-humility, agreeableness, and conscientiousness dimensions and corresponding facets of the HEXACO model among an Australian sample of people in the late stage of emerging adulthood (25/26 years to 27/28 years). Indeed, this is the first study we are aware of that has used the HEXACO-100 inventory longitudinally. Among the dimensions, we observed a high rank-order stability over two years in the three dimensions, and particularly honesty-humility. Among the facets, rank-order stability was more moderate, though the mean re-test correlation was still reasonably high at .67, and comparable to those observed in other two-year studies (e.g., Leikas & Salmela-Aro, 2015).

We also observed a general trend towards increasing maturity among this emerging adult cohort, with higher scores observed on all but the sincerity facet. The largest observed effect size was approximately one-fifth of a standard deviation, which is similar in magnitude to those observed in other longitudinal studies of the FFM capturing similar life stages (Roberts, Walton, & Viechtbauer, 2006). The within-person change in honesty-humility was also consistent with the cross-sectional age trends observed by others (Ashton & Lee, 2016; Kawamoto, 2016).

In contrast to the findings of Ashton and Lee's (2016) cross-sectional study, we observed an *increase* in agreeableness and on two of its facets, forgivingness and patience. We investigated Ashton and Lee's speculation that raising children might be a causal contributor of a decline in self-rated agreeableness. Relatively few participants (26) had children up until 2018 (and for 15 of them, the children were born after 2016) and no relations of parenthood status, or change in parenthood status, with agreeableness were observed in our post-hoc analysis. Thus, it remains unclear why the discrepancy in findings emerged.

4.1 Limitations

While the omission of three of the HEXACO dimension scales (emotionality, extraversion, and openness) is a limitation, we note that longitudinal cohort studies very often sacrifice scale length and reliability in favor of breadth. However, brief measures of major personality dimensions can be problematic (Ludeke & Larsen, 2017), and thus in the face of the breadth-depth trade-off, we favored depth. We also acknowledge the possibility that participation in this component of the broader cohort study may be causally determined by factors that also cause personality maturation (e.g., avoidance of illness or legal encounters), potentially yielding an exaggerated account of the maturation process in this study.

4.2 Conclusion

The HEXACO model is relatively under-used in longitudinal studies of personality. This study suggested that its unique factor, honesty-humility, is affected by the normative maturation experience in the later stages of early adulthood. Agreeableness and conscientiousness also appear to change in the direction of greater maturity over the two-year period. We encourage future life-course researchers to continue investigating the evolution of these personality dimensions over time, including what factors shape individuals' personality change over time.

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