Two-Year Retest Reliability and Criterion Validity of the Self- and Informant-Personality

Inventory for ICD-11 in Older Adults

Anton A. Mays, M.A., Cameron J. Mills, M.A., and Joshua R. Oltmanns, Ph.D.

Author's note:

Anton Mays, School of Psychology, Xavier University. Cameron J. Mills, School of Psychology, Xavier University, Joshua R. Oltmanns, Department of Psychology, Southern Methodist University.

An earlier version of this work was presented at the annual meeting of the *Society for Research in Psychopathology* in St. Louis, Missouri. This research was supported by the NIH under Award Numbers R01-AG061162, R01-AG045231, and R01-MH077840. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH. Thank you to the participants and researchers of the St. Louis Personality and Aging Network (SPAN) for making this study possible.

Correspondence should be addressed to Anton A. Mays, School of Psychology, Xavier University, Cincinnati, OH. Email: maysa1@xavier.edu.

#### Abstract

The International Classification of Diseases – 11<sup>th</sup> edition (ICD-11) adopted a fully dimensional model of personality disorder. The Personality Inventory for ICD-11 (PiCD) and Informant-Personality Inventory for ICD-11 (IPiC) were developed to assess the ICD-11 trait model and the PiCD has since received significant validation support. However, there has only been one prior study of longitudinal predictive validity, two relatively short test-retest reliability studies of the PiCD, and no prior longitudinal tests of the IPiC. Longitudinal psychometric support for psychological assessment measures is essential. The present study provides a longer, larger, twoyear psychometric validation test of the PiCD and IPiC. Participants (N = 711) and their informants (N = 569) were recruited in the St. Louis Personality and Aging Network (SPAN). The results demonstrated strong two-year retest reliability for the PiCD and IPiC, as well as mean level stability. Additionally, we explored the relationships between the PiCD and IPiC and important life outcome measures (depressive symptoms, satisfaction with life, and health status). The analysis revealed several significant associations between PiCD and IPiC scales and the outcome variables across time. Further, the PiCD Negative Affectivity and IPiC Detachment scales demonstrated incremental validity over each other and the outcome variables at Wave 1 in the prediction of depressive symptoms and satisfaction with life, respectively. The findings provide essential longitudinal test-retest reliability and predictive validity support for the PiCD and IPiC.

*Keywords:* personality, ICD-11, PiCD, IPiC, older adults, test-retest, depressive symptoms, health, satisfaction

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Despite being the standard in the field, categorical models of personality disorder fail to accurately capture the complexity of personality (Widiger & Mullins-Sweatt, 2010). Categorical models show problems related to arbitrary diagnostic thresholds, excessive co-occurrence, and heterogeneity within disorders, and can lead to stigmatization (Tyrer et al., 2015). In the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5), an alternative model of personality disorders was introduced that included a general severity rating (Criterion A) and five maladaptive trait domains aligned with the five-factor model of personality (Criterion B; APA, 2013). Unfortunately, this model was not officially adopted and was included as an appendix in the Emerging Measures and Models section. In the years following, the World Health Organization (WHO) officially adopted a fully dimensional model of personality disorders in the *International Classification of Diseases-11<sup>th</sup> edition* (ICD-11). The model includes a general severity dimension in addition to five maladaptive trait domains and a borderline pattern specifier (WHO, 2023).

The five ICD-11 trait domains align with four domains of the five-factor model: Negative affectivity with neuroticism, detachment with low extraversion, dissociality with low agreeableness, anankastia with high conscientiousness, and disinhibition with low conscientiousness (Mulder et al., 2016). The Personality Inventory for ICD-11 (PiCD) was developed as a measure of the five trait domains (Oltmanns & Widiger, 2018). Despite the absence of facet-level trait assessment, evidence of convergent and discriminant validity with widely used dimensional models of personality disorder and psychopathology has been established across global data collections (Oltmanns, 2021). In a follow-up study, the Informant-

Personality Inventory for ICD-11 (IPiC) was developed and initial convergent and discriminant validation support was found (Oltmanns & Widiger, 2021). However, given the recency of the development of these measures, there is little-to-no evidence of their retest reliability and longitudinal predictive validity, which are essential features of test development (Anastasi, 1986).

The test-retest reliability of the PiCD has been tested across short time periods. Somma et al. (2020) evaluated the psychometric properties of the PiCD in a sample of 1,122 Italian adults with a mean age of 30.6 years. The researchers evaluated convergent-discriminant validity and test-retest reliability across two weeks. Two-week test-retest reliability for the PiCD domains were r = .81 for anankastic, r = .82 for disinhibition, r = .84 for dissocial and r = .89 for both negative affectivity and detachment. Stricker et al. (2022) evaluated the PiCD's stability and predicative ability for psychological distress over 6 months. Their sample included 206 German community adults with a mean age of 27.5 years. Their findings indicate strong differential stability with large autocorrelations between two measurement points: r = .81 for negative affectivity, r = .87 for detachment, r = .81 for dissocial, r = .80 for disinhibition, and r = .81 for anankastic. Additionally, the researchers identified that the PiCD trait domain scales maintained adequate predictive ability in capturing negative tendencies that lead to an increase of psychological distress (depression, anxiety, and general stress) within a 6-month period ( $\sim \beta$  = .15). These findings, when considered together, demonstrated strong test-retest reliability of the PiCD across two weeks and six months. However, questions remain about longer-term stability and predictive validity of the PiCD, and neither of these areas have been examined with the IPiC.

Oltmanns and Widiger (2021)'s results demonstrated relatively large significant cross-sectional relationships between 1) both PiCD/IPiC Negative Affectivity (NA) and self-report

Satisfaction with Life, 2) PiCD NA and depressive symptoms at a large effect size and IPiC NA and depressive symptoms at a moderate effect size, and 3) IPiC NA and informant-report health problems at a large effect size and PiCD NA and informant-report health problems at a moderate effect size. In the present study, we examine these relationships across two years to confirm longitudinal predictive validity.

The aim of this study is to evaluate PiCD and IPiC test-retest reliability and longitudinal predictive validity across time. The St. Louis Personality and Aging Network (SPAN Study; Oltmanns et al., 2014) consists of N = 714 older adults and their informants (N = 569) who completed the PiCD and IPiC, respectively, at two waves, two years apart. The test-retest reliability of the PiCD has only been evaluated across two weeks and six months, demonstrating strong results. Demonstration of stability and predictive validity across two years would be novel support for its use as a measure for personality in accordance with the ICD-11. We hypothesized that the test-retest reliability in the present study would be strong, although relatively lower, over the period of two years. The hypotheses and analyses were registered after data collection, but before data analysis (aspredicted.org link here: <a href="https://aspredicted.org/7DH\_8LF">https://aspredicted.org/7DH\_8LF</a>). Data and syntax are available on the Open Science Framework (link: <a href="https://osf.jo/rh58p/">https://osf.jo/rh58p/</a>)

#### Method

## **Participants**

Participants were recruited as part of the St. Louis Personality and Aging Network (SPAN; Oltmanns et al., 2014), which is a longitudinal study of personality and health. The sample includes a mix of incomes with a median slightly above the St. Louis area (\$55,000 per year); however, 12% of participants were below the poverty line (>\$20,000 per year). At initial recruitment, 66% of participants were employed and 48% were married (Oltmanns et al., 2014).

Wave 1 for the present study was completed at a follow-up assessment ten years into SPAN. At Wave 1, the PiCD was completed by N = 711 target participants (M age = 69.8 years, SD = 2.8). Targets identified as 54% women, 77% White/Caucasian, 22% Black/African-American, and 1% other. Additionally, Wave 1 IPiC was completed by N = 569 informants. Informant relationships to targets were described as 52% spouses/partners, 22% other family members, 23% friends, and 3% other. On average, informants stated that they had known the targets for 41 years (SD = 16 years). On a five-point scale, 1 "Better than anyone else" to 5 "Not well", informants knew the targets on average at a level of 1.5 (SD = 0.63) out of 5. On a five-point scale, 1 "More than anyone else" to 5 "Not at all", informants liked the targets on average at a level of 1.5 (SD = 0.59) out of 5.

Wave 2 PiCD was completed by N = 748 target participants, n = 608 of whom overlapped with Wave 1 PiCD completers (thus, test-retest PiCD N was 608). For the 608 participants who completed the PiCD at both waves, 56.1% women, 78.5% identified as white and 19.7% identified as Black/African-American. Wave 2 IPiC was completed by n = 424 informants, n = 269 of whom overlapped with Wave 1 IPiC completers (thus, test-retest IPiC N was 269).

#### **Measures**

## **Personality**

Target participants completed the self-report PiCD while informants completed the informant-report IPiC about the target participants' personalities. The PiCD (Oltmanns & Widiger, 2018) and IPiC (Oltmanns & Widiger, 2021) are freely available to researchers and included in online supplemental materials for their respective development articles. On both the self and informant-versions, five scales containing twelve items each are rated on a Likert-type

scale from 1 being (*strongly disagree*) to 5 (*strongly agree*) to assess five maladaptive trait domains: Negative Affectivity, Detachment, Anankastia, Dissociality, and Disinhibition. Prior validation evidence of the measure was reviewed in the introduction and Oltmanns (2021).

### **Outcomes**

## **Self-Report Criteria Variables.**

The Beck Depression Inventory-II (BDI-II; Beck et al., 1996) was used to assess self-reported depressive symptoms. The BDI-II includes 21 items rated on a 4-point scale and strong validation evidence (Erford et al., 2016). The Satisfaction With Life Scale (SWLS; Diener et al., 1985) was utilized to assess life satisfaction among target participants. The SWLS includes five items rated on a seven-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*).

## **Informant-Report Criteria Variable.**

Informants completed a short form of the Informant Health Status Inventory (IHSI), which includes 10 adapted items about general emotional and physical health functioning from the RAND-36 Health Status Inventory (Hays & Morales, 2001). There are a total of 2 general health questions, 2 physical health questions, and 6 emotional health questions. An example of an emotional health item would be "Is she/he a happy person?" which is rated on a 6-point scale from 1 (*all of the time*) to 6 (*none of the time*), with higher scores indicating worse health. A question pertaining to physical health is "During the past 4 weeks, to what extent has her/his physical health interfered with her/his ability to work or engage in physical activities?" which is rated on a 5-point scale with 1 being (*not at all*) and 5 being (*extremely*).

#### **Results and Discussion**

### **Descriptive Statistics**

The descriptive statistics for the scales are provided in Table 1. All PiCD scales at baseline had an internal consistency greater than  $\alpha$  = .72, with a median of  $\alpha$  = .79. All IPiC scales at baseline indicated an internal consistency greater than  $\alpha$  = .78, with a median of  $\alpha$  = .84, which replicates prior evidence suggesting that informant-reports of five-factor model personality and DSM personality disorders are more internally consistent than self-reports (Balsis et al., 2015), and extends it to the ICD-11 model. Mean interitem correlations at baseline suggest that PiCD Negative Affectivity and Detachment were more homogenous than PiCD Disinhibition, Dissociality, and Anankastia, and IPiC Negative Affectivity, Disinhibition, and Detachment were more homogenous than IPiC Dissociality and Anankastia. Thus, disinhibition appears to be one domain where self and informants slightly differ: Informants describe disinhibition more homogeneously than the self.

## **Mean Level Stability**

Paired samples t-tests were performed to evaluate mean-level change in PiCD and IPiC variables between Wave 1 and Wave 2 (Table 1). There were significant decreases in mean level PiCD Negative Affectivity, PiCD Detachment, PiCD Dissocial, and a significant increase in mean level IPiC Anankastia. However, the Cohen's d effect sizes of these changes were trivial, ranging from d = .05 (PiCD Detachment) to d = .10 (IPiC Anankastia). This indicates that the PiCD and IPiC scores were all relatively stable across time at the mean level.

### **Test-Retest Reliability**

The test-retest reliability Pearson correlations are presented in Table 2. Across two years, the PiCD domains demonstrate strong test-retest reliability, ranging from r = .68 (Disinhibition) to r = .85 (Detachment), with a median of r = .76. Across two years, the IPiC domains also demonstrated strong test-retest reliability ranging from r = .72 (Anankastia) to r = .78

(Dissociality and Disinhibition), with a median of r = .76. Thus, the test-retest reliability results for both PiCD and IPiC domains over a two-year period indicate consistently strong reliability, both with median correlation coefficients of r = .76, respectively. These results converge with our hypothesis that we would find strong, but relatively lower, test-retest reliability across a longer period of time (i.e., two years, compared to two weeks [Somma et al., 2020] and six months [Stricker et al., 2022]).

### **Criteria Correlations**

Correlations among the outcomes (BDI, SWLS, IHSI) are presented in Table 3. Stability of the outcome measures were strong across the two time points (r = .71, .75, and .62,respectively). Correlations of the PiCD and IPiC with the criteria measures are also presented in Table 3. Regarding depressive symptoms, correlation coefficients for PiCD and IPiC scales ranged from r = -.14 (IPiC Anankastia) to r = .54 (PiCD Negative Affectivity) across both waves, with a median cross-sectional absolute value r of |.29| for PiCD and |.15| for the IPiC. Regarding satisfaction with life, correlation coefficients for PiCD and IPiC scales ranged from r = -.41 (PiCD Negative Affectivity) to r = .19 (IPiC Anankastia) across both waves, with a median cross-sectional absolute value r of |.29| for PiCD and |.21| for the IPiC. Regarding health status, correlation coefficients for PiCD and IPiC scales ranged from -.24 (IPiC Anankastia) to .59 (IPiC Negative Affectivity) across both waves, with a median absolute value r of |.17| for PiCD and |.21| for the IPiC. Thus, the PiCD correlated more strongly with BDI and SWLS, and the IPiC correlated more strongly with the IHSI. Of note is the shared method variance of the PiCD with the BDI and SWLS and the IPiC with the IHSI: self and informant-reports of personality correlated more strongly with outcomes that were reported through the same method (self or informant). Lack of correlation between Anankastia and negative life outcomes (poorer

health, worse satisfaction, depressive symptoms), and even positive correlations between IPiC Anankastia and life outcomes, replicates prior studies indicating Anankastia's nuanced relationship with negative outcomes (Oltmanns, 2021)—and may reflect complications of being a maladaptive variant of a 'healthy' pole of a FFM trait (i.e., high conscientiousness).

# **Multiple Regressions**

Multiple regression analysis of PiCD and IPiC as independent variables is presented in Table 4. In multiple regressions comparing the predictive utility of the PiCD versus the IPiC as independent variables for each two-year dependent variable outcome separately, Negative Affectivity and Disinhibition were the strongest predictors of the outcomes overall, ranging from  $R^2 = .10$  (Disinhibition with SWLS) to  $R^2 = .24$  (Negative Affectivity with BDI). Converted to Pearson r values, these are in the moderate effect size range (between r = .30 and r = .50) according to Cohen (1992). Dissociality and Anankastia had the weakest relationships with the outcomes, ranging from  $R^2 = .00$  (Anankastia with SWLS) to  $R^2 = .05$  (Dissociality with IHSI).

In terms of individual predictors, PiCD scales predicted BDI (median absolute value  $\beta$  = .20) over and above IPiC scales (median absolute value  $\beta$  = .13), although IPiC Dissociality did outperform PiCD Dissociality. PiCD and IPiC scales predicted SWLS similarly (median absolute value PiCD  $\beta$  = .20 versus median absolute value IPiC  $\beta$  = .18). As an interpretive example, for every one unit increase in depressive symptoms, PiCD Negative Affectivity increased .24 standard deviations, controlling for IPiC Negative Affectivity. Lastly, IPiC scales predicted participants' health status (median absolute value  $\beta$  = .23) over and above PiCD scales (median absolute value  $\beta$  = .06). As an interpretive example, for every one standard deviation increase in health status (this dependent variable was *z*-scored), IPiC Negative Affectivity increased .42 standard deviations, controlling for PiCD Negative Affectivity. The general effects replicate

Oltmanns and Widiger (2021) and extend the findings to provide a longitudinal criterion validity instead of cross-sectional. Shared method variance appears to contribute to stronger relations between the PiCD and BDI, and IPiC and IHSI, respectively. However, PiCD and IPiC similarly predicted the SWLS. These results indicate a strong unique predictive validity of ICD-11 Negative Affectivity and Disinhibition for depressive symptoms, satisfaction with lie, and health status, with more nuanced effects for ICD-11 Detachment, Dissociality, and Anankastia.

### **Hierarchical Regressions**

In hierarchical regressions, the outcome variables (BDI, SWLS, and IHSI) at Wave 1 were added to the model in step 1 and the Wave 1 PiCD and IPiC variables in step 2.  $R^2$  was .33 (IHSI), .47 (BDI) and .55 (SWLS). The autocorrelations for the outcomes ranged from r = .58 to r = .74, indicating strong stability of the outcomes. Despite the stability of the outcomes, there were still instances where PiCD or IPiC scales predicted the outcomes across time over and above the outcomes themselves at Wave 1. Step 2 of the negative affectivity model increased  $R^2$ .01 (p < .001) and PiCD Negative Affectivity predicted variability in depressive symptoms ( $\beta =$ .11, zero-order r = .47) over and above Wave 1 BDI ( $\beta = .61$ , zero-order r = .69) and the IPiC  $(\beta = .04, \text{ zero-order } r = .26)$ . Thus, participants' own perception of experiencing negative affectivity was significantly associated with increases in depressive symptoms across time. Step 2 of the detachment model increased  $R^2$  .01 (p < .001) and IPiC Detachment predicted selfreported satisfaction with life ( $\beta = -.12$ ) over and above Wave 1 SWLS ( $\beta = .71$ , zero-order r =.74) and PiCD Detachment ( $\beta = -.01$ , zero-order r = -.29). Thus, informants describing the target participants' as being detached was significantly associated with decreases participants' own self-reported satisfaction with life across time. Given that these specific hierarchical associations

were not hypothesized a priori, they should be replicated in the future. The full table of hierarchical regression results is included in the supplemental materials.

# **Conclusions**

The PiCD was developed to assess the five maladaptive trait domains of the newly adopted dimensional model of personality disorder in ICD-11 (WHO, 2023). Mounting evidence supports the cross-sectional reliability and validity of the PiCD (Oltmanns, 2021) and the sixmonth stability and predictive validity of psychological distress (Stricker et al., 2022). However, until the present study there were not yet longer-term tests of the test-retest stability or longitudinal predictive validity for the PiCD or any longitudinal psychometric tests of the IPiC. The present study finds support for both of these, as evidenced by high stability estimates, several significant longitudinal relationships with life criteria measures across two years, and evidence of incremental validity for PiCD Negative Affectivity and IPiC Detachment in the prediction of depressive symptoms and satisfaction with life across two years, respectively. In the future, further analysis of the longitudinal retest reliability and validity of the measures should be conducted including latent variable modeling (c.f., Lodder et al., 2022). However, together this initial evidence provides longitudinal psychometric support for the validity and reliability of the PiCD and IPiC scales.

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Table 1. Descriptive Statistics

					Cronbach's	Inter-Item	t	d
Baseline	Time	Mean	SD	Skewness	Alpha	Correlations		
PiCD Negative Affectivity	1	26.07	6.58	0.54	.86	.33	3.05**	.08
	2	25.46	6.58	0.41	.84	.31		
PiCD Disinhibition	1	23.23	5.38	0.35	.76	.22	.60	.02
	2	22.98	5.47	0.32	.74	.21		
PiCD Detachment	1	26.43	6.68	0.42	.85	.32	2.38*	.05
	2	26.17	6.81	0.48	.84	.30		
PiCD Dissocial	1	22.88	5.22	0.51	.76	.21	2.04*	.06
	2	22.71	5.30	0.44	.73	.19		
PiCD Anankastia	1	38.93	5.35	0.07	.72	.18	06	.00
	2	39.00	5.45	0.19	.71	.17		
IPiC Negative Affectivity	1	26.78	7.76	0.38	.90	.42	1.06	.05
	2	27.57	7.89	0.23	.90	.41		
IPiC Disinhibition	1	23.48	7.09	0.66	.86	.35	-1.33	.05
	2	23.65	7.71	0.86	.88	.39		
IPiC Detachment	1	25.42	6.55	0.64	.84	.31	1.10	.05
	2	24.40	6.16	0.92	.81	.27		
IPiC Dissocial	1	25.33	6.29	0.62	.80	.25	1.14	.05
	2	25.09	7.04	0.91	.85	.31		
IPiC Anankastia	1	39.82	6.22	-0.04	.78	.23	2.07*	.10
	2	39.95	6.38	-0.24	.78	.24		

Note. \* = <.05; \*\* = <.01; Mean values are for each wave (W1, N = 711; W2, N = 748) independently; t scores represent participants who were assessed at both waves (N = 608).

Table 2. Correlations Between the PiCD and IPiC Across Waves 1 and 2

	PiCD/IPiC Scale									
PiCD/IPiC Scale	W1 NA	W1 DN	W1 DT	W1 DL	W1 AK	W2 NA	W2 DN	W2 DT	W2 DL	W2 AK
W1 Negative Affectivity	.30	.58	.44	.52	14	.74	.48	.35	.45	16
W1 Disinhibition	.53	.29	.31	.49	58	.50	.78	.30	.45	50
W1 Detachment	.39	.32	.43	.29	.04	.30	.19	.76	.19	.06
W1 Dissociality	.28	.39	.24	.31	22	.42	.40	.21	.78	20
W1 Anankastia	.10	30	.16	06	.28	15	48	01	21	.72
W2 Negative Affectivity	.77	.44	.38	.20	.08	.27	.57	.49	.58	17
W2 Disinhibition	.42	.68	.25	.30	32	.53	.29	.27	.51	66
W2 Detachment	.31	.24	.85	.16	.16	.41	.29	.41	.35	.03
W2 Dissociality	.17	.27	.19	.76	07	.25	.38	.19	.33	22
W2 Anankastia	.04	29	.14	04	.75	.05	33	.16	08	.32

*Note.* PiCD correlations below the diagonal, IPiC correlations above the diagonal. Self-other correlations on the diagonal. Test-retest reliability and self-other agreement correlations bolded. W1 = wave 1, W2 = wave 2, NA = Negative Affectivity, DN = Disinhibition, DT = Detachment, DL = Dissociality, AK = Anankastia. Correlations above .10 significant at p < .01.

Table 3. Correlations Among the PiCD, IPiC, and Outcome Variables

			W1	W2		
	W1 HSI	W2 HSI	SWLS	SWLS	W1 BDI	W2 BDI
W1 PiCD Negative Affectivity	.25	.13	40	35	.52	.45
W1 PiCD Disinhibition	.19	.17	31	26	.37	.29
W1 PiCD Detachment	.17	.03	30	29	.31	.23
W1 PiCD Dissociality	.06	.09	06	.00	.11	.05
W1 PiCD Anankastia	.00	.05	.00	.00	.06	.03
W2 PiCD Negative Affectivity	.24	.18	40	41	.49	.54
W2 PiCD Disinhibition	.17	.19	26	27	.33	.34
W2 PiCD Detachment	.12	.10	28	32	.29	.30
W2 PiCD Dissociality	.03	.16	04	01	.09	.08
W2 PiCD Anankastia	03	03	02	02	.02	.02
W1 IPiC Negative Affectivity	.58	.46	35	32	.26	.26
W1 IPiC Disinhibition	.38	.39	25	24	.20	.21
W1 IPiC Detachment	.33	.26	26	33	.17	.16
W1 IPiC Dissociality	.27	.24	15	13	.07	.13
W1 IPiC Anankastia	14	12	.09	.01	14	11
W2 IPiC Negative Affectivity	.49	.59	24	24	.18	.24
W2 IPiC Disinhibition	.40	.48	25	18	.14	.15
W2 IPiC Detachment	.36	.33	21	28	.11	.10
W2 IPiC Dissociality	.35	.40	16	16	.04	.10
W2 IPiC Anankastia	17	24	.19	.06	10	08
W2 Health Status Inventory	.62					
W1 Satisfaction With Life Scale	43	26				
W2 Satisfaction With Life Scale	42	35	.75			
W1 Beck Depression Inventory	.44	.23	61	49		
W2 Beck Depression Inventory	.31	.27	45	52	.71	

*Note.* W1 = wave 1, W2 = wave 2, HSI = Health Status Inventory, SWLS = Satisfaction With Life Scale, BDI = Beck Depression Inventory. Correlations above .10 significant at p < .01.

Table 4. Outcomes Regressed on PiCD and IPiC Predictor Variables

				В	
		ß Self-		Informant	-
Scale at Follow-Up	$R^2$	Report	p	Report	p
BDI					
Negative Affectivity	.24	.43	<.001	.12	.005
Detachment	.06	.20	<.001	.07	.160
Dissociality	.02	.02	.721	.13	.010
Anankastia	.02	.05	.324	13	.007
Disinhibition	.11	.26	<.001	.14	.003
SWLS					
Negative Affectivity	.17	29	<.001	22	<.001
Detachment	.13	20	<.001	23	<.001
Dissociality	.02	.05	.293	15	.002
Anankastia	.00	.01	.771	.02	.720
Disinhibition	.10	21	<.001	18	<.001
IHSI					
Negative Affectivity	.18	.04	.526	.42	<.001
Detachment	.05	03	.607	.23	.001
Dissociality	.05	.06	.355	.19	.003
Anankastia	.02	.11	.099	13	.043
Disinhibition	.14	.07	.231	.34	<.001

Note. Bold p < .01; BDI = Beck Depression Inventory; SWLS = Satisfaction with Life Scale; IHSI = Informant Health Status Inventory.