

Factor Structure of the Hierarchical Personality Inventory for Children (HiPIC) as it applies to Autistic Children

Straus, J., Burnheimer, E., Yo, J.

June 8, 2021

Background

- ▶ Autism (ASD) is a neurodevelopmental disorder that affects ~ 1% of the population (APA, 2013)
- ▶ Children with autism may face challenges in responding effectively to emotional situations and everyday encounters
- ▶ Studies found differences in personality traits between typically developing children and children with autism; Researchers found that typically developing children experienced higher levels of conscientiousness as compared to individuals with autism (Fortenberry et al., 2011).
 - ▶ Individuals with ASD are thought to show numerous unique personality tendencies but that “surprisingly little research has examined these issues” (Scribner et al., 2014, p.1)

Study Purpose

Goal of our exploratory study was to see whether the Hierarchical Personality Inventory for Children (HiPIC) questionnaire, which is normed on a general population, can be applied to children with Autism Spectrum Disorder (ASD).

Hypothesis & Research Question

- ▶ The Big Five domains of personality exist within the autistic population but that the subdomains may differ since personality differences can affect individuals with ASD.
- ▶ Which personality traits emerge within the Conscientiousness domain (i.e., one of the Big Five personality domains) from the HiPIC questionnaire for this sample of autistic children?

Data - Wood et al. (2019) Study

- ▶ 195 participants, 7-13 years of age ($M = 9.98$, $SD = 1.81$)
- ▶ Recruited participants from 3 major US Universities through fliers, clinician referrals, and letters.

Demographics by Gender, Race, & Ethnicity	%
Female	20
White	76
Latinx	22
Asian/Pacific Islander	8
African American	6
Multiracial	3
American Indian/Alaskan Native	1

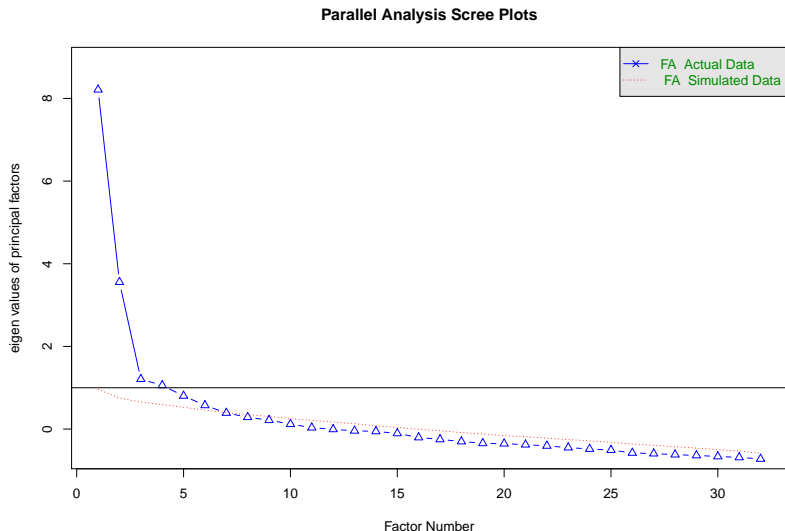
Hierarchical Personality Inventory for Children (HiPIC)

- ▶ 144 item questionnaire completed by child's parent/caregiver
- ▶ Instructed parents/caregivers to describe their child by their most frequent behaviors that occurred within the last year
- ▶ 5-point Likert scale (*barely characteristic* to *highly characteristic*)
- ▶ Measures the Big Five personality domains
 - ▶ Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness
 - ▶ 18 subdomains split within the Big Five domains
- ▶ Focused on Conscientiousness
 - ▶ 32 items, 4 subdomains (Achievement, Orderliness, Concentration, and Persistence)

Procedure

- ▶ Observed and reversed HiPIC Conscientiousness items to ensure consistent direction
- ▶ Confirmed with Cronbach's α among cleaned conscientiousness items ($\alpha = 0.885$)
- ▶ Examples of Items:
 - ▶ goes to school against his/her will (RC)
 - ▶ leaves everything lying around (RC)
 - ▶ has a sense of order
 - ▶ makes a mess of things (RC)

Procedure - Parallel Analysis



► Reveal 7 Factors, 4 factors with $\lambda > 1$.

Procedure - EFA & CFA Analysis

- ▶ Parallel analysis showed more factors than HiPIC was intended to measure
- ▶ Proceed with EFA:
 1. Conduct EFA and observe model fit indices
 2. Remove items that did not fit and/or had loadings < 0.45 in all factors
 3. Repeat steps 1 & 2 until satisfactory model fit
- ▶ Proceed with CFA

EFA Results

Table 1: EFA Model Results and Actions Taken

EFA Analysis	TLI	RMSEA	RMSR	Action Taken
7-Factor v1	.731	.099	.040	Removed 9 items
7-Factor v2	.829	.094	.094	Decide to run 6-Factor EFA
6-Factor v1	.804	.101	.030	Removed 1 item
6-Factor v2	.840	.094	.030	Removed 1 item
6-Factor v3	.830	.094	.030	Decide to run 5-Factor EFA
5-Factor	.784	.110	.040	Decide to run 4-Factor EFA
4-Factor	.716	.121	.050	Decide to run 6-Factor CFA

EFA Results

Oblimin-rotated factor loadings of exploratory factor analysis with 21 conscientiousness items from autistic population (N = 195)

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Wants to be among the best	<i>0.63</i>	-0.13	0.01	0.03	-0.06	-0.09
Always does his/her best	<i>0.60</i>	0.02	0.21	0.13	-0.08	0.21
Strives for perfection	<i>0.90</i>	-0.05	0.01	-0.11	0.07	0.12
Makes heavy demands on him/herself	<i>0.88</i>	-0.01	0.03	-0.04	-0.01	-0.02
Dedicates oneself to things with full conviction	<i>0.59</i>	0.02	0.05	0.18	0.03	0.02
Works hard to get top marks	<i>0.67</i>	0.10	-0.11	0.28	-0.02	0.09
Wants to shine at everything	<i>0.82</i>	0.04	-0.05	0.02	0.06	-0.16
Leaves everything lying around	0.01	<i>0.60</i>	0.26	0.04	-0.08	0.11
Makes a mess of things	-0.03	<i>0.97</i>	-0.10	-0.02	0.06	0.04
Acts rather thoughtlessly	0.01	<i>0.64</i>	0.21	-0.03	0.02	-0.12
Hates cleaning up	0.04	<i>0.52</i>	0.27	0.08	-0.12	0.06
Takes the easiest way out	-0.06	0.00	<i>0.85</i>	-0.03	0.09	0.09
Prefers to leave the work to others	0.10	0.09	<i>0.78</i>	0.10	0.03	-0.07
Keeps at it when the going gets tough	-0.02	0.01	0.01	<i>0.80</i>	-0.02	0.04
Perseveres until the goal is achieved	0.03	-0.02	0.01	<i>0.86</i>	0.09	-0.01
Can occupy him/herself for a long time	-0.03	0.11	-0.17	-0.02	<i>0.60</i>	0.13
Works with sustained attention	0.05	-0.04	0.13	0.13	<i>0.65</i>	0.06
Can concentrate on one thing for a long time	0.04	0.01	0.10	0.02	<i>0.79</i>	-0.05
Has a sense of order	0.00	0.02	0.01	-0.02	0.10	<i>0.65</i>
Takes care of his/her possessions	0.06	0.12	-0.03	0.03	0.00	<i>0.61</i>
Does work in a careful and neat way	0.04	0.01	0.14	0.18	-0.01	<i>0.50</i>

- The SS loadings range from 1.43 to 4.06 and these six factors account for 63% of the variance.

CFA Results

Factor loadings of confirmatory factor analysis with 21 conscientiousness items from autistic population (N = 195) with factor labels

	Factor 1 Achievement	Factor 2 Disorderliness	Factor 3 Withdrawing	Factor 4 Perseverance	Factor 5 Concentration	Factor 6 Organization
Wants to be among the best	0.58					
Always does his/her best	0.76					
Strives for perfection	0.88					
Makes heavy demands on him/herself	0.85					
Dedicates oneself to things with full conviction	0.73					
Works hard to get top marks	0.82					
Wants to shine at everything	0.77					
Leaves everything lying around		0.82				
Makes a mess of things		0.83				
Acts rather thoughtlessly		0.68				
Hates cleaning up		0.71				
Takes the easiest way out			0.84			
Prefers to leave the work to others			0.92			
Keeps at it when the going gets tough				0.77		
Perseveres until the goal is achieved				0.94		
Can occupy him/herself for a long time					0.51	
Works with sustained attention					0.83	
Can concentrate on one thing for a long time					0.77	
Has a sense of order						0.64
Takes care of his/her possessions						0.67
Does work in a careful and neat way						0.67

Fit Indices and Limitations

CFA Analysis	TLI	CFI	RMSEA	SRMR
6-Factor model	.827	.856	.098	.073

- ▶ Only the SRMR fell into the acceptable range
 - ▶ Many were close; may have better fit with a larger sample

Conclusions

- ▶ “If you’ve met one person with autism, then you’ve met one person with autism.” - *Professor Stephen Shore*
- ▶ Great variation exists among individuals with ASD
- ▶ Relates with our study of conscientiousness
 - ▶ 4 factors in general population vs. 6 factors in our sample of children with ASD
 - ▶ achievement, orderliness, concentration, persistence, *organization, withdrawing*
- ▶ Redesign a personality measure specifically for those with autism
- ▶ Include more items related to additional factors than suggested in prior research

References

- ▶ American Psychological Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5). American Psychiatric Association: DC.
- ▶ Fortenberry, C. L., Grist, C. L., & McCord, D. M. (2011). Personality trait differences between typically developing children and those diagnosed with autism spectrum disorder. *Individual Differences Research*, 9, 73-83.
- ▶ Jeste, S. S., & Geschwind, D. H. (2014). Disentangling the heterogeneity of autism spectrum disorder through genetic findings. *Nature reviews. Neurology*, 10(2), 74–81.
<https://doi.org/10.1038/nrneurol.2013.278>.
- ▶ Mervielde, I., & De Fruyt, F. (1999). The construction of the hierarchical personality inventory for children (HiPIC). In I. Mervielde, I. Deary, F. De Fruyt, & F. Ostendorf (Eds.), *Personality Psychology in Europe*. Proceedings of the Eight European Conference on Personality Psychology (pp. 107-127). Tilburg: Tilburg University Press.

References

- ▶ Schriber, R. A., Robins, R. W., & Solomon, M. (2014). Personality and self-insight in individuals with autism spectrum disorder. *Journal of personality and social psychology*, 106(1), 112.
- ▶ Schwartzman, B. C., Wood, J. J., & Kapp, S. K. (2016). Can the Five Factor Model of Personality Account for the Variability of Autism Symptom Expression? Multivariate Approaches to Behavioral Phenotyping in Adult Autism Spectrum Disorder. *Journal of autism and developmental disorders*, 46(1), 253–272. <https://doi.org/10.1007/s10803-015-2571-x>.
- ▶ Tackett, J. L., Kushner, S. C., De Fruyt, F., & Mervielde, I. (2013). Delineating personality traits in childhood and adolescence: Associations across measures, temperament, and behavioral problems. *Assessment*, 20(6), 738-751.

References

- ▶ Wood, J.J., Kendall, P.C., Wood, K.S., Kerns, C.M., Seltzer, M., Small, B.J., Lewin, A.B., & Storch, E.A. (2019). Cognitive behavioral treatments for anxiety in children with autism spectrum disorder: A randomized clinical trial. *JAMA Psychiatry*. doi:10.1001/jamapsychiatry.2019.4160.