




# Measuring the Big Five personality factors in South African adolescents: Psychometric properties of the Basic Traits Inventory



## Authors:

Gideon P. de Bruin<sup>1</sup>   
Nicola Taylor<sup>2,3</sup>   
Șerban A. Zanfirescu<sup>4</sup> 

## Affiliations:

<sup>1</sup>Department of Industrial Psychology, Faculty of Economic and Management Sciences, Stellenbosch University, Stellenbosch, South Africa

<sup>2</sup>JvR Psychometrics, Johannesburg, South Africa

<sup>3</sup>Department of Industrial Psychology and People Management, Faculty of Management, University of Johannesburg, Johannesburg, South Africa

<sup>4</sup>Department of Psychology, Faculty of Psychology and Educational Sciences, University of Bucharest, Bucharest, Romania

## Corresponding author:

Gideon de Bruin,  
deondb@sun.ac.za

## Dates:

Received: 27 Sept. 2021  
Accepted: 31 Jan. 2022  
Published: 31 Mar. 2022

## How to cite this article:

De Bruin, G.P., Taylor, N., & Zanfirescu, Ș.A. (2022). Measuring the Big Five personality factors in South African adolescents: Psychometric properties of the Basic Traits Inventory. *African Journal of Psychological Assessment*, 4(0), a85. <https://doi.org/10.4102/ajopa.v4i0.85>

The present study examined the psychometric properties of the Basic Traits Inventory (BTI): a Big Five personality questionnaire that was developed for adults, amongst South African adolescents. The research focussed on (1) whether the factor structure of the inventory manifested similarly for younger and older adolescents and whether this structure matched that found for adults and (2) whether the scales of the BTI yield scores with similar reliabilities for adolescents of different ages and whether these reliabilities match those found for adults. Results demonstrate the replicability of the theoretical five-factor structure of the BTI amongst younger and older adolescents and evidence that the scales yield scores with high reliability. Overall, the results show that the BTI holds promise as a measure of the personality traits of the Big Five model amongst adolescents in the South African context.

**Keywords:** BTI; adolescents; reliability; personality; factor structure.

Whereas the measurement of personality traits in adults appears to be a productive area for research psychologists and practitioners, much less attention is focused on the measurement of personality traits amongst children and adolescents. There are a number of personality inventories available for use with adults, for example, the Revised NEO Personality Inventory (NEO-PI-R) (Costa & McCrae, 2008), the Occupational Personality Questionnaire (SHL, 2009) and the Hogan Personality Inventory (Hogan & Hogan, 2007). By contrast, there are few instruments available for the evaluation of personality in adolescents and children and this may have contributed to the relative scarcity of research carried out in this area. Moreover, the existing research was principally conducted in Europe and Northern America, which raises questions about how personality assessment in adolescents and children can best be performed in non-western contexts. There have been recent efforts to examine the utility of Big Five measures amongst adolescents in non-western contexts (e.g. John, Xavier, Waldmeier, Meyer, & Gaab, 2019; Wu, Lindsted, Tsai, & Lee, 2008), but such research has not been performed in the South African context. Against this background, the present study examines the reliability and validity of the Basic Traits Inventory (BTI) (Taylor & De Bruin, 2006), which has been shown to yield reliable and valid measures of the Big Five in adults (Ramsay et al., 2008; Taylor & De Bruin, 2006, 2013), amongst adolescents in the South African context.

The Big Five model of personality is arguably the most widely accepted model of personality traits. There are many instruments that have been developed using this model as the underlying structure (cf. Eds. De Raad & Perugini, 2002), for instance the NEO-PI-R (Costa & McCrae, 2008), the Hogan Personality Inventory (Hogan & Hogan, 2007), the Big Five Inventory (Goldberg, 1993) and the Big-Five Questionnaire (Caprara et al., 1993). Measures of the Big Five have also been developed for children and adolescents, for example, Hierarchical Personality Inventory for Children (HiPIC; Mervielde & De Fruyt, 2002) and the Five-Factor Personality Inventory – Children (FFPI-C; McGheem, Ehrier, & Buckhalt, 2007). Taylor and De Bruin (2006) developed the BTI as a measure of the Big Five traits amongst adults in the multicultural and multilingual South African context, where the vast majority of the population are African. Similarly, Fetvadjev, Meiring, Van de Vijver, Nel and Hill (2015) recently developed the South African Personality Inventory (SAPI), which includes but is not restricted to the Big Five factors.

## The structure and measurement of personality in adolescence

The dominant model of personality structure amongst adults specifies that individual differences in personality attributes can be optimally described in terms of five factors. Whereas the labels

Copyright: © 2022. The Authors. Licensee: AOSIS. This work is licensed under the Creative Commons Attribution License.

## Read online:



Scan this QR code with your smart phone or mobile device to read online.

and definitions of the traits varies somewhat across countries, instruments and authors, the five traits are commonly labelled as extraversion, neuroticism, conscientiousness, agreeableness and openness/intellect (De Raad, 2000). The five factors present a satisfactory balance between bandwidth and fidelity, which means that the factors provide an economical description of personality, yet allow for meaningful prediction of important outcomes (Ones & Viswesvaran, 1996), such as health, education and work performance (e.g. Cheng, Weiss, & Siegel, 2015; Judge & Zapata, 2015).

The Big Five structure has been shown to be replicable across different cultures amongst adults (Rolland, 2002). Personality psychologists have also demonstrated that the Big Five factors are also useful in personality description of adolescents (De Fruyt, Mervielde, Hoekstra, & Rolland, 2000; McCrae, Martin, & Costa, 2005; Mervielde & De Fruyt, 2002; Parker & Stumpf, 1998; Shiner & Caspi, 2003; Soto & Tackett, 2015). Indeed, the so-called Little Six model of personality in childhood and adolescence includes the Big Five traits with the addition of activity as a sixth trait (Soto & John, 2014; Soto & Tackett, 2015).

There has been some debate in the literature as to whether the Big Five model of personality is an adequate representation of the structure of personality in childhood and adolescence. Soto, John, Gosling and Potter (2008) postulated that the factor structures of personality measures 'should be recovered less clearly in the responses of children and adolescents than in those of adults' (p. 720). This is related to an increasing awareness of identity and differentiation of self-concept with age, which should lead to more clearly defined structures amongst adults. In this respect it appears that self-report ratings indeed become more consistent, and factors are better differentiated with an increase in age (Soto et al., 2008; Soto & John, 2014).

A related issue is the consistency with which persons respond to evaluations of their own behaviour and attributes and how this relates to age. In this respect Soto et al. (2008) suggested that older adolescents would likely respond more consistently to personality items than younger adolescents, which would manifest in better reliability coefficients of measures of the traits for older adolescents. They suggest that the reason for this is because older adolescents have more developed self-concepts and better ability to evaluate the issues of logical consistency when rating their own behaviour.

## Hierarchy and continuity

Soto, John, Gosling and Potter (2011), highlighted two principles with respect to youth personality development. The first principle states that that youth personality traits are organised *hierarchically* in a similar fashion to adult traits (Soto & John, 2014) that is higher-order traits (e.g. agreeableness) subsuming narrow, lower-order ones (e.g. modesty and generosity). The *cumulative-continuity principle* states that changes in personality traits occur during the

transition from childhood to adulthood and that traits reach their highest levels of stability in adulthood (Roberts & DelVecchio, 2000; Soto & Tackett, 2015).

## Basic Traits Inventory

The BTI (Taylor & De Bruin, 2006) was developed using a combined emic-etic approach to test development. From an etic perspective, the Big Five taxonomy was used to inform the five-factor structure of the inventory. From an emic perspective, the items were developed keeping the multilingual and multicultural South African context in mind. Two versions are available, namely an English and an Afrikaans version. The items are brief, require a low reading level and avoid cultural particularities. In other words, the development philosophy was that the items should be comprehensible for persons who complete it in a language other than their first language and that the items should include content that would be relevant to most adults in South Africa. For a more detailed description of the development of the BTI, please consult Taylor (2004, 2008) or Taylor and De Bruin (2006).

The BTI measures five factors, namely extraversion, neuroticism, conscientiousness, openness to experience and agreeableness. Each factor has a number of sub-factors (varying between four and five), called facets, which measure narrow aspects of the broader factors and provide potentially rich interpretive information (e.g. De Vine & Morgan, 2020). The five-factor structure of the BTI has been replicated with adults across gender groups, language groups and cultural groups in numerous studies (Ramsay et al., 2008; Taylor, 2008; Taylor & De Bruin, 2006). The reliability of the five-factor scores is consistently higher than 0.85 and most facets consistently demonstrate reliability coefficients of 0.70 and above (Taylor & De Bruin, 2006, 2013).

Against the background of the lack of personality inventories suitable for the use with adolescents and emerging evidence that the Big Five structure is replicable and provides adequate descriptions of personality amongst adolescents (Cheng et al., 2015; McCrae et al., 2005; Wu et al., 2008), the present study examined the factor structure and reliability of the BTI for South African adolescents. The BTI was deemed appropriate given the steps that were taken in its development to keep the content brief and simple, which could facilitate its use with adolescents. It is necessary to demonstrate the structural validity and reliability of the BTI with adolescents given the cautions that have been expressed regarding the differentiation and consistency of personality in childhood and adolescence

In particular, the present study examined (1) the similarity of the factor structure of the BTI, and (2) the reliability of the Big Five traits and their facets across younger adolescents (12–15 years), older adolescents (16–18 years) and the normative adult sample (18–72 years).

## Method

### Participants

Participants were 450 boys and 415 girls from various schools across South Africa. There was an almost even split between black ( $n = 313$ ; 36%) and white ( $n = 321$ ; 37%) adolescent respondents. An additional 10% was made up of mixed-race respondents ( $n = 91$ ), whereas Asian or Indian respondents made up 4% of the sample ( $n = 35$ ). Younger adolescents (15 years and younger,  $M_{\text{age}} = 14.54$ ,  $s.d. = 0.56$ , age range = 13–15 years) made up 44% of the sample ( $n = 381$ ) and older adolescents (16–18 years,  $M_{\text{age}} = 16.90$ ,  $s.d. = 0.79$ , age range = 16–years) made up 56% of the sample ( $n = 484$ ). All participants were high school learners.

The normative adult sample consisted of 5352 participants ( $n = 3323$  female respondents). The participants specified their ethnic group as black people ( $n = 3548$ ; 66.3%), white people ( $n = 790$ ; 14.8%), mixed-race ( $n = 180$ ; 3.4%), Asian ( $n = 139$ ; 2.6%), other ( $n = 31$ ; 0.6%) and 12.4% ( $n = 664$ ) didn't specify their corresponding ethnic group. The sample consisted of adults aged 18 to 72 years ( $M_{\text{age}} = 24.81$ ,  $s.d. = 5.67$ ). The participants in the normative sample completed the BTI for selection and personal development purposes.

### Procedure

Data were collected over a period of 3 years across a number of different initiatives in different provinces. Data collection in other provinces was performed as part of career information processes or other youth initiatives that were not necessarily large-scale school assessments. For all data collection initiatives, participation was voluntary and participants were provided with feedback on their results along with a personal development workshop or personal feedback session. Parental consent was obtained where required, along with individual informed consent from each of the participants. Assessments were administered in a supervised setting, either using paper and pencil format or online through the JvR Online platform that hosts the BTI scoring and reporting facility.

### Qualitative evaluation

A total of 27 second-language English high school learners (13 boys and 14 girls) were asked to evaluate the items of the English BTI in terms of their relevance to them at their age (between 14 and 17 years). A total of 7 of the 193 items were flagged as potentially problematic. Two items were flagged because of content related to working long hours, where some learners indicated that they did not have a job, so could not answer. Three items were flagged with regard to contributing to charity or lending money, which some learners indicated that they do not earn money so could not contribute. One item was flagged regarding the discussion of politics, where some learners indicated that they were not interested in political matters. One item regarding making changes in the house was flagged as the

learners indicated that they did not own houses. The flagged items were retained in all statistical analyses, however, were earmarked for revision in a future version of the BTI for adolescents.

## Results

We used the *psych* package (Revelle, 2017) in R (R Core Team, 2016) to subject the correlations of the 24 BTI facets of the pooled adolescent data set to an unrestricted unweighted least squares factor analysis. We decided the number of factors to retain with reference to Velicer's MAP test, the empirical Bayesian Information Criterion (eBIC), Horn's parallel analysis, Cattell's scree plot, the Root Mean Squared Residual (RMSEA) and the Standardised Root Mean Squared Residual (SRMR). The maximum *a-posteriori* (MAP) criterion and the eBIC reached their respective minima with five factors. Parallel analysis evidenced that only the first five roots had eigenvalues that exceeded those of random data, and the scree plot revealed a clear elbow in the plot of the eigenvalues after the fifth root. With five factors extracted, the RMSEA = 0.05 and the SRMR = 0.02 suggested satisfactory fit with the observed data. Against this background, and theoretical expectation, we retained five factors.

Next, we obtained separate unweighted least squares five-factor solutions for adolescents of 15 years and younger (labelled the younger adolescents) on the one hand and adolescents 16 year and older (labelled the older adolescents) on the other hand. For each group the factor solution was rotated to a target structure based on the theoretical structure of the BTI. The factors were allowed to freely correlate.

In both groups the obtained factor pattern matrices corresponded closely with the theoretical structure of the BTI.<sup>1</sup> On the basis of the pattern of high and low loadings of the 24 facets the factors were labelled as follows: Factor 1 = conscientiousness; Factor 2 = neuroticism; Factor 3 = openness to experience; Factor 4 = agreeableness and Factor 5 = extraversion.

Next, we examined the similarity of the empirically obtained factor pattern matrices of the two groups. Congruence coefficients (Tucker's phi coefficient) of corresponding factors show that the factors manifested very similarly across the two groups of adolescents (conscientiousness,  $\Phi = 0.98$ ; neuroticism,  $\Phi = 0.99$ ; openness,  $\Phi = 0.97$ ; agreeableness,  $\Phi = 0.98$ ; and extraversion,  $\Phi = 0.96$ ; Table 1). These coefficients indicate that the corresponding factors of the younger and older adolescents can be considered similar (Lorenzo-Seva & Ten Berge, 2006).

We also compared the empirical target rotated factor pattern matrices of the two adolescent groups with the rotated factor pattern matrix of the adult standardisation sample (as reported in Table 8 of the BTI manual [Taylor & De

1. These factor pattern matrices can be obtained from the first author on request.

Bruin, 2006)). For both adolescent groups each facet's primary factor loading corresponded with the pattern of loadings observed for adults. The coefficients of congruence of the corresponding factors of the younger adolescents and adults were as follows: conscientiousness,  $\Phi = 0.97$ ; neuroticism,  $\Phi = 0.99$ ; openness,  $\Phi = 0.97$ ; agreeableness,  $\Phi = 0.97$ ; and extraversion,  $\Phi = 0.96$ . In turn, the coefficients for the older adolescents and the adults were as follows: conscientiousness,  $\Phi = 0.97$ ; neuroticism,  $\Phi = 0.98$ ; openness,  $\Phi = 0.97$ ; agreeableness,  $\Phi = 0.97$ ; and extraversion,  $\Phi = 0.97$ . These coefficients indicate that the corresponding factors of the adolescents and the working adults can be considered similar.

On the basis of the high levels of factor similarity across the younger and older adolescents we obtained a target rotated solution for the pooled adolescent data set. The factor pattern matrix is presented in Table 2, which shows that each facet had a salient loading ( $> 0.30$ ) on its target factor. Two facets had cross-loadings that just

exceeded the  $|0.30|$  criterion on non-target facets (i.e. ascendance on the conscientiousness factor ( $\lambda = 0.33$ ) and excitement-seeking on the conscientiousness factor [ $\lambda = -0.33$ ]). The factor correlations are given in Table 3, which shows small to medium sized correlations between the five factors. Somewhat lower correlations between the factors were observed for the adolescents compared with the adults.

The reliability coefficients (Cronbach's alpha) of the five factors and the facets across the two groups and the working adult group are given in Table 4, which shows that the personality scales yielded scores with similar levels of measurement precision across the three groups. Across the five traits the reliability coefficients of the three groups were within  $|0.01|$  of each other, with coefficients ranging from 0.86 to 0.95 across the five traits. Overall, the reliability coefficients indicate a high level of measurement precision for each of the five scales.

**TABLE 1:** Coefficients of congruence of Basic Traits Inventory factors for younger and older adolescents.

Factor	C	N	O	A	E
Conscientiousness (C)	<b>0.98</b>	-0.05	0.06	0.12	0.07
Neuroticism (N)	-0.05	<b>0.99</b>	-0.01	0.01	-0.02
Openness (O)	0.11	0.01	<b>0.97</b>	0.08	0.11
Agreeableness (A)	0.16	0.01	0.17	<b>0.98</b>	0.05
Extraversion (E)	0.06	-0.06	0.13	0.09	<b>0.96</b>

Note: Corresponding factors of the two groups are printed in bold.

**TABLE 3:** Basic Traits Inventory factor correlations for the pooled adolescent group and normative working adult group.

Factor	C	N	O	A	E
Conscientiousness (C)	1	-0.43	0.59	0.36	0.27
Neuroticism (N)	-0.31	1	-0.22	-0.10	-0.12
Openness (O)	0.27	0.11	1	0.52	0.40
Agreeableness (A)	0.47	-0.16	0.42	1	0.60
Extraversion (E)	0.24	-0.28	0.34	0.24	1

Note: Correlations for adolescents below the diagonal and correlations for adults above the diagonal.

**TABLE 2:** Oblique target rotated factor pattern matrix of the 24 Basic Traits Inventory facets for the pooled adolescent group.

Facet	Factor										h <sup>2</sup>
	Conscientiousness		Neuroticism		Openness		Agreeableness		Extraversion		
	Loadings	Discrepancies	Loadings	Discrepancies	Loadings	Discrepancies	Loadings	Discrepancies	Loadings	Discrepancies	
Ascendance	0.33	(-0.17)	0.03	(-0.08)	0.03	(0.01)	-0.12	(0.03)	<b>0.51</b>	(0.03)	0.40
Liveliness	0.22	(-0.12)	0.08	(-0.02)	0.02	(-0.13)	0.04	(-0.04)	<b>0.60</b>	(0.17)	0.47
Positive affectivity	0.06	(-0.01)	-0.23	(0.12)	0.00	(-0.04)	0.25	(-0.07)	<b>0.35</b>	(0.15)	0.38
Gregariousness	-0.19	(0.11)	-0.05	(0.00)	0.00	(0.05)	0.08	(-0.03)	<b>0.74</b>	(0.11)	0.55
Excitement seeking	<b>-0.33</b>	(-0.05)	0.10	(0.05)	0.15	(-0.03)	-0.14	(0.26)	<b>0.47</b>	(0.07)	0.32
Affective instability	0.04	(-0.05)	<b>0.78</b>	(-0.06)	0.05	(0.01)	-0.24	(0.30)	0.10	(0.00)	0.65
Depressed mood	-0.06	(0.06)	<b>0.82</b>	(0.03)	0.06	(-0.01)	0.04	(0.01)	-0.06	(0.00)	0.75
Self-consciousness	-0.03	(0.05)	<b>0.80</b>	(0.01)	-0.10	(0.08)	0.20	(-0.22)	0.00	(-0.01)	0.62
Anxiety	0.05	(0.04)	<b>0.77</b>	(0.06)	-0.06	(-0.01)	0.08	(-0.03)	-0.02	(0.02)	0.56
Effort	<b>0.75</b>	(-0.02)	-0.07	(0.11)	-0.03	(0.00)	0.01	(-0.06)	0.12	(-0.02)	0.65
Order	<b>0.75</b>	(0.06)	0.06	(0.00)	-0.04	(-0.05)	0.10	(0.09)	0.01	(-0.03)	0.61
Dutifulness	<b>0.67</b>	(0.01)	-0.05	(0.05)	0.00	(0.03)	0.16	(-0.03)	0.01	(0.05)	0.61
Prudence	<b>0.82</b>	(0.01)	0.02	(0.04)	0.22	(-0.10)	-0.04	(-0.06)	-0.09	(0.00)	0.73
Self-discipline	<b>0.74</b>	(0.03)	-0.11	(0.07)	-0.02	(0.03)	0.06	(-0.09)	0.07	(-0.05)	0.69
Aesthetics	0.01	(-0.11)	0.05	(-0.03)	<b>0.69</b>	(-0.07)	0.06	(0.02)	-0.09	(0.08)	0.48
Ideas	0.15	(-0.12)	-0.06	(-0.02)	<b>0.67</b>	(0.08)	0.06	(-0.09)	-0.04	(0.04)	0.56
Action	-0.01	(0.08)	-0.03	(0.03)	<b>0.58</b>	(-0.13)	0.06	(-0.01)	0.25	(-0.04)	0.53
Values	-0.15	(0.11)	-0.01	(0.10)	<b>0.50</b>	(-0.03)	0.03	(0.01)	0.02	(-0.06)	0.24
Imagine	0.04	(0.11)	-0.01	(-0.03)	<b>0.62</b>	(-0.05)	0.05	(0.02)	0.08	(-0.05)	0.48
Straightforwardness	0.17	(0.14)	-0.16	(0.06)	-0.08	(-0.01)	<b>0.46</b>	(-0.00)	0.14	(-0.14)	0.42
Compliance	-0.07	(-0.04)	0.05	(-0.02)	-0.07	(-0.03)	<b>0.79</b>	(0.03)	0.08	(0.02)	0.56
Pro-social behaviour	0.17	(-0.13)	0.00	(0.02)	0.23	(-0.15)	<b>0.44</b>	(0.16)	-0.03	(0.04)	0.44
Modesty	-0.02	(0.00)	0.04	(0.05)	0.07	(0.05)	<b>0.53</b>	(0.00)	-0.13	(0.01)	0.29
Tender-mindedness	0.05	(0.05)	0.10	(-0.08)	0.22	(-0.06)	<b>0.60</b>	(0.05)	0.04	(-0.07)	0.56

Source: Adapted from Taylor, N., & De Bruin, G.P. (2006). Basic Traits Inventory: Technical manual. Johannesburg: Jopie van Rooyen & Partners

Note: Values in parentheses represent differences of the factor loadings obtained on a sample of adults ( $N = 1122$ ). Values printed in bold are factor loadings of items on their targeted factors.



**TABLE 4:** Reliability coefficients of the Basic Traits Inventory scales and facets for adolescents and adults.

Scale/facet	Younger adolescents	Older adolescents	Adults	Differences between younger adolescents and adults	Differences between older adolescents and adults
<b>Extraversion</b>	<b>0.86</b>	<b>0.86</b>	<b>0.86</b>	0.00	0.00
Ascendance	0.75	0.75	0.75	0.00	0.00
Liveliness	0.67	0.65	0.64	-0.03	-0.01
Positive affectivity	0.75	0.74	0.68	-0.07	-0.06
Gregariousness	0.78	0.81	0.80	-0.02	-0.01
Excitement seeking	0.79	0.77	0.77	-0.02	0.00
<b>Neuroticism</b>	<b>0.93</b>	<b>0.94</b>	<b>0.93</b>	0.00	-0.01
Affective instability	0.85	0.88	0.85	0.00	-0.03
Depressed mood	0.86	0.86	0.82	0.00	-0.04
Self-consciousness	0.79	0.78	0.80	-0.01	-0.02
Anxiety	0.83	0.84	0.84	-0.01	0.00
<b>Conscientiousness</b>	<b>0.95</b>	<b>0.94</b>	<b>0.94</b>	-0.01	0.00
Effort	0.86	0.86	0.79	-0.07	-0.07
Order	0.86	0.85	0.85	-0.01	0.00
Dutifulness	0.82	0.79	0.80	-0.02	-0.03
Prudence	0.80	0.78	0.74	-0.06	-0.04
Self-discipline	0.83	0.78	0.81	-0.02	0.03
<b>Openness</b>	<b>0.88</b>	<b>0.88</b>	<b>0.87</b>	-0.01	-0.01
Aesthetics	0.79	0.79	0.81	0.00	-0.02
Ideas	0.68	0.65	0.67	-0.01	0.02
Action	0.65	0.66	0.70	0.05	0.04
Values	0.51	0.49	0.42	0.09	0.07
Imagine	0.80	0.81	0.79	0.01	0.02
<b>Agreeableness</b>	<b>0.88</b>	<b>0.87</b>	<b>0.89</b>	-0.01	-0.02
Straightforwardness	0.71	0.65	0.71	0.00	-0.06
Compliance	0.67	0.68	0.70	-0.03	-0.02
Pro-social behaviour	0.79	0.73	0.76	0.03	-0.03
Modesty	0.64	0.62	0.58	0.06	0.04
Tender-mindedness	0.77	0.76	0.77	0.00	-0.01

## Discussion

Against the background of a dearth of suitable tools for the measurement of personality traits amongst adolescents, we examined the construct validity of the BTI amongst South African adolescents. As a whole the results support the replicability of the factor structure of the BTI (and therefore its construct validity) and indicate that the scales yield highly reliable scores for adolescents. In the paragraphs that follow we discuss these results in more detail.

Results show that the theoretical Big Five structure of the BTI was replicated in the empirical correlations of the 24 facets amongst younger (13–15 years) and older (16–18 years) adolescents. These results underline the robustness of the Big Five factors (i.e. extraversion, neuroticism, conscientiousness, openness for experience and agreeability) across age groups and support the construct validity of the BTI scales for adolescents. The Big Five factors manifested almost identically amongst the younger and older adolescents. These factors were also almost identical with the factors of the normative working adult group, which suggest that the adolescents and adults attached similar meaning to the content of the BTI items. McCrae et al. (2005) and Wu et al. (2008) similarly demonstrated that the factor structures of the NEO-PI-3 (McCrae et al., 2005) and NEO-PI-R (Wu et al., 2008), respectively, were replicable across adolescents and adults. The reliabilities of scores yielded by the Big Five scales were uniformly high across the two adolescent

groups and similar to the reliabilities reported for adults by Taylor and De Bruin (2006). Hence, adolescents and adults responded with similar consistency to the items. These results suggest that the structure and coherence of personality, as reflected in responses to the BTI, might be established amongst adolescents as young as 13 years.

## Practical implications

The replicable factor structure and high reliabilities of the five scales suggest that the BTI holds promise as a measure of the Big Five traits in adolescents, which opens possibilities for future personality research amongst this group in the South African context. Qualitative analysis revealed a small number of items (about 3%) with content that do not directly apply to adolescents, for example, items related to work, owning a house and contributing towards charity. The psychometric analyses suggested that the inclusion of these items do not detract from the measurement quality (i.e. the factor structure or reliability) of the scales, but it is necessary to revise these items for future applications.

## Limitations

We adopted a top-down approach, where a measure that was developed for adults is examined with respect to its utility for measuring personality traits in adolescents [(see De Fruyt et al., 2000; McCrae et al., 2005 for studies where a similar approach was adopted)]. Whereas the evidence in support of

the replicability of the BTI factor structure amongst adults support the construct validity of these factors, it does not necessarily mean that the particular set of BTI facets are optimal for the description of personality amongst adolescents. Indeed, it is possible that a bottom-up approach may yield a different set of facets as indicators of the broader Big Five traits. In this respect it is perhaps useful to emphasise that there is no such thing as 'the correct set of facets' for the Big Five factors. Ultimately, as long as the facets are proper indicators of the factors, it is the utility of the chosen facets that matters and in this respect studies that examine the predictive validity of the BTI scales with respect to educational, health and social outcomes represent a fruitful area of further research.

A second limitation is that the study focussed on structural similarity and reliability of the BTI for adolescents at the scale or trait level only. Whereas these results were supportive of the construct validity of the scales it is possible that some items may function less than optimally for adolescents. Further research should examine the quality of individual items when used with adolescents and whether the items function equivalently for younger and older adolescents.

## Conclusion

The results indicate that the BTI, which was developed for adults, holds promise as a measure of the Big Five personality traits amongst adolescents. The BTI appears to be a potentially useful tool to track the development of personality in adolescence. In addition, practitioners who are interested in the role of personality traits in educational and career counselling with adolescents might fruitfully employ the BTI in these contexts. As a whole, these results add to the growing body of evidence that supports the validity and usefulness of the Big Five personality traits in South Africa and the validity of the BTI as a measure of these traits.

## Acknowledgements

### Competing interests

The authors declares that they had no financial or personal relationships that may have inappropriately influenced them in writing this article.

### Authors' contributions

G.P.d.B. contributed to the literature review, method, results and discussion. N.T. contributed to the literature review, method and discussion. She also contributed to the data collection process. A.S.Z. contributed to the literature review, method, results and discussion.

### Ethical considerations

Permission was granted to collect data in Gauteng schools by the Gauteng Department of Education (D2017/187G).

### Funding information

This research received no specific grant from any funding agency in the public, commercial or non-for-profit sectors.

## Data availability

Data has been stored on OSF online repository and can be accessed via the following link: [https://osf.io/q4967/?view\\_only=ff272b303fbc4b169c53a762f2a5bfff](https://osf.io/q4967/?view_only=ff272b303fbc4b169c53a762f2a5bfff).

## Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

## References

- Caprara, G.V., Barbaranelli, C., Borgogni, L., & Perugini, M. (1993). The 'big five questionnaire': A new questionnaire to assess the five factor model. *Personality and Individual Differences*, 15(3), 281–288. [https://doi.org/10.1016/0191-8869\(93\)90218-R](https://doi.org/10.1016/0191-8869(93)90218-R)
- Cheng, C.-H.E., Weiss, J.W., & Siegel, J.M. (2015). Personality traits and health behaviors as predictors of subjective wellbeing among a multiethnic sample of university-attending emerging young adults. *International Journal of Wellbeing*, 5(3), 21–43. <https://doi.org/10.5502/ijw.v5i3.2>
- Costa, P.T., & McCrae, R.R. (2008). The revised NEO personality inventory (NEO-PI-R). In G.J. Boyle, G. Matthews, & D.H. Saklofske (Eds.), *The SAGE handbook of personality theory and assessment: Volume 2 – Personality measurement and testing* (pp. 179–198). Thousand Oaks: Sage. <https://doi.org/10.4135/9781849200479.n9>
- De Fruyt, F., Mervielde, I., Hoekstra, H.A., & Rolland, J.P. (2000). Assessing adolescents' personality with the NEO PI-R. *Assessment*, 7(4), 329–345. <https://doi.org/10.1177/107319110000700403>
- De Raad, B. (2000). *The Big Five personality factors: The psycholexical approach to personality*. Göttingen: Hogrefe & Huber Publishers.
- De Raad, B., & Perugini, M. (Eds.). (2002). *Big Five assessment*. Seattle: Hogrefe & Huber Publisher.
- De Vine, J.B., & Morgan, B. (2020). The relationship between personality facets and burnout. *SA Journal of Industrial Psychology*, 46, a1786. <https://doi.org/10.4102/sajip.v46i0.1786>
- Fetvadjev, V.H., Meiring, D., Van de Vijver, F.J.R., Nel, J.A., & Hill, C. (2015). The South African Personality Inventory (SAPI): A culture-informed instrument for the country's main ethnocultural groups. *Psychological Assessment*, 27(3), 827–837. <https://doi.org/10.1037/pas0000078>
- Goldberg, L.R. (1993). The structure of phenotypic personality traits. *American Psychologist*, 48, 1–26. <https://doi.org/10.1037/0003-066X.48.1.26>
- Hogan, R., & Hogan, J. (2007). *Hogan personality inventory* (3rd ed.). Hogan Assessment System. Retrieved from [www.hoganpress.com](http://www.hoganpress.com)
- John, R.K., Xavier, B., Waldmeier, A., Meyer, A., & Gaab, J. (2019). Psychometric evaluation of the BFI-10 and the NEO-FFI-3 in Indian adolescents. *Frontiers in Psychology*, 10, 1057. <https://doi.org/10.3389/fpsyg.2019.01057>
- Judge, T.A., & Zapata, C.P. (2015). The person-situation debate revisited: Effect of situation strength and trait activation on the validity of the big five personality traits in predicting job performance. *Academy of Management Journal*, 58(4), 1149–1179. <https://doi.org/10.5465/amj.2010.0837>
- Lorenzo-Seva, U., & Ten Berge, J.M.F. (2006). Tucker's congruence coefficient as a meaningful index of factor similarity. *Methodology*, 2(2), 57–64. <https://doi.org/10.1027/1614-2241.2.2.57>
- McCrae, R.R., Martin, T.A., & Costa, P.T. (2005). Age trends and age norms for the NEO personality inventory-3 in adolescents and adults. *Assessment*, 12(4), 363–373. <https://doi.org/10.1177/1073191105279724>
- McGheem, R.L., Ehrier, D.J., & Buckhalt, J.A. (2007). *Five-Factor Personality Inventory – Children (FFPI-C)*. Austin, Texas: Pro-ED.
- Mervielde, I., & De Fruyt, F. (2002). Assessing children's traits with the Hierarchical Personality Inventory for Children. In B. De Raad & M. Perugini (Eds.), *Big Five assessment* (pp. 129–142). Göttingen: Hogrefe & Huber Publishers.
- Ones, D.S., & Viswesvaran, C. (1996). Bandwidth-fidelity dilemma in personality measurement for personnel selection. *Journal of Organizational Behavior*, 17(6), 609–626. [https://doi.org/10.1002/\(SICI\)1099-1379\(199611\)17:6<609::AID-JOB1828>3.0.CO;2-K](https://doi.org/10.1002/(SICI)1099-1379(199611)17:6<609::AID-JOB1828>3.0.CO;2-K)
- Parker, W.D., & Stumpf, H. (1998). A validation of the five-factor model of personality in academically talented youth across observers and instruments. *Personality and Individual Differences*, 25(6), 1005–1025. [https://doi.org/10.1016/S0191-8869\(98\)00016-6](https://doi.org/10.1016/S0191-8869(98)00016-6)
- Ramsay, L.J., Taylor, N., De Bruin, G.P., & Meiring, D. (2008). The Big Five personality factors at work: A South African validation study. In J. Deller (ed.), *Research contributions to personality at work* (pp. 99–114). Munich, Germany: Rainer Hampp Verlag.
- R Core Team. (2016). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. Retrieved from <http://www.r-project.org/>
- Revelle, W.R. (2017). *psych: Procedures for personality and psychological research*. Retrieved from <https://cran.r-project.org/package=psych>

- Roberts, B.W., & DelVecchio, W.F. (2000). The rank-order consistency of personality traits from childhood to old age: A quantitative review of longitudinal studies. *Psychological Bulletin*, 126(1), 3–25. <https://doi.org/10.1037/0033-2909.126.1.3>
- Rolland, J.P. (2002). The cross-cultural generalizability of the Five-Factor Model of personality. In R.R. McCrae & J. Allik (Eds.), *The Five-Factor Model of personality across cultures* (pp. 7–28). New York: Springer US. [https://doi.org/10.1007/978-1-4615-0763-5\\_2](https://doi.org/10.1007/978-1-4615-0763-5_2)
- Shiner, R., & Caspi, A. (2003). Personality differences in childhood and adolescence: Measurement, development, and consequences. *Journal of Child Psychology and Psychiatry*, 44(1), 2–32. <https://doi.org/10.1111/1469-7610.00101>
- SHL. (2009). *OPQ32r user manual*. Washington: SHL Group.
- Soto, C.J., & John, O.P. (2014). Traits in transition: The structure of parent-reported personality traits from early childhood to early adulthood. *Journal of Personality*, 82(3), 182–199. <https://doi.org/10.1111/jopy.12044>
- Soto, C.J., John, O.P., Gosling, S.D., & Potter, J. (2008). The developmental psychometrics of Big Five self-reports: Acquiescence, factor structure, coherence, and differentiation from ages 10 to 20. *Journal of Personality and Social Psychology*, 94(4), 718–737. <https://doi.org/10.1037/0022-3514.94.4.718>
- Soto, C.J., John, O.P., Gosling, S.D., & Potter, J. (2011). Age differences in personality traits from 10 to 65: Big Five domains and facets in a large cross-sectional sample. *Journal of Personality and Social Psychology*, 100(2), 330–348. <https://doi.org/10.1037/a0021717>
- Soto, C.J., & Tackett, J.L. (2015). Personality traits in childhood and adolescence: Structure, development, and outcomes. *Current Directions in Psychological Science*, 24(5), 358–362. <https://doi.org/10.1177/0963721415589345>
- Taylor, N. (2004). *The construction of a South African five-factor personality questionnaire*. Unpublished Master's dissertation. Johannesburg: Rand Afrikaans University.
- Taylor, N. (2008). *Construct, item and response bias across cultures in personality measurement*. Unpublished doctoral dissertation. Johannesburg: Rand Afrikaans University.
- Taylor, N., & De Bruin, G.P. (2006). *Basic Traits Inventory: Technical manual*. Johannesburg: Jopie van Rooyen & Partners.
- Taylor, N., & De Bruin, G.P. (2013). *The Basic Traits Inventory*. In S. Laher & K. Cockcroft (Eds.), *Psychological assessment in South Africa* (pp. 232–243). Johannesburg: Wits University Press.
- Wu, K., Lindsted, K.D., Tsai, S.-Y., & Lee, J.W. (2008). Chinese NEO-PI-R in Taiwanese adolescents. *Personality and Individual Differences*, 44(3), 656–667. <https://doi.org/10.1016/j.paid.2007.09.025>