A multi-faceted, open source, measure of personality

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Abstract

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1. Introduction

18   Over the last decades, the Five Factor Model as well as the Big Five model have
19 become widely accepted models for describing general attributes of personality. Often the
20 terms are even used synonymously, which is why we will refer to the Big Five from here on.
21 The Big Five is a hierarchical model which describes human individual differences in
22 personality at the dispositional level: one of the most basic, universal, biologically-influenced
23 and stable layers of human inter-individual differences in behavior, cognition and feeling
24 (McAdams & Pals, 2006). Its hierarchical conception is relevant to acknowledge behavior
25 from the most specific (nuances), to the most broad differences in temperament and
26 character (dimensions), through a varying number of mid-level personality characteristics
27 called facets. Most of the research concerning criterion validity of the Big Five inventories
28 has focused on the covariation between the Big Five dimensions and relevant external
29 outcomes. However, specific dispositional characteristics captured on the facet level might be
30 of extreme utility to provide more complex descriptions of individuality and to predict life
31 outcomes to a major extent (Lounsbury, Sundstrom, Loveland, & Gibson, 2002; Paunonen &
32 Ashton, 2001; Ziegler et al., 2014). Unfortunately, the number and nature of the facets below
33 the Big Five and being measured by different personality instruments is far from being
34 consensual. In fact, different facet level models have been proposed (XXXX). One potential
35 reason for this could be that many facet level models were developed after a questionnaire
36 version without such a level had been published. Thus, the facets were developed as an
37 elaboration. While this has many theoretical advantages it also has the disadvantage of
38 potentially limiting the search space of possible facets. In this work we aim at maximizing
39 this search space and present a personality questionnaire which is broad at the facet level,
40 open-access, and measurement invariant across two different cultures.

1.2. A short history of the Big Five

Francis Galton proposed the fundamental lexical hypothesis as a ground from where to describe interpersonal differences in personality. The hypothesis states that every apprehended characteristic in the realm of personality should have its place in the natural language, a corollary derived from this first statement is that the essential features must represent a unique word in the lexical universe of this language. Galton (1884) himself, and later Allport and Odbert (1936) and still later Norman (1967) used English dictionaries for a systematic collection of all adjectives which could be related to human personality characteristics. Using exploratory factor analyses on self- and other ratings five broad factors could repeatedly be extracted from the data. These efforts were also replicated in different languages, such as in German (Klages,...), Baumgartner,...

Cattell was one of the first researchers who systematically applied exploratory factor analysis in order to explore personality structure. He inspected the correlation structure of the items in the word lists of his predecessors, finding 16 personality oblique factors, including one factor specifically for intelligence, these factors form the 16-PF. These 16 factors were the primary factors in a hierarchical structure for Cattell (coetany to L.L. Thurstone and undoubtedly influenced by him). Cattell himself viewed personality as a hierarchical structure, containing three layers (Cattell, 1956). The second order factors resemble the Big Five dimensions (Digman, 1990).

Different researchers followed Cattell in the study of dispositional traits of personality. One of the most influential models was Eysenck's Big Three. Grounded on a strong biological basis, Eysenck's theory supposed a link between temperament and personality. Its structural proposal concerned at first two big factors, named Neuroticism vs. Emotional stability and Extraversion vs. Introversion. These two dimensions were later joined by a third factor that Eysenck called Psychoticism. This label was criticized by others who suggested

66 that a more appropriate term would be psychopathy (Digman, 1990). Eysenck's big two are

67 still „alive" today in the Big Five, and his third factor, psychoticism, can be operationalized

68 as two dimensions of the Big Five: Agreeableness (or . . .) and Conscientiousness (or . . . .).

69   A large number of studies have focused on the problem of personality structure

70 resulting in a five factor solution (Fiske (1949); Norman (1967); Tupes and Christal (1961);

71 Borgatta (1964)). Possibly the two most widely cited works relating to the foundations of

72 the Big Five are those by Goldberg et al. (2006) and Costa and McCrae (1995). Goldberg

73 can be seen as one of the first who extended research concerning the Big Five, while McRae

74 and Costa's importance rests on popularizing the terminology (OCEAN) and the

75 development of one of the most used tools to assess personality based on the Big Five: the

76 NEO-PI. The Big Five dimensions are labeled as follows: I) Extraversion vs. Introversion. II)

77 Agreeableness or Friendliness. III) Conscientiousness or Achievement or Will. IV) Emotional

78 Stability vs. Neuroticism. V) Openness or Intellect or Culture.

79   One of the most important features of the Big Five is the fact that it could be

80 replicated in different languages. Research is available in Japanese, Vietnamese, German,

81 Spanish, Greek, (refs). . . This finding suggests that the way human beings construe

82 personality is at some point universal and that its basic features are retained within the Big

83 Five. Another essential characteristic relies on its hierarchical nature. The five domains are

84 useful to retain the big picture of personality, maximize the situation consistency and

85 reliably assess difficult subjects such as children. Nonetheless, each dimension is

86 conceptualized as a latent construct formed by more specific narrow factors called facets,

87 which in turn are useful to depict the impact of personality characteristics into specific

88 behaviors and concrete life outcomes.

89   The Big Five has proven to be a valid theoretical and empirical model to predict

90 relevant life outcomes. Research such as Ozer and Benet-Martínez (2006) or Roberts, Kuncel,

91 Shiner, Caspi, and Goldberg (2007) has shown that scores for the Five Dimensions (and their

related facets) are able to explain outcomes such as Academic and work performance, health, personality disorders, political attitudes and many more. The empirical findings linking Big Five measures to life outcomes have reinforced the concurrent validity of the test scores interpretations. At the same time, the broad nature of the domains has spurned research into the more fine-grained lower order structure of facets.

1.3. Facet Structures

There are a number of models that include a facet structure below the five broad domains. The most widely known model is the one suggested by Costa and McCrae (1995). Other popular models have been suggested for the Big Five Inventory 2 (BFI-2; Soto & John, 2016), the IPIP (Goldberg et al., 2006), and the HEXACO model (Lee & Ashton, 2016), which assumes six broad domains. Table 1 gives an overview of these different models listing their facets per domain as well as some information regarding their psychometric properties.

< Table 1 >

As shown in table 1, there are many different possibilities of facets forming the domains. However, there is still a degree of overlap on the facets covered by the different instruments. Soto and John (2009) inspected the convergences between the NEO-PI-R and the first version of the BFI, suggesting that two constructs per domain were measured at the facet level by both inventories. The constructs defined by Soto and John (2009) were: Assertiveness and Activity for Extraversion; Altruism and Compliance for Agreeableness; Order and Self-Discipline for Conscientiousness; Anxiety and Depression for Neuroticism; and Aesthetics and Ideas for Openness. The convergence holds for the four instruments listed in table 1, as these ten constructs are covered within the facets for every instrument. Some of the constructs are explicitly covered at the facet level (e.g. Anxiety); meanwhile

others are mainly covered though the four instruments, although sometimes implicitly

(e.g. Liveliness in HEXACO resembles the "core" construct Activity, present in all other

instruments). The reverse is not always true, not every facet within the four instruments is

covered by the constructs proposed by Soto and John (2009). As an example we find

Self-Consciousness, a Neuroticism facet defined by the NEO-PI-R and the IPIP-NEO-120,

which is clearly tapping at a construct different from Anxiety or Depression.

The nomological network commonly assumed in Big Five questionnaires is drawn from

nuances through facets to domains, from more specific to more general. Relying in domains

to explain and predict behavior can benefit from ease of interpretability. However, optimal

predictions for specific contexts can be enhanced if a more specific set of traits is used. On

the other hand, using nuances to predict behavior might yield even stronger predictive

ability (Seeboth & Mõttus, 2018), but as the number of predictors grows the interpretations

become more complex. Facets are on a middle ground between nuances and domains, in a

compromise between specificity and sensitivity in the bandwidth-fidelity dilemma. This

narrow aggregation both satisfies the specificity of predictions to concrete situations and

environments and also enhances the ease of interpretability when summarizing individual

personality characteristics.

Furthermore, there is a large corpus of research which points towards facets as

important criterion predictors showing incremental validity to domains. For academic

achievement, Paunonen and Ashton (2001) showed that the facets achievement motivation

and intellectual curiosity increased the variance accounted for by college students' grades,

above and beyond its respective dimensions: Conscientiousness and Openness to experience.

Similarly, Lounsbury et al. (2002) provided evidence regarding the facets work drive and

aggression, which added an extra 12% of explained variance over the Big Five domains on

10th grade students' GPA. Ziegler, Danay, Schölmerich, and Bühner (2010) showed that

better performance in college grades was associated with low gregariousness, excitement

141 seeking and order as well as high activity, openness to ideas and openness to values. Often

142 different facets within the same domain can have effects in opposite directions, partially

143 canceling out the predictive ability when only paying attention to the domain score. This is

144 the case for Openness to ideas vs. Openness to fantasy, as the former is related positively to

145 academic achievement whereas the latter is related negatively (Ziegler et al., 2014), resulting

146 in a potential masking effect on the ability of Openness predicting the academic achievement.

147   As described above, facet measures often yield scores that have stronger test-criterion

148 correlations than their respective domain scores (e.g., Ziegler et al., 2012; . . .). However,

149 facet scores have also been shown to be related to personality disorders. Thus, the

150 combination of a higher fidelity along with the potential clinical relevance of facet scores

151 might open up unique advantages for clinical research.

152 **1.4. The Big Five and Personality Disorders**

153   Personality disorders are steadily shifting from a categorical definition into a continua

154 conceptualization within the clinical realm. This process is not new for personality science

155 history, as the subject itself moved from a qualitatively distinct set of definitions, called

156 types, into a subset of continuous domains in which both normality and extreme tendencies

157 were moving along, named traits. In fact, the new version of the Diagnostic and Statistical

158 Manual of mental disorders, DSM- V, now proposes two different ways of assessing

159 personality disorders: 1) A descriptive model of personality disorders in section II which

160 mimics the former model of assessing personality disorders and; 2) A novel trait model that

161 follows research on the personality scientific domain (In section III), which conceptualizes

162 personality disorders as extreme tendencies located in the continuum of the Big Five domains

163 and facets (American Psychiatric Association, 2013; Widiger & Mullins-Sweatt, 2009)

164   This paradigm shift in clinical assessment of personality has led to the construction of

165 the Personality Disorder Inventory (PID-5; Krueger, Derringer, Markon, Watson, & Skodol,

166 2012), a 25-facet and five-dimension self-report inventory, with an informant-report version

167 (Markon, Quilty, Bagby, & Krueger, 2013). The big five dimensions mirror the Big Five

168 domains, although with a focus on the maladaptative end of the continuum,: I) Detachment

169 (Big Five's introversion), II) Antagonism (absence of Big Five's Agreeableness), III)

170 Disinhibition (absence of Big Five's Conscientiousness), IV) Negative affect (Big Five's

171 Neuroticism) and V) Psychoticism (Absence of Big Five's Openness). The PID-5 has shown

172 satisfying evidences of criterion validity (…summary). However, the limited number of

173 facets on the PID-5 has already raised some concerns due to the low reliability when

174 studying developmental phenomena of personality disorders (Clercq et al., 2014)', and may

175 also limit the capacity of portraying vivid personality profiles which are suitable for

176 explanatory purposes in the clinical domain.

177   In line with what has been stated previously for academic achievement, the

178 examination of facets may result in an enhancement of the specificity of assessment when

179 looking at the nature of PDs (Clark, 2005; Samuel & Widiger, 2008). This improvement of

180 specificity resulted in a predictive gain ranging from 3% to 16% when comparing facets to

181 domains predicting PD in the Reynolds and Clark (2001) study. Furthermore, the use of

182 facets may be of extreme utility for those PD whose personality profile is less clear at the

183 domain level. As Saulsman and Page (2004) point out, Schizotypal and

184 Obsessive-Compulsive disorders are examples of PD which are not well covered by Big Five

185 domains. A reason for it may be found in a pattern inconsistency of facets within the same

186 dimension or in a lack of coverage for essential characteristics of the PD. For example,

187 aberrant cognitions are essential characteristics of schizotypal disorder and are not covered

188 by some instrument's facets like the NEO-PI-R (Samuel & Widiger, 2008; Saulsman & Page,

189 2004). Likewise, the expected high scores on warmth and low scores on assertiveness could

190 mask the effects of extraversion when predicting Dependent Personality Disorder, following

191 the theoretical correspondence between PD and Big Five facets proposed by Costa Jr. and

192 Widiger (1994). Moreover, the PID-5 has prompted the elaboration of a number of Five

193 Factor Model Personality Disorders (FFMPD) scales to maximize the facet coverage in

194 relation to specific PDs (Bagby & Widiger, 2018).

195   Facet analysis and dedicated Big Five questionnaires have been used to solve issues like

196 those mentioned in the last paragraph. We propose to base such research on a broader facet

197 basis. To this end we suggest a general instrument to cover a broad number of facets which

198 could aim for fine grained assessments.

1.5. This study

200   We present in this paper an instrument for personality assessment which aims to cover

201 the need for an internationally usable, open source, and differentiated measure at the facet

202 level. Two studies are presented, for each one inspects the factor structure of the instrument

203 in a different sample drawn from a different culture (American vs. German). Measurement

204 invariance across samples will be examined. Internal consistency and test-criterion

205 correlations will be estimated for all scores. To sum up, the aim for this research project was

206 to provide an instrument that can be used in non-clinical but also in clinical research which

207 emphasizes the facet level of the Big Five.

2. Methods

209   Two different studies are presented in this work. The first study uses a sample drawn

210 from a USA bachellor student population. The aim was to detect and confirm a

211 measurement model that maximizes the facet space of the IPIP instrument. An Exploratory

212 Factor Analysis (EFA) was used to identify the number of facets per domain. A

213 Confirmatory Factor Analysis per facet was modelled in order to confirm the item - facet

214 relationship. Finally, an Exploratory Structural Equation Model (ESEM) was fitted to

integrate the measurement model of the facets with the dimensions. ESEM is a novel
method which allows the researcher to use Structural Equation Modelling (SEM) without
the need of imposing an independent cluster solution, as its common in the CFA procedure.
ESEM has gained reputation in the personality field, where the independent cluster model
may not capture the complexity of the constructs measured (Marsh et al., 2010).

The second sample was drawn again from a graduate student population, albeit this
time based in Germany. The aim for the second study is to replicate the structure found in
study one, plus assess the degree of measurement invariance of the proposed model.

2. Study 1 - US-American Sample

2.1.1. Participants.   The sample consisted of 722 American undergraduate students
(59.30% male) who participated voluntarily. The mean age was 21.60 years (SD = 5.90).
Students were emailed a link to a computerized assessment battery that included the IPIP
items as well as several other tests not reported in this paper. The data set was randomly
splitted in two equally sized samples. Both samples were matched in relation to missing
values, outliers and extreme values. In Sample 1 the mean age was 21.80 years (SD= 6.30),
in Sample 2 the mean age was 21.50 years (SD=5.60).

2.1.2. Measures.

International Personality Item Pool (IPIP).   Altogether, 525 items from the
International Personality Item Pool (IPIP) were used to measure Neuroticism, Extraversion,
Openness (to experience), Agreeableness and Conscientiousness. The IPIP is an open source
database of personality items, which was launched in 1996, and contains over 2000 items
(Goldberg et al., 2006). Participants were asked to rate themselves on typical behaviors or
reactions on a 5-point Likert scale, ranging from 1 ("Not all like me") to 5 ("Very much like

238 me").

239 **Satisfaction With Life (SWL).** Measured with a 5 item composite defined in
240 Diener, Emmons, Larsen, and Griffin (1985).

241 **GPA.** Grade Point Averages measured in high school, university, and in cc.

242 **SAT.**

243 **ACT.**

244 **Absences from class.** As a behavioral measure absence from class was asked to
245 report from subjects. ABS2 ABS4 what are the differences?

246 **2.1.3. Procedure**

247 **EFA with subsample 1.** To determine the number of possible facets per domain
248 Velicer (1976) Minimum Average Partial (MAP) method and Horn (1965) parallel analysis
249 (PA) were employed for every domain. Based on these results an exploratory factor analysis
250 was calculated for each domain via Mplus using a geomin rotation (Quelle) and a maximum
251 likelihood estimator (ML). The decision for the preferred number of facets per domain was
252 based partly on comparing model fits (CFI, RMSEA, SRMR). More importantly though was
253 the interpretability of the facet solution. After all facet solutions of other personality
254 measures were looked at to compare it to the found facet structure. If there were important
255 parts missing to present the domain with regards to content, new facets would be added
256 afterwards.

257 **CFA and ESEM with subsample 2.** To confirm the structure of facets the EFAs
258 delivered, multiple confirmatory factor analyses were calculated via Mplus. In a first step
259 measurement models were estimated for each of the facets. To obtain balance between the

₂₆₀ facets, the items were reduced to five per facet based on item content and loading pattern in

₂₆₁ a second step, afterwards the estimations for the measurement models on facet levels were

₂₆₂ repeated. For both steps estimators were WLSMV (weighted least squares adjusted for

₂₆₃ means and variances). Aim was to ensure an optimal breadth and sufficient reliability. In a

₂₆₄ final model, all five domain structural models were integrated using exploratory structural

₂₆₅ equation modeling (ESEM) (Asparouhov & Muthén, 2009). Marsh et al. (2010) could show

₂₆₆ that ESEM fits personality data better and results in substantially more differentiated

₂₆₇ factors than it would using CFA, while using an EFA measurement model with rotations in a

₂₆₈ structural equation model. All facets were able to load on all domains. If there would show

₂₆₉ up facets that do not significantly load on the intended domain, this facets would get

₂₇₀ eliminated subsequently. The estimators used were ML, factor scores were used as indicators

₂₇₁ and the rotation was oblique (using Geomin). Model fit was determined based on the guide

₂₇₂ lines by Hu and Bentler (1999) as well as Beauducel and Wittmann (2005). Consequently, to

₂₇₃ consider a good fit of a proposed model, the Comparative Fit Index (CFI) should be at or

₂₇₄ over .95, the standardized root mean squared residual (SRMR) smaller than .08 and the root

₂₇₅ mean square error of approximation (RMSEA) smaller than .06.

₂₇₆   **Criterion validity evidence.**   To examine the nomological structure of the facets

₂₇₇ and domains to external constructs like life satisfaction and education, correlations and

₂₇₈ multiple regression were computed.

₂₇₉ **2.2. Results**

₂₈₀   **Results of EFA.**   In *Table 2* model fits for the chosen facet model for each domain

₂₈₁ are shown, as well as Eigenvalues and results from MAP and PA test. To ensure the

₂₈₂ homogeneity of the facets and to reduce the risk of cross domain loadings, items with factor

₂₈₃ loadings less than .30 were eliminated. This was only done when item content was also

₂₈₄ judged as being non-central to the domain in question (Ziegler et al., 2014).

285   < Table 2 here>

286   According to the exploratory model, Agreeableness consists of eight facets after two

287 facets were eliminated due to weakly loading and inconsistent items. The remaining facets

288 are named Appreciation, Integrity, Low Competitiveness, Readiness to Give Feedback,

289 Search for Support, Good Faith, Genuineness and Altruism.

290   Conscientiousness consists of nine facets after one facet with item factor loadings less

291 than .30 was excluded, they are: Dominance, Persistence, Self-discipline, Task planning,

292 Goal orientation, Carefulness, Orderliness, Wish to work to capacity and Productivity.

293   Extraversion is formed by nine facets. A new facet (Energy) was added in order to tap

294 better the physical component of Extraversion, which was missing in the eight facet solution.

295 The facets are Sociability, Readiness to take risks, Wish for affiliation, Positive attitude,

296 Forcefulness, Communicativeness, Humor, Conviviality and Energy.

297   Neuroticism (interpreted here as emotional stability) consists of seven facets. One facet

298 was dropped due to poor interpretability, and was therefore not included in the subsequent

299 analyses. The final set of facets are named Equanimity, Confidence, Carefreeness, Mental

300 balance, Drive, Emotional robustness and Self-attention.

301   Openness to experience comprises of nine facets. One facet was identified as a method

302 factor and eliminated, because it solely contained negatively formulated items and no

303 coherent underlying trait could be identified. Furthermore another facet (Intellect) was

304 added, because the remaining facets lacked an intellectual content. The facets of Openness

305 are named Creativity, Wish for variety, Open-mindedness, Interest in reading, Artistic

306 interests, Wish to analyze, Willingness to learn, Sensitivity and Intellect.

307   The items to each facet are listed in the appendix (A).

308   **Results of CFA and ESEM.**   All measurement models for the facets were fitting

309 well, results can be found in *Table 3*. In this table both five-item facets and multiple-item

310 facets are presented with their respectve model fit measures. The 5-item facets normally

311 outperform the multiple-item facet versions regarding model fit.

312   < Table 3 here caption="Model fit for each facet")>

313   The exploratory structural equation model (ESEM) of the final model with all five

314 domains fits approximately with CFI = .87, RMSEA = .072, SRMR = .036. As you can see

315 in *Table 4* nearly all facets load significantly on their intended domain. Some cross loadings

316 can be found as they are plausible with ESEM procedures. However, in any case the number

317 of cross loadings is high nor unconsistent with the facet content.

318   < Table 4 here caption="ESEM factor scores")>

319   **Criterion validity evidence.**   Bivariate correlations of the facets with the external

320 criteria are shown in *table 5*. The facets N2 (Confidence, r = 0.53) and E4 (Positive attitude,

321 r = 0.49) show the highest correlations with SWL respectively. The SWL scale was also

322 correlated with facets such as N4 (Mental balance, r = 0.25) and N5 (Drive, r = 0.27) in the

323 Neuroticism / Emotional stability realm. C5 (Goal orientation, r = 0.28) and C2

324 (Persistence, r = 0.27) in Conscientiousness. E1 (Sociability, r = 0.26) and E9 (Energy, r =

325 0.25) in the Extraversion domain. O9 (Intellect, r = 0.24) and O3 (Open-mindedness, r =

326 0.22) in Openness and A6 (Good faith, r = 0.25) in the Agreeableness domain.

327   Regarding the academic performance criteria (GPA, SAT and ACT), the Openness

328 facets O4 (Interest in reading), O6 (Wish to analyze) and O9 (Intellect) yield the most

329 consistent correlations. Interestingly, O4 correlates directly with the reading subtests of SAT

(r = 0.25) and ACT (r = 0.2) and shows a negligible relationship with the math (r = 0.06 / 0.08) subscales, providing evidences for discriminant validity (maybe this for the discussion).

Furthermore, the global GPA scale (assuming cc is for global) correlated with several Conscientiousness and Agreeableness facets. C9 (Productivity, r = 0.4), C5 (Goal orientation, r = 0.38) and C4 (Task planning, r = 0.35) yield the higher correlations with overall GPA respectively in the Conscientiousness domain, and A1 (Appreciation, r = 0.32) in the Agreeableness domain.

Concerning the behavioral criteria controlled in this study, absence from class, the meaningful correlations unsurprisingly loaded within the facets at the Conscientiousness domain. Particularly the facets C4 (Task planning, r = -0.22 / -0.26), C7 (C6: Carefulness, r = -0.21 / -0.21) and C9 (Productivity, r = -0.21 / -0.24) were the most robust indicators of this criteria.

< Table 5 here caption="Criterion correlations" >

Study 2 – German Sample

Participants. The representative sample consisted of 387 German speakers (49.10% male) with a mean age of 45.60 years (SD = 17.50). (How was the data collected?)

Measures. The five items per facet derived from Study 1 were translated and back-translated by bilingual experts, creating a German version of the measure used there. The translated items can be found on appendix B.

Procedure

350   **Step 1 − Examining the structure.** To check the facet structure Study 1

351 delivered, multiple confirmatory factor analyses were calculated via Mplus following an

352 analogue procedure to Study 1. First, measurement models were estimated for all facets,

353 using WLSMV as the estimator. Model fit was determined based on the guide lines

354 mentioned above. In a final model, all five domain structural models were integrated using

355 ESEM.

356   **Step 2 − Testing for measurement invariance.** In a next step, measurement

357 invariance between German and US samples was examined. We followed the procedure

358 suggested by Sass (2011) and tested configural, factorial and strong factorial invariance. The

359 cutoffs suggested by Chen (2007) were applied to compare model fits. According to this

360 configural measurement invariance can be assumed when the same item is associated with

361 the same factor in each domain, while the factor loadings can differ. If the factor loadings of

362 each item would not differ between the samples, factorial measurement invariance can be

363 assumed. Strong factorial measurement invariance can be assumed when on top of that the

364 intercepts of each item are equal. The limit to factorial measurement invariance was set to Δ

365 CFI < .01, Δ RMSEA < .015 and Δ SRMR < .03, at which the limit to strong factorial

366 measurement invariance was set to Δ CFI < .01, Δ RMSEA < .015, Δ SRMR < .01 (Chen,

367 2007).

368 **Results**

369   **Results of CFA.** The measurement models of the American sample were replicated

370 for the reduced number of items per facet. Model fits can also be seen in *Table 3*. The ESEM

371 with all five domains show an approximate fit to the data with CFI = .82, RMSEA = .078,

372 SRMR = .044. *Table 6* shows the ESEM factor loadings for the German sample. All facets

373 load significantly on their intended domain but can have loadings on other domains as well.

374   <Table 6 here >

375   **Results of MI.**   For analyzing the measurement invariance the latest facet model

376   structure (with additional facets) was taken. The results are shown in Table 7. Configural

377   measurement invariance is assumed for the facets Appreciation of others,

378   Superiority/Grandiosity, Need to be liked, Crybabiness, Manipulation, Altruism (facets of

379   Agreeableness), Perseverance, Task Planning, Goal-orientation/Achievement striving,

380   Preferred Load, Procrastination (facets of Conscientiousness), Assertiveness,

381   Sociability/Gregariousness, Activity (facets of Extraversion), Irritability, Self-serving

382   Attention (facets of Neuroticism), Self-attributed Inginuity, Openness to actions and

383   activities, Openmindedness/Judgement, Love of Learning, Openness to feelings and Intellect

384   (facets of Openness).

385   Factorial measurement invariance is assumed for the facets Meanness, Trust (facets of

386   Agreeableness), Control of others, Lack of (Self-) Control, Deliberation/Caution, Lack of

387   Tidiness/Order (facets of Conscientiousness), Sensation Seeking, Reclusiveness, Emotionality,

388   Humor (facets of Extraversion), Depression, Anxiety, Self-assuredness, Lethargia,

389   Sentimentality (facets of Neuroticism), Openness to reading, Openness to arts and Need for

390   cognition (facets of Openness).

391   The only facet with strong factorial measurement invariance is Shyness, a facet of

392   Extraversion

393   <Table 7 here>

Discussion

³⁹⁴

³⁹⁵   We have presented an open access instrument for personality assessment within the Big

³⁹⁶ Five framework, which showed evidences of factorial validity in two different cultures and

³⁹⁷ maximized the space set of facets encompassed. Furthermore, evidences for external criteria

³⁹⁸ validity were attained

³⁹⁹   We cover all the "core" facets proposed by soto and john. We also cover all the facets

⁴⁰⁰ proposed by the most influential Big Five measures as seen in table 1. In addition we

⁴⁰¹ included even more facets.

⁴⁰²   The evidences for reliability and structural validity are retained. Like most of the Big

⁴⁰³ Five instruments, ours could not survive to the CFA independent cluster model. Even

⁴⁰⁴ though ESEM has been used to provide structural validity evidence of personality measures

⁴⁰⁵ recently. Here we show that the standards for a good ESEM model are met. Furthermore

⁴⁰⁶ the structural validity is robust between two different cultures.

⁴⁰⁷   We have collected some criterion validity evidences. Like bla bla bla. Nonetheless the

⁴⁰⁸ multi - facetted nature of the instrument makes forthcoming evidences for criterion and

⁴⁰⁹ predictive validity promising.

⁴¹⁰   One limitation is the sample used. Students are not a representative population of

⁴¹¹ society and results may not be generalized.

⁴¹²   Future directions are to provide a tool with the subset of items for public use. Gather

⁴¹³ community sample, from more cultures and test the extent of the universality of the

⁴¹⁴ instrument. And use the instrument to predict important life outcomes so the links between

⁴¹⁵ specific behaviors and facets become richer.

416   Brick and Lewis (2014)

417   Gaughan, Miller, and Lynam (2012)

418   Leone, Chirumbolo, and Desimoni (2012)

419   Mcabee, Oswald, and Connelly (2014)

420   Gaughan, Miller, Pryor, and Lynam (2009)

421   Noftle and Shaver (2006)

422   Bagby, Taylor, and Parker (1994); Schimmack, Furr, and Funder (1999); Wakabayashi,

423   Baron-Cohen, and Wheelwright (2006); Shaver and Brennan (1992); Ruiz, Pincus, and

424   Dickinson (2003); Mccrae, Kurtz, Yamagata, and Terracciano (2011); Rosander, Bäckström,

425   and Stenberg (2011); McAdams and Donnellan (2009); Siddiqui (2011); Hagger-Johnson and

426   Whiteman (2007)

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590   **Table captions**