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Concurrent validity and expanded interpretation of the M5–50

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Abstract
The M5–50 is a brief 50 item international personality item pool public-domain five-factor model personality instrument. While public-domain instruments can facilitate social justice by allowing access to instruments to those who may not have the financial resources to use a pay-to-use instrument, public-domain measures may lack the scrutiny given to pay-to-use instruments. This study provides scrutiny through examining the concurrent validity evidence of the M5–50 by correlating it to the proprietary NEO-PI-3. Additionally, to provide additional validity, this study also correlates the M5–50 domains with well-documented relationships with religious fundamentalism. Regarding the NEO-PI-3, the domains of Neuroticism and Conscientiousness appear to well represent their NEO-PI-3 domain counterparts, whereas Extraversion and Agreeableness had weak relationships with some facet-level content. Openness to Experience on the M5–50 appears able to align with both the Openness/Intellect model and a unified domain structure suggested by traditional five-factor model literature as M5–50 domains and items most strongly correlate with the Aesthetics and Ideas facets in the NEO-PI-3 Openness domain. Regarding religious fundamentalism, the M5–50 domain of Openness had an inverse relationship with fundamentalism, while extraversion had a positive relationship with fundamentalism. Interpretive recommendations for the M5–50 and recommendations for future development of brief, IPIP-based Openness to Experience domains are discussed.

Keywords IPIP · NEO-PI-3 · M5–50 · Personality · Five-factor model

The M5–50 is a public-domain international personality item pool (IPIP) five-factor model (FFM) personality instrument. Public-domain, as opposed to proprietary, instruments have the potential for greater access to those who are financially underprivileged (Warlick et al. 2018); they also allow for continual refinement by all researchers, which may be a struggle with proprietary instruments (Goldberg 1999). However, public-domain measures need scrutiny to inform potential users of the instruments regarding the validity and reliability of the free instrument. The M5–50 is no different.

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While there has been research and debate regarding the structural form of the M5–50 (Socha et al. 2010; Ingram et al. 2013), there remains a dearth of concurrent validity and also previous psychometric studies only used collegiate samples. If public-domain instruments are to be used in place of proprietary instruments, additional examination, with a general population sample, is needed to investigate concurrent validity of the instrument. This study aims to bolster validity of the M5–50 by examining relationships with the NEO-PI-3 (NEO-PI-3), a prominent proprietary FFM instrument, and the Religious Fundamentalism Scale-Revised (RFS), which has a documented history of relationships with FFM constructs, in an Amazon Mechanical Turk (MTurk) general population sample.

Five-Factor Model of Personality

The FFM, measuring the domains of Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience, has become the predominant model of normal personality. While hailed as ambitious and central to the understandings of personality, the FFM has also been subject to controversies (e.g., Block 2010). One domain more

than others has iconized some of the historic difficulties with structural validation seen within the FFM and continues to pose opportunities of theoretical development (DeYoung et al. 2012). Openness to Experience has produced inconsistency in the relationships between instruments (Gow et al. 2005), demonstrated greater variance by gender when compared to the other domains (Gomez 2006), and it has been assessed as a hierarchically ordered construct distinct from the other FFM domains (Caspi et al. 2005). In fact, even the very appropriateness of the Openness to Experience domain label has been contested (Digman 1990).

Controversies such as these have given way to a conceptualization of the domain called the *Openness/Intellect model* (O/I model) which proposes a two-part, differentiated structure in lieu of a single domain as its interpretive structure. Factor analyses of several personality instruments have shown that the *Openness* and *Intellect* elements appear as distinctive but connected components (DeYoung et al. 2007; Johnson 1994). Where *Intellect* is uniquely correlated with measures of fluid intelligence (DeYoung et al. 2009), *Openness* is more associated with creativity (Nusbaum and Silvia 2011). Thus, the O/I model purports to explain the core of Openness to Experience more comprehensively than a unified domain. In doing so, the O/I model also offers an explanation to some of the past structural difficulties seen within Openness to Experience. Despite this now longstanding controversy over the conceptualization of Openness to Experience (e.g., Johnson 1994; McCrae 1994), most FFM instruments still measure, conceptualize, and interpret it as a single construct.

The difficulties and disagreements over the structural and interpretive nature of Openness to Experience make it a distinctive domain in need of particular focus when new tests are created that purport to measure its thematic core content. This is particularly true of brief instruments given their sometimes less than desirable reliability coefficients (e.g., Donnellan et al. 2006). These risks are especially pronounced in testing instruments which embraced the IPIP (Goldberg 1999) as the basis for their construction.

The IPIP was developed as a broad-bandwidth, public alternative to copy-written instruments that have proved costly or cumbersome to both researchers and practitioners. The IPIP allows the creation of personalized instruments that are able to produce internal consistencies similar to those in pay-to-use FFM instruments (Gow et al. 2005). While this follows Miller's (1969) call to "give psychology away" and it allows researchers and clinicians who may be unable to pay the licensing fees for the pay-to-use FFM instruments (e.g. NEO-PI-3), these instruments may need additional psychometric scrutiny comparing them to some of the more prominent proprietary FFM instruments. Individual IPIP items, and some scales, have been validated as relating to markers of the FFM; however, authors composing new scales of individual IPIP items are left to demonstrate the validity for their new measures.

M5–50

The M5–50 (McCord 2002) is one such brief IPIP-based instrument that was devised intended to measure each of the FFM domains. Psychometric properties of the M5–50 have been generally based on the data provided on the IPIP website with two exceptions. First, Socha et al. (2010) conducted a confirmatory factor analysis (CFA) expanding the information available for the M5–50. They found problems with model fit, particularly within Agreeableness, and suggested that unaddressed cross-loadings for that domain (i.e., unexpected correlations) may account for the lower RMSEA fit statistic which proved most problematic for the interpretation of their model. Given this likelihood for model misspecification, Socha and colleagues also conducted an exploratory factor analysis (EFA) to widen the interpretive base for the instrument. While this provided some additional information about the nature of item relationships which might underlie the model misfit, problems with item loadings not emerging where expected continued to be evident within the EFA.

Second, Ingram et al. (2013) conducted an EFA on the Openness to Experience domain using a similar sample to the M5–50's validation sample in order to explore potential interpretive differences leading to previous model misfit. They found that within Openness to Experience, two factors consistent with the O/I model framework emerged and they recommended development of alternative interpretation for the instrument consistent with Socha and colleagues call for the exploration of alternative structural models. Although both Ingram and colleagues (Ingram et al. 2013) and Socha and colleagues (Socha et al. 2010) made estimations of the structural form of the M5–50, these studies lacked exploration into the instrument's concurrent validity. This makes it hard to reconcile contrasting interpretive models (i.e., Openness as a unified domain or as a two-factor structure) suggested by these respective authors.

Religious Fundamentalism and the FFM

When examining validity of an instrument, it remains important to examine concurrent validity to similar instruments, and also to use it to explore well-documented relationships with other constructs. Religious fundamentalism is a construct with a well-documented history with the FFM. While there remain different definitions of religious fundamentalism, this term is commonly used to describe those individuals for whom their religious beliefs possess a high level of salience. Meta-analysis suggests positive relationships among religious fundamentalism and Agreeableness and Conscientiousness, and a negative relationship with Openness (Saroglou 2010). Looking more specifically, the Religious Fundamentalism Scale (RFS; Altemeyer and Hunsberger 2004) and the NEO-PI-3 show positive

relationships with Extroversion and Conscientiousness, and a negative relationship with Openness (Warlick et al. 2017). In an Italian Catholic population that used the RFS and the Intratextual Fundamentalism Scale (Williamson et al. 2010), Openness was found to have a negative relationship with fundamentalism, while Conscientiousness and fundamentalism was positive (Carlucci et al. (2011). Religious fundamentalism will serve as an outside construct to assist to expanding the M5–50's validity.

The Present Research

Public-domain instruments need accountability. The current study has three goals related to providing additional scrutiny of the M5–50, a public-domain IPIP instrument: (a) to examine the relationship between the M5–50 (McCord 2002) and a well-established proprietary FFM instrument, using the domains and facets of the NEO-Personality Inventory-3 (NEO-PI-3; McCrae et al. 2005) (b) to expand the validity of the M5–50 instrument using established FFM relationships with religious fundamentalism and (c) to expand the recruitment samples beyond college students, the sole sample used in previous psychometric studies (i.e., Ingram et al. 2013; Socha et al. 2010). By doing so, this study establishes a more comprehensive interpretive framework for the M5–50 and offers a theoretical grounding which allows for the advancement of previously published works that have each suggested distinctive structural forms for the Openness to Experience domain.

This study hypothesized that: (1) the NEO-PI-3 Openness to Experience facets of Aesthetics and Ideas will most strongly represent M5–50 Openness to Experience domain scores, (2) the M5–50 Agreeableness domain will have notably lower correlations between its related NEO-PI-3 domains/facets along with greater numbers of significant correlations to other domain content, (3) the M5–50 domains of Neuroticism, Extraversion, and Conscientiousness will be strongly represented by their related domain and facet content on the NEO-PI-3, (4) the M5–50 domain of Openness will be inversely related to religious fundamentalism, (5) the M5–50 domain of Extraversion will be positively related to religious fundamentalism and (6) the M5–50 domain of Conscientiousness will be positively related to religious fundamentalism.

Methods

Participants and Procedures

Participants ($N = 305$, 53% male) ranging in age from 18 to 71 ($M = 34.38$, $SD = 11.76$; $M = 33.29$, $SD = 11.31$ for males; $M = 35.5$, $SD = 12.17$ for females) were recruited using MTurk, a crowdsourcing software designed by Amazon. Mason and Suri (2012) demonstrate MTurk as a large and diverse subject pool which is appropriate for research. MTurk is more representative than college student samples (Berinsky et al. 2012), other social media sources of data collection (Casler et al. 2013), and it is helpful regarding establishing the reliability and validity of psychological instruments (Buhrmester et al. 2011). In exchange for participation in the study, participants were paid $3.00, an amount above average for such studies (Horton and Chilton 2010). The instruments order was counter-balanced and contained attention checks where respondents were asked to respond to an item in a given way (i.e., "Please select *strongly agree* for this item"). The University of MASKED's Institutional Review Board approved this study.

Measures

M5–50 The M5–50 (McCord 2002) is comprised of 50 items (10 per domain) drawn from the IPIP database (Goldberg 1999) and it is conceptualized to measure domains of the FFM. This public-domain instrument assesses each of these five domains using 10 items. Sample items include: "Believe that others have good intentions" (Agreeableness), "Carry out my plans" (Conscientiousness), "Know how to captivate people (Extraversion), "Dislike myself" (Neuroticism), and "Believe in the importance of art" (Openness to Experience). Half of the items for each scale are reverse coded. All participants responded on a 5-point Likert-type scale ranging from 1 (inaccurate) to 5 (accurate). The M5–50 has been used previously in a variety of settings from assessing positive organizational behaviors in public administrators (Cooper et al. 2013) to examining treatment seeking in individuals who self-report suffering from anorexia-nervosa (Bridges et al. 2016). As highlighted above, the M5–50 has demonstrated good evidence of internal consistency using college student samples (Socha et al. 2010; Ingram et al. 2013). Within this study using a general population from MTurk, M5–50 scales demonstrated acceptable to excellent internal consistent with alphas ranging from .74 (Agreeableness) to .88 (Extraversion). These levels remain similar to studies in college students (e.g. .76–.86 in Socha et al. 2010 and 0.73–0.9 in Ingram et al. 2013) and in public managers (.72–.87 in Cooper et al. 2013). Complete descriptive characteristics of the M5–50 are located in Table 1.

NEO Personality Inventory–3 The NEO-PI-3 (McCrae et al. 2005) is the newest iteration of the NEO with updated norming standards and 38 revisions in item content. Its 240 items assess all five FFM domains of personality and the six subordinate facets of each domain. All participants issue responses on a 5-point Likert-style scale (1 = inaccurate to 5 = accuate). Internal consistencies range from .88–.95 (Costa and McCrae 2010). The NEO-PI-3 has been widely used from being validity-criterion of other FFM measures (Soto and

Table 1 Means, standard deviations, and internal consistency for the NEO-PI-3 and M5–50

Domain/facet	*M*	SD	α
M5–50 extraversion	3.07	.88	.88
M5–50 agreeableness	3.73	.68	.74
M5–50 conscientiousness	3.78	.74	.86
M5–50 neuroticism	3.73	.70	.88
M5–50 openness	2.48	.88	.77
NEO extraversion	149.70	23.58	.91
E1	28.54	5.55	.83
E2	22.52	6.38	.83
E3	22.39	6.78	.76
E4	23.40	4.61	.64
E5	26.27	5.20	.64
E6	26.59	5.40	.76
NEO agreeableness	164.98	21.63	.90
A1	25.81	5.98	.86
A2	27.37	5.40	.74
A3	30.22	4.82	.79
A4	24.82	4.83	.69
A5	27.30	5.63	.80
A6	29.05	5.52	.72
NEO conscientiousness	170.02	24.56	.94
C1	29.51	4.62	.76
C2	29.92	5.64	.79
C3	29.42	4.44	.71
C4	27.82	5.39	.81
C5	28.45	5.86	.85
C6	27.89	4.52	.74
NEO neuroticism	133.30	28.48	.95
N1	23.63	6.27	.84
N2	21.68	5.64	.79
N3	22.82	6.77	.86
N4	22.98	5.36	.79
N5	22.60	5.05	.71
N6	19.58	5.49	.82
NEO openness	164.54	19.75	.88
O1	26.38	5.11	.73
O2	27.19	6.06	.82
O3	28.83	4.63	.71
O4	23.64	4.33	.67
O5	29.44	5.33	.77
O6	29.05	5.52	.80
Religious fundamentalism	41.79	24.25	.96

M5–50 means are based on a scale of 1 to 5. NEO-PI-3 facet scores range from 1 to 40. NEO-PI-3 domain scores are a sum of all subordinate facet scores and range from 1 to 240

John 2009) to studies investigating socioeconomic status (Jonassaint et al. 2011) and exercise behavior and intention (Hoyt et al. 2009).

Religious Fundamentalism Scale-Revised (RFS; Altemeyer and Hunsberger 2004) is the newest iteration of the religious fundamentalism scale. The RFS assesses a believer's adherence to the "one true religion" using 12-item across a Likert-style scale from −4 (strongly disagree) to +4 (strongly agree). To simplify scoring interpretation, we used a Likert-style scale (1 = strongly disagree to 8 = strongly agree). While much of the research using this scale involves a Judeo-Christian population, the RFS parent scale has shown similar internal consistency and convergent validity in members from Hindu, Muslim, and Jewish religions (Hunsberger 1996).

Results

Means, standard deviations, and coefficient alphas for the NEO-PI-3, the M5–50, and the RFS are reported in Table 1. Correlations between the facets and domains of the NEO-PI-3 and the FFM domains of the M5–50 are presented in Table 2. To ensure that correlations between the M5–50 and the NEO-PI-3 were interpretably significant, this study set two additional criteria. Using Bonferroni's correction, this study required a corrected significance of $p < .0003$ to be considered significant. In addition, given the oblique nature of FFM structures, we interpreted only those statistically significant correlations at or above |.40| as a representative aspect of the correlated domain which is often done in assessment research (e.g., Ingram et al. 2011) as this value substantially exceeds the threshold required for classification as a moderate correlation (Cohen 1992). Bearing these two criteria in mind, Table 2 also denotes significantly related NEO-PI-3 constructs according to these two criteria.

Regarding Aim A, results showed general consensus between the FFM constructs of the NEO-PI-3 and the M5–50. Possessing either a stronger conceptual core associated to specific facet(s) values or excluded certain facet content its interpretation, three M5–50 domains (i.e., Openness to Experience, Agreeableness, and Extraversion) showed suggested room for interpretive narrowing. With what appears the most pronounced divergence from traditional FFM conceptualization, Openness to Experience was most associated with the Aesthetics (O2) and Ideas (O5) facets of the NEO-PI-3 while neatly minimizing influence of the other four factors (Hypothesis 1). Likewise, Agreeableness (Hypothesis 2) and Extraversion (Hypothesis 3a) were poorly correlated with their NEO-PI-3 facets of Modesty (A5) and Excitement Seeking (E5), respectively. Given these difficulties, the extra step was taken to prepare item-level correlations between the ten items comprising each of those M5–50 domains and scores of the NEO-PI-3's associated domain (Table 3) for the three domains which might benefit from some interpretive sharpening. M5–50 Conscientiousness and M5–50 Neuroticism were both

Table 2 Correlation matrix for the domains and facets of M5–50 and NEO-PI-3

M5–50 domain	E	A	C	N	O
M5–50 extraversion	–				
M5–50 agreeableness	.26*	–			
M5–50 conscientiousness	.44*	.43*	–		
M5–50 neuroticism	−.43*	−.41*	−.60*	–	
M5–50 openness	.24*	.26*	.24*	−.11	–
NEO extraversion	**.84**[a]	.27*	.45 [a]	−.48 [a]	.22*
E1	**.68** [a]	.55 [a]	.51* [a]	−.46 [a]	.27*
E2	**.76** [a]	.29*	.30*	−.39*	.13
E3	**.70** [a]	.03	.37*	−.41 [a]	.16
E4	**.59** [a]	−.01	.39*	−.29*	.08
E5	**.28***	−.13	−.03	−.06	.13
E6	**.61** [a]	.37*	.41 [a]	−.46 [a]	.17
NEO agreeableness	.05	**.78** [a]	.33*	−.23*	.29*
A1	.30	**.61** [a]	.25*	−.38*	.14
A2	−.10	**.58** [a]	.26*	−.16	.19
A3	.28*	**.71** [a]	.46 [a]	−.27*	.32*
A4	.08	**.63** [a]	.17	−.27*	.11
A5	−.46 [a]	**.25***	.01	.18	.07
A6	.15	**.53** [a]	.27*	−.06	.43 [a]
NEO conscientiousness	.41 [a]	.40 [a]	**.85** [a]	−.54 [a]	.21*
C1	.41 [a]	.40 [a]	**.73** [a]	−.60 [a]	.26*
C2	.24*	.19	**.57** [a]	−.27	.06
C3	.29*	.43 [a]	**.71** [a]	−.45 [a]	.21*
C4	.45 [a]	.16	**.69** [a]	−.42 [a]	.17
C5	.44 [a]	.42 [a]	**.85** [a]	−.59 [a]	.19
C6	.12	.36*	**.52** [a]	−.29*	.15
NEO neuroticism	−.49 [a]	−.43*	−.61 [a]	**.89** [a]	−.10
N1	−.43 [a]	−.19	−.33*	**.76** [a]	−.02
N2	−.16	−.54 [a]	−.37*	**.64** [a]	−.10
N3	−.50 [a]	−.33*	−.58 [a]	**.85** [a]	−.06
N4	−.61 [a]	−.29*	−.54 [a]	**.74** [a]	−.09
N5	−.26*	−.44 [a]	−.54 [a]	**.61** [a]	−.09
N6	−.44 [a]	−.33*	−.64 [a]	**.79** [a]	−.13
NEO openness	.18	.28*	.17	−.10	**.74** [a]
O1	.01	.08	−.12	.04	**.36***
O2	.21*	.16	.08	.03	**.63** [a]
O3	.21*	.29*	.27*	.01	**.42** [a]
O4	.27*	.15	.09	−.26*	**.29***
O5	.15	.14	.25*	−.15	**.60** [a]
O6	−.13	.24	.08	−.03	**.46** [a]

*denotes significance at the Bonferroni corrected α level of $p < .0003$ while [a] denotes significance at both the Bonferroni corrected level and this study's correlation threshold. Bolded correlations indicate measurement of corresponding FFM domains

represented by their domain content of the NEO-PI-3 (Hypothesis 3b).

Regarding Aim B, relationships between the M5–50 domains and the religious fundamentalism, correlation coefficients were computed among the five M5–50 domains and the RFS. Using the Bonferroni approach to control for Type I error across the six correlations, a p value of less than .008 (.05/6 = 0.008) was required for significance. Openness was associated with a negative relationship with the RFS ($r = -.27$; Hypothesis 4) at the .001 level. Additionally, Extroversion was positively associated with the RFS ($r = .19$; Hypothesis 5) at the .001 level. However, Conscientiousness's association with the RFS (Hypothesis 6) was not significant ($p = .28$). In general, these associations support the validity of the M5–50 in revealing well-documented relationships between religious fundamentalism and specific FFM personality constructs. Both examinations support Aim C by using a general population sample, as opposed to collegiate student samples.

Discussion

This study expanded the interpretive capacity of the M5–50 through scope and recruitment. The scope here focused on expanding validity through examining facet level correlations with the NEO-PI-3 and domain level correlations with the RFS. Both relationships between the M5–50 and the NEO-PI-3 indicate similarity and it provides some evidence that M5–50's Openness domain may also be able to differentiate the O/I model. Regarding religious fundamentalism, the M5–50 domain of Openness had an inverse relationship with fundamentalism, while extraversion had a positive relationship with fundamentalism. The results here suggest the M5–50 is appropriate for use within a general population sample.

A priori hypotheses projected for a weaker pattern of correlations for the Agreeableness domain and for two NEO-PI-3 facets to emerge as the strongest correlates for the M5–50's Openness to Experience domain. Predictions relative to Openness to Experience were confirmed while lower expected correlations for Agreeableness were not. Thus, this study provides support for the needed development of an O/I based interpretation model for the M5–50 (Ingram et al. 2013). However, there is no evidence here to suggest thematic problems in Agreeableness that may have caused it to have fit problems previously (Socha et al. 2010). In addition, the M5–50 domain of Extraversion was not as comprehensively representative of all facet content as predicted whereas Neuroticism and Conscientiousness appear to act as comprehensive measures of both domain and facet content on the NEO-PI-3. Additionally, the M5–50 domain of Conscientiousness was not significantly associated with religious fundamentalism, while the domains of Openness (negative association) and Extraversion (positive association) supported previous literature.

Table 3 Item-level analysis of M5–50 with the NEO-PI-3

M5–50 item	NEO domain	Facet 1	Facet 2	Facet 3	Facet 4	Facet 5	Facet 6
Openness							
1	.42	.52	.34	.25	.16	.27	.06
2	.51	.24	.66	.30	.19	.31	.17
5*	.51	.23	.27	.29	.17	.59	.39
8	.24	.05	.20	.08	.09	.11	.35
15*	.49	.20	.58	.33	.17	.32	.23
20*	.39	.21	.17	.22	.14	.22	.52
22*	.57	.28	.36	.31	.18	.60	.40
29*	.49	.23	.58	.25	.21	.36	.17
37	.27	.06	.23	.19	.21	.30	.02
43	.38	.10	.32	.21	.21	.41	.18
Agreeableness							
4*	.50	.29	.37	.42	.53	.26	.26
13*	.57	.65	.43	.41	.40	.19	.27
24	.51	.78	.25	.38	.35	.01	.33
32*	.51	.32	.37	.48	.48	.17	.33
33	.39	.44	.18	.42	.36	.08	.32
34*	.55	.24	.54	.38	.46	.40	.26
40	.51	.38	.33	.51	.34	.09	.43
44	.45	.32	.22	.48	.31	.10	.48
46*	.53	.23	.46	.51	.40	.26	.38
49	.29	.24	.12	.47	.17	.07	.34
Extraversion							
10	.66	.68	.59	.46	.42	.21	.48
17*	.57	.43	.54	.52	.40	.15	.42
26*	.43	.39	.39	.44	.25	.01	.34
27	.72	.63	.67	.54	.47	.23	.56
31*	.50	.25	.53	.46	.41	.20	.30
36*	.45	.43	.35	.36	.29	.12	.40
39	.70	.61	.57	.58	.50	.27	.50
42	.63	.36	.58	.49	.53	.39	.41
45*	.55	.48	.51	.48	.32	.13	.45
48	.61	.46	.53	.56	.50	.23	.39

Numbers under the M5–50 item heading represent item order and those with a * are reverse coded. Their correlations were inversed here

Below external correlates are discussed from within the framework of M5–50 interpretation. Conscientiousness produced evidence of well-matched convergent and discriminant validity with external correlates. Likewise, Neuroticism demonstrated good validity and may be described confidently using the descriptions of Costa and McCrae (1995). However, more variability was seen between intent and measurement for the domains of Extraversion, Agreeableness, and Conscientiousness. Extraversion interpretations should avoid descriptors consistent with Excitement Seeking (E5) while Agreeableness had poor emphasis of modesty-related concepts (A5). Evidence also suggests that M5–50 Openness to Experience is dominated by the facets of Aesthetics (O2) and Ideas (O5) supporting contention that the O/I model may be an apt way to interpret this domain of the M5–50.

It may be that moderate correlations between unintended domains may explain why model fit was not as high as the authors had anticipated. However, Agreeableness did not appear to be particularly afflicted by this problem as it produced consistent divergent and convergent evidence (80% of intended facets and only 7% of unintentional NEO-PI-3 facets/domains were significantly related). This suggests that, in samples if the M5–50 had a broader recruitment sample during its validation (i.e., Socha et al. 2010) that no such problems would have emerged for the domain. Conversely, since some relationships between unintended FFM constructs

are expected given the oblique nature of personality, the M5–50's difficulties with Agreeableness may merely serve to highlight why some researchers are emphasizing exploratory structural equation modeling over CFA as the preferred analysis for FFM instruments (Marsh et al. 2010).

As well as a difference in scope, this study differs from other research on the M5–50 in recruitment. By using MTurk to recruit participants, correlations reported here may vary from those seen within the regional norming group used for the M5–50. Nevertheless, the utility of the study remains for two reasons: (a) the coefficient alphas of this study are consistent with those seen elsewhere for the M5–50 (i.e. .76–.86 in Socha et al. 2010, .73–.90 in Ingram et al. 2013 and .72–.87 in Cooper et al. 2013) and (b) domain descriptions provided by Costa and McCrae (1995) are thematic to those seen for the M5–50. Lastly, the M5–50's domain correlates with religious fundamentalism are seen elsewhere in FFM and fundamentalism research. This evidence suggests that traits measured on the M5–50 are theoretically well grounded. Moreover, this study's broader recruitment strengthens efforts to understand the interpretative feasibility of the M5–50 beyond its initial validation sample (McCord 2002) towards a general population sample.

Conclusion

The purpose of this project was to provide the first evidence of concurrent validity for the M5–50, a public-domain IPIP FFM instrument, and to examine its appropriateness for usage using a general population. Results indicate the domains of Consciousness and Neuroticism are the most evenly matched to the descriptions provided by Costa and McCrae (1995). While most domains match fairly well, others tend to under-emphasize certain facets. This does not appear to invalidate interpretive uses for the M5–50 as it clearly captures its intended content within each domain. However, it does provide some additional preliminary evidence that the M5–50's Openness to Experience may be able to differentiate in the O/I model along with its single construct conceptualization.

This study also suggests a new direction for brief test development efforts which emphasize the IPIP. Given the adaptability and free-form nature of the IPIP, the use of it to spur theory development and standards for FFM assessment development are likely to become an increasingly important issue. This is increasingly likely given the recent influx of brief scales. More than grounding and expanding the interpretation available for the M5–50, this study suggests that development of abbreviated FFM instruments can be done in a way that enables an integration of distinct interpretive approaches–particularly amongst the Openness to Experience domain.

While instruments measuring Openness/Intellect often do so using assessment methods which were independently designed for this explicit purpose (e.g., Ashton et al. 2000), it appears reasonable to expect that assessment's ongoing emphasis on using scale information effectively will continue. Thus, the development of future IPIP instruments may wish to take into consideration an integration of these two separate conceptualization and interpretation approaches during the instrument development process. By placing the largest item selection emphasis on the IPIP facets of *Artistic Interests* and *Intellect*, brief FFM instruments appear able to offer the opportunity for scoring systems using multiple interpretation schemes that meet the theoretical and practical needs of different test developers. Doing so could make brief IPIP instruments, such as the M5–50, able to connect conceptually overlapping interpretation approaches (i.e., Openness to Experience as a single domain and the O/I model as a distinct two factor approach) and thereby enabling a hastened opportunity for research into the outcome and prediction differences of these two models. While this may be challenging given the difficulty in establishing effective reliability estimate in some abbreviated FFM forms (Hofmans et al. 2008), the allure of doing so is that it might further the stated purpose of the IPIP- enhancing the FFM for public use.

Compliance with Ethical Standards

Conflict of Interests The authors declare no conflicts of interests.

Data Statement The datasets for this study are not publicly available, but they are available upon reasonable request. The dataset we would provide would strip out individual item responses and they would provide composite information only.

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