An examination of the Spanish translation of the 50-item International Personality Item Pool big-five inventory in a Spanish speaking Peruvian sample

Running Title: Psychometric Evaluation of IPIP-50-S

An examination of the Spanish translation of the 50-item International Personality Item Pool PIP Big-five inventory

David J. Hughes[1*], Daniel Pizarro De Olazabal[2*], Ioannis Kratsiotis[1],

Ricardo Twumasi[1] and Tom Booth[2*]

[1] Alliance Manchester Business School, The University of Manchester

[2] Department of Psychology, University of Edinburgh

*These authors contributed equally to this manuscript.

Declarations of interest: none

Author contact: Tom Booth, F17 Department of Psychology, University of Edinburgh, 7 George Square, Edinburgh, EH8 9JZ. Tom.booth@ed.ac.uk , (+44) 131 650 3424

Abstract

The International Personality Item Pool (IPIP) five-factor model inventories are widely used for personality research and have been translated into multiple languages. However, the extent of the psychometric assessment of translated scales is variable, often minimal. Here we present a structural analysis of one Spanish translation of the 50-item IPIP five-factor inventory in a sample of Peruvian non-university educated working adults (n=778). A global confirmatory factor analytic (CFA) model of the a priori five factors failed to fit. So too did single factor models for four of the five factors, the exception being Neuroticism. Fit was improved via use of an exploratory structural equation measurement model, but the resultant solution showed very poor theoretical coherence. The pattern of factor loadings suggested that the lack of coherence might be due to the effects of the valence of item wording. CFA models including five substantive factors and a series of method factors modelling shared covariance based on item wording, improved fit and coherence. This investigation suggests that unless method factors are explicitly modelled the tested Spanish translation may not be suitable for use in certain Spanish-speaking countries or samples composed of non-university educated participants.

Keywords: IPIP; FFM; Psychometric; Method Artefacts; Spanish translation.

1. Introduction

Assessments of personality most commonly use tools developed from within a Big Five or Five-Factor Model approach and assess the broad domains of Neuroticism, Extraversion, Openness/Intellect, Agreeableness, and Conscientiousness. The five factors assessed by these tools do differ but are generally regarded to refer to the same broad psychological constructs (cf. Block, 1995; Digman, 1990). Five-factor approaches remain the dominant framework for trait description, and the associated tools are the most widely applied across multiple fields of study. One of the most important elements of supporting evidence in favour of five-factor models is that they have shown a degree of cross-cultural stability (McCrae & Costa, 1997; McCrae & Terracciano, 2005), suggesting that they represent something of a universal taxonomy of broad personality factors.

As a result, five factor assessment tools have been translated into an array of languages, often using items from The International Personality Item Pool (IPIP; Goldberg, 1999) as a starting point. The IPIP provides open access personality scales designed as proxies for many constructs including proprietary five factor inventories. Building on the benefits of free use, which has accelerated research beyond what would be possible using only proprietary tools, the IPIP has been used in a range of different cultures and translated to over 25 different languages (Goldberg, 1999; Goldberg et al., 2006).

However, translated IPIP scales are typically subject to reduced psychometric scrutiny compared to their English-language counterparts (Mlačić & Goldberg, 2007). Thus, it can be difficult for researchers to choose an appropriate translation for their study, especially when multiple versions exist. The lack of psychometric scrutiny is particularly problematic because translation is an inherently complex process. Translators must ensure that translated items accurately assesses the same construct (i.e., respondents draw upon the same class of memories and experiences when responding to the items; see Hughes, 2018) whilst

contending with unique cultural, environmental, and grammatical differences. However, if translated items do not operate in an equivalent manner (i.e., words or phrases have different conations, leading participants to draw upon different memories/processes; Boroditsky, 2001) then item responses are no longer equivalent and any scale score created from them changes in meaning. Often this lack of equivalence is reflected in the structure of the item responses (i.e., the factor structure will not replicate, Hughes, 2018).

Accordingly, we sought to investigate the psychometric properties of a Spanish translation of the 50 item IPIP Big-five inventory (henceforth referred to as the IPIP-50-S) within a Spanish speaking Peruvian sample. To our knowledge only two studies have previously investigated the psychometric properties of the scale: one within a sample of Argentinian teenagers (Cupani, 2009) and one within a mixed but predominantly student Argentinian sample (Gross, Zalazar-Jaime, Piccolo, & Cupani, 2012). Both studies noted some problems concerning the factor structure including low loading items (<.4), large numbers of non-trivial cross-loadings, and some items having their largest loading on their non-target factor (Cupani, 2009; Gross et al., 2012). However, neither study was able to fully diagnose the causes of problems. The generalizability of these findings may also be somewhat limited because the samples consisted predominantly of Argentinian students. Therefore, further investigation of the performance of the translated measure in other Spanish speaking samples is of interest.

Accordingly, the major focus of the current study is on the identification of the appropriate factor structure for the translated items. Here we will consider both a priori confirmatory factor models, for a complete five-factor model and for each domain individually, as well exploratory models where there is evidence of misfit. Specifically, a number of studies show that CFA models of personality data produce inadequate model fit according to conventional criteria (Booth & Hughes, 2014; Hopwood & Donnellan, 2010).

This, it has been argued, is due to the complexity of personality items for which the responses may be influenced by multiple traits, and thus the independent cluster modelling assumption in typical CFA applications may be too restrictive (Marsh et al., 2010). As such, we will apply exploratory structural equation modelling (ESEM) in the presence of misfit to identify the sources of misfit and the alternative optimal factor structure. Typically, ESEM approaches improve personality model fit but they remain some way from being adequately fitting models (Booth & Hughes, 2014).

Model misfit typically arises due to unmodeled sources of shared variation among indicators. Other possible sources of such variation in personality assessments stem from measurement errors commonly referred to as response biases and measurement artefacts (Podsakoff, MacKenzie & Podsakoff, 2003; Podsakoff, MacKenzie & Podsakoff, 2012). Thus, the third element of our analysis will be to explore the existence of such measurement artefacts. Previous research exploring scale translations has noted country-specific effects of extreme, acquiescent, and socially desirable responding (Diamantopoulos, Reynolds, & Simintiras, 2006; Johnson, Kulesa, Cho, & Shavitt, 2005). Indeed, previous research examining English-Spanish translations has suggested that the two most crucial item characteristics that influence cross-language equivalence are item complexity (length and language difficulty) and social desirability (Valentine, 2013). Thus, if CFA and ESEM models do fail to fit, we will explore the data for evidence of systematic measurement artefacts and seek to model them to improve the psychometric properties of the scale.

2. Method

2.1 Participants

Participants were 778 employees from fourteen stores of a supermarket retail company in Lima, Peru (379 male; 369 female; 30 missing values). Participants were selected at random from a list of all employees at each store who had worked at the company for over

one month. Between 33 and 97 participants were collected from each store. All participants were Peruvian, aged from 18 to 60 years old (M= 24.67; SD= 6.38), and employed as customer service assistants. Participants' job tenure ranged from 1 to 228 months (M = 16; SD = 22.37). All participants had completed secondary education (from 13 to 17 years) in Peruvian state schools.

2.2 Procedure

Permission to recruit participants was provided by the Human Resources department of the company who also assisted with data collection. To ensure consistency across test administrators, a member of the research team provided Human Resource assistants with instructions on the delivery of the survey. Questionnaires were completed in paper-pencil format, and later transferred to an electronic database by the research team. Testing was conducted in the workplace and in order to maintain the confidentiality/anonymity of participants, no identifying information was taken; instead all participants received a unique identifier meaning that data was fully anonymous.

2.3 Ethics

The study was given ethical approval by the Psychology Research Ethics Committee, Department of Psychology, University of Edinburgh. Surveys were completely anonymised at point of input into the electronic database. The original surveys were not shared with the hosting institution.

2.4 Measures

The survey consisted of two sections, a series of questions on co-worker satisfaction, and a personality inventory. For the purpose of the current study, only the personality items are analysed.

The IPIP-50-S was used to measure the Big Five personality domains of Neuroticism, Extraversion, Intellect, Agreeableness, and Conscientiousness. Participants had to rate

themselves on a 5-point Likert-type scale ranging from 1 (very inaccurate) to 5 (very accurate), according to how accurately each statement describes them. The IPIP-5-S comprised 50 items, 10 per personality domain. Examples items are "Am interested in people" (agreeableness), "Am the life of the party" (extraversion), "Pay attention to details" (conscientiousness), "Am relaxed most of the time" (neuroticism) and "Have a vivid imagination" (intellect). All items, in English, and their mean and standard deviation are reported in Table 1. The specific translation used is available at https://ipip.ori.org/SpanishBig-FiveFactorMarkers.htm and also in Supplementary Material.

[Insert Table 1 Here]

2.5 Analysis Strategy

Estimation and Evaluation: All models were estimated using weighted-least-squares means and variances (WLSMV) estimation in Mplus 7.4 (Muthén & Muthén, 1998-2017). Code for all analyses is available at https://osf.io/6dxbm/ . Models were evaluated based on the magnitude of the factor loadings and on model fit. We followed typically applied criteria whereby CFI and TLI ranging from .90 to > 0.95 and RMSEA < 0.06 were deemed indicative of good model fit (Hu & Bentler, 1999; Schermelleh-Engel, Moosbrugger, & Müller, 2003). As we implement WLSMV estimation in Mplus, we also report WRMR, however it is noted that to date, little simulation evidence is available to suggest indicative cut-off values.

Measurement models: We initially fit a confirmatory factor model for an independent cluster five-factor model, allowing each of the trait factors to correlate. The model was identified by fixing the first factor loading on each latent factor to 1.0. If the model failed to reach minimum standards for model fit, as is common in the extant literature, we planned to apply three sets of models to identify misfit. First, single factor CFA models for each trait in order to identify possible correlated residuals. Second, an exploratory structural equation model (ESEM) with five correlated factors, modelling item cross-loadings and allowing for

structural complexity. Third, we would consider the possibility of method factors in the data, and estimate five factor CFA models with latent factors included to account for variance due to different artefacts (see Podsakoff, MacKenzie, & Podsakoff, 2012 for discussion of different approaches). Specifically we estimated models including a general aquiesence factor (Figure 1, panel A), positive and negative valence factors (Figure 1, panel B), and finally a model with all three potential sources of method effect included (Figure 1, panel C).

[Insert Figure 1 about here]

3. Results

3.1 Measurement models for the IPIP-50-S

The five-factor independent clusters CFA model converged, but the factor covariance matrix was non-positive definite due to factor correlations greater than 1.0. Given this, we considered this solution inappropriate.

Next, we examined each of the five factors independently. Four of the five single-factor CFA solutions showed poor fit, the one exception being Neuroticism (see supplementary tables S2 for model fit). Within these models, 12 of the 50 items did not load greater than .30 on their hypothesized factor, indicating that the items do not cohere as expected or produce a psychometrically strong scale. Perhaps more importantly, Neuroticism and Extraversion items, despite containing both positively (e.g., Don't mind being the center of attention) and negatively (e.g., Don't like to draw attention to myself) worded items, all loaded positively onto the single factor (see supplementary tables S3 to S7 for factor loadings).

To explore the data further, we first fit a five factor ESEM. Model fit for the ESEM model was reasonable (x^2 = 2027.881(985), p<.001; CFI = .95; TLI = .94; RMSEA = .037; WRMR 1.029). The full factor loading matrix for the ESEM solution is provided in Table 2.

[Insert Table 2 Here]

Consideration of the item loadings in Table 2 suggested that the solution was not conceptually similar to the a priori five-factor model. Factor 2 contained salient loadings (> .30) for a majority of the negatively worded items across traits, including loadings from eight of the 10 Neuroticism items. Similarly, Factor 3 contained salient loadings from all positively worded items from Conscientiousness and Intellect, and four positively worded items from both Extraversion and Agreeableness. Thus, these two factors seemed identifiable as method factors defined by item valence. Of the remaining factors, and based on the items with salient loadings, Factors 1 and 4 could be labelled Neuroticism and Agreeableness respectively. Factor 5 could not be readily labelled. To explore the data further, we also estimated ESEM models using CF-Parsimax Oblique, Oblimin Oblique, and Target rotation. The pattern of the results did not change. We have included the pattern matrices from these additional analyses in supplementary materials, Tables S10-S12.

3.2 Method Artefacts in the IPIP-50-S

Based on the indications from both the extant literature and the pattern of item loadings in Table 2, we explicitly modelled a series of method factors. Table 3 contains the model fit indices for models including positive and negative valence method factors (M1), a general acquiescence method factor (M2), and a model with positive, negative, and general acquiescence factors (M3). In all models, factor variances were fixed at 1 to identify to models, and WLSMV estimation was used.

[Insert Table 3 Here]

Model fit across all models was acceptable to good. Unsurprisingly, the model containing all three method artefact latent variables showed the best model fit. Fit of this model was comparable to the ESEM model but was more parsimonious. In addition, the factor loadings from all models were more consistent with what would have been expected a priori. In M1 (see supplementary Table S8 for factor loadings), positively and negatively

worded items loaded consistently on their respective valence factors. However, eleven items had loadings below .30 on their substantive factors. A similar pattern was true for model M2. All items had positive loadings on the general method factor and appropriate directionality of loading on their substantive factors. Again, the same eleven items failed to load on their a priori substantive factors above .30. However, in both M1 and M2, the factor correlations were much greater than would be expected, with absolute r ranging from .48 to .85 for M1, and .50 to .86 for M2.

Table 4 shows the full factor loading matrix for M3. Two primary observations can be made from Table 4. First, whilst the inter-factor correlations for M3 were in line with most five factor research in magnitude (+/- .10 to .42), the direction these correlations are not as would be anticipated. Consideration of the direction of the factor loadings, and thus the definition of the factors, does not clarify the pattern of correlations. Second, a majority of the variance in the items is typically accounted for by the methodological factors rather than their substantive factor.

[Insert Table 4 Here]

4. Discussion

Our goal was to evaluate the psychometric properties of the IPIP-50-S within a sample of Peruvian customer service employees. No previous studies had examined this scale in Peru or in a fully non-student sample. As expected, a CFA of the a priori model did not fit the data and with the exception of Neuroticism, the factors did not fit even when modeled independently. An ESEM model did improve the overall fit but the solution remained sub-optimal with numerous large cross-loadings and some items failing to load on the expected factor. These results are in line with past research on five factor inventories (Booth & Hughes, 2014) and suggest that the IPIP-50-S is not well suited to research with Peruvian adults with a non-university level of education.

Further exploration of the possible sources of misfit proved interesting. Specifically, the ESEM pattern matrix suggested two factors that were consistently loaded by either positively or negatively worded items, suggesting that the variance attributable to these item valence was substantial (Suárez-Alvarez, Pedrosa, Lozano, García-Cueto, Cuesta, & Muñiz, 2018). Once these two method factors were explicitly modeled, a CFA of all five factors demonstrated good levels of model fit, certainly comparable to other five factor inventories (Booth & Hughes, 2014). However, eleven items still failed to load substantially (>.3) on their hypothesized factor, with substantial loadings on respectively method factors. Nevertheless, the current results suggest that when method factors are ignored, the IPIP-50-S is inappropriate for use within Peruvian samples. However, once the effect of acquiescence due to item valence has been modelled, the structure of the IPIP-50-S is closer to the a priori structure dictated by the English-language version (Goldberg, 1992). These findings are consistent with similar patterns in other questionnaires that use positive and negatively worded items. For example, Suárez-Alvarez et al. (2018) examined a self-efficacy scale, within a Spanish-speaking sample, and found that combinations of positive and negative items reduced test reliability, undermined unidimensionality, and produced scale means that differed significantly from means derived from versions with all positive or negative items.

One striking observation is the magnitude of the method effects observed within this sample. We believe there are likely two main reasons for the substantial method effects. First, it is possible that diversity in lexical and syntactical structures across different Spanish-speaking nations meant that some items failed to translate in an equivalent manner, which exacerbated general method effects (Cupani & Lorenzo-Seva, 2016). Second, unlike previous studies to investigate this inventory, our sample was educated to secondary level, not university level (e.g., Cupani, 2009; Gross et al., 2012). Previous research has demonstrated that method artefacts, such as acquiescence, are exacerbated in samples with lower levels of

educational attainment (Rammstedt, Danner, & Bosnjak, 2017; Rammstedt, Goldberg, & Borg, 2010).

Nevertheless, the modeling approach employed largely controlled for these substantial effects, and thus, our results align with previous research demonstrating that once socially desirable or acquiescent responding is modelled, five factor inventories are somewhat structurally stable across cultures and educational levels (Rammstedt, Goldberg, & Borg, 2010; Rammstedt, Kemper, & Borg, 2013; Suárez-Alvarez et al., 2018).

To the authors knowledge, this is the first published attempt to examine the psychometric properties and appropriateness of the IPIP-50-S for use within a non-university educated sample, here a Peruvian sample. From the findings, it is recommended that caution be exercised in using the IPIP-50-S in such samples, without explicit actions taken to account for the influence of item valence and socially desirable responding. However, use of alternative measures may be preferable. For example, Cupani and Lorenzo-Seva (2016) proposed a variant of the Spanish IPIP designed to mitigate the effects of acquiescent responding. The data for the current study was collected prior to publication of this measure; however, future research might focus on the properties of this inventory across countries and educational levels.

In closing, we note the importance of psychometric evaluations of freely available translated inventories, like those provided by the IPIP, and would strongly advocate for continued efforts to link published and unpublished evaluations. Such a resource would allow researchers interested in cross-cultural research to identify whether translations provide accurate measurement in their target population and thus whether they are appropriate for the intended purposes (Hughes, 2018).

5. References

Block, J. (1995). A Contrarian View of the Five-Factor Approach to Personality Description. *Psychological Bulletin*, *117*, 187–215. https://doi.org/10.1037/0033-2909.117.2.187

Booth, T., & Hughes, D. J. (2014). Exploratory structural equation modeling of personality data. *Assessment*, *21*, 260–271. https://doi.org/10.1177/1073191114528029

Boroditsky, L. (2001). Does Language Shape Thought?: Mandarin and English Speakers' Conceptions of Time. *Cognitive Psychology*, *43*, 1–22. https://doi.org/10.1006/cogp.2001.0748

Cupani, M. (2009). El cuestionario de personalidad IPIP-FFM: Resultados preliminares de una adaptaci on en una muestra de preadolescentes argentinos (The IPIP- FFM Questionnaire of Personality: Preliminary results for the adaptation in a sample of young Argentinean adolescents). *Perspectivas En Psicologia*, *6*, 51–58.

Cupani, M., & Lorenzo-Seva, U. (2016). The development of an alternative IPIP inventory measuring the Big-Five factor markers in an Argentine sample. *Personality and Individual Differences*, *91*, 40–46. https://doi.org/10.1016/j.paid.2015.11.051

Diamantopoulos, A., Reynolds, N. L., & Simintiras, A. C. (2006). The impact of response styles on the stability of cross-national comparisons. *Journal of Business Research*, *59*, 925–935. https://doi.org/10.1016/j.jbusres.2006.03.001

Digman, J. M. (1990). Personality Structure: Emergence of the Five-Factor Model. *Annual Review of Psychology*, *41*, 417–440. https://doi.org/10.1146/annurev.ps.41.020190.002221

Goldberg, L. R. (1992). The development of markers for the Big-Five factor structure. *Psychological Assessment, 4*, 26-42

Goldberg, L. R. (1999). A broad-bandwidth, public domain, personality inventory measuring the lower-level facets of several five-factor models. In I. Mervielde, I. Deary, F. De

Fruyt, & F. Ostendorf (Eds.), *Personality Psychology in Europe, Vol. 7* (pp. 7-28). Tilburg, The Netherlands: Tilburg University Press.

Goldberg, L. R., Johnson, J. A., Eber, H. W., Hogan, R., Ashton, M. C., Cloninger, C. R., & Gough, H. G. (2006). The international personality item pool and the future of public-domain personality measures. *Journal of Research in Personality*, *40*, 84–96. https://doi.org/10.1016/j.jrp.2005.08.007

Gross, M., Zalazar-Jaime, M., Piccolo, N., & Cupani, M. (2012). Nuevos estudios de validación del cuestionario de personalidad IPIP-FFM (New validation study of the IPIP-FFM personality questionnaire). In X Congreso Latinoamericano de Sociedades de Estadística. Córdoba, Argentina.

Hopwood, C. J., & Donnellan, M. B. (2010). How should the internal structure of personality inventories be evaluated? *Personality and Social Psychology Review*, *14*, 332-346. https://doi.org/10.1177/1088868310361240

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*, 1–55. https://doi.org/10.1080/10705519909540118

Hughes, D. J. (2018). Psychometric validity: Establishing the accuracy and appropriateness of psychometric measures. In P. Irwing, T. Booth & D. J. Hughes (Eds.), *The Wiley handbook of psychometric testing: A multidisciplinary approach to survey, scale and test development.* Chichester, UK: Wiley.

Johnson, T., Kulesa, P., Cho, Y. I., & Shavitt, S. (2005). The Relation Between Culture and Response Styles. *Journal of Cross-Cultural Psychology*, *36*, 264–277. https://doi.org/10.1177/0022022104272905

Marsh, H. W., Ludtke, O., Muthen, B., Asparouhov, T., Morin, A. J. S., Trautwein, U., & Nagengast, B. (2010). A new look at the Big-Five factor structure through exploratory structural equation modeling. *Psychological Assessment*, *22*, 471-491. https://doi.org/10.1037/a0019227

McCrae, R. R., & Costa, P. T. (1997). Personality trait structure as a human universal. *American Psychologist*, *52*, 509–516. https://doi.org/10.1037/0003-066X.52.5.509

McCrae, R. R., & Terracciano, A. (2005). Universal Features of Personality Traits From the Observer's Perspective: Data From 50 Cultures. *Journal of Personality and Social Psychology*, *88*, 547–561. https://doi.org/10.1037/0022-3514.88.3.547

Mlačić, B., & Goldberg, L. R. (2007). An Analysis of a Cross-Cultural Personality Inventory: The IPIP Big-Five Factor Markers in Croatia. *Journal of Personality Assessment*, *88*, 168–177. https://doi.org/10.1080/00223890701267933

Muthén, L.K. and Muthén, B.O. (1998-2017). *Mplus User's Guide. Eighth Edition*. Los Angeles, CA: Muthén & Muthén.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies. *Journal of Applied Psychology*, *88*, 879–903. https://doi.org/10.1037/0021-9010.88.5.879

Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual review of psychology*, *63*, 539-569. https://doi.org/10.1146/annurev-psych-120710-100452

Rammstedt, B., Danner, D., & Bosnjak, M. (2017). Acquiescence response styles: A multilevel model explaining individual-level and country-level differences. *Personality and Individual Differences*, *107,* 190–194. https://doi.org/10.1016/j.paid.2016.11.038

Rammstedt, B., Goldberg, L. R., & Borg, I. (2010). The measurement equivalence of Big-Five factor markers for persons with different levels of education. *Journal of Research in Personality*, *44*, 53–61. https://doi.org/10.1016/j.jrp.2009.10.005

Rammstedt, B., Kemper, C. J., & Borg, I. (2013). Correcting Big Five Personality Measurements for Acquiescence: An 18-Country Cross-Cultural Study. *European Journal of Personality*, *27*, 71–81. https://doi.org/10.1002/per.1894

Suárez-Alvarez, J., Pedrosa, I., Lozano, L.M., García-Cueto, E., Cuesta, M., & Muñiz, J. (2018). Using reversed items in likert scales: A questionable practice. *Psicothema, 30* (2), 149-158.https://doi.org/10.7334/psicothema2018.33

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of psychological research online*, *8*, 23-74.

Valentine, A. (2013). *Is translation enough? A study of the item characteristics which influence equivalence between English and Spanish versions of a selection test.* University at Albany, State University of New York. Retrieved from https://search.proquest.com/openview/54042c6558970c1b8d2a8e451b348933/1?pq-origsite=gscholar&cbl=18750&diss=y

Table 1

Item descriptive statistics for the IPIP-S

Items	**N**	**Mean**	**SD**
Get stressed out easily (+N)	776	3.28	1.03
Am relaxed most of the time (-N)	777	3.04	1.17
Worry about things (+N)	774	3.65	1.08
Seldom feel blue (-N)	777	3.53	1.01
Am easily disturbed (+N)	775	2.14	1.21
Get upset easily (+N)	776	3.70	0.92
Change my mood a lot (+N)	778	3.03	1.11
Have frequent mood swings (+N)	776	2.31	1.13
Get irritated easily (+N)	768	2.62	1.10
Often feel blue (+N)	777	3.78	0.87
Am the life of the party (+E)	776	3.36	0.98
Don't talk a lot (-E)	776	2.95	1.07
Feel comfortable around people (+E)	774	3.28	1.19
Keep in the background (-E)	774	3.70	1.10
Start conversations (+E)	775	3.93	0.81
Have little to say (-E)	771	2.49	1.18
Talk to a lot of different people at parties (+E)	775	2.92	1.14
Don't like to draw attention to myself (-E)	774	2.50	1.14
Don't mind being the center of attention (+E)	774	3.70	0.85
Am quiet around strangers (-E)	774	2.40	1.23
Feel little concern for others (-A)	773	2.98	1.14
Am interested in people (+A)	767	3.11	1.16
Insult people (-A)	778	3.93	0.90
Sympathize with others' feelings (+A)	775	2.26	1.22
Am not interested in other people's problems (-A)	771	2.20	1.24
Have a soft heart (+A)	776	4.13	0.89
Am not really interested in others (-A)	775	2.91	1.16
Take time out for others (+A)	775	2.86	1.14
Feel others' emotions (+A)	771	2.74	1.08
Make people feel at ease (+A)	777	3.90	0.82
Have a rich vocabulary (+I)	772	3.42	1.03
Have difficulty understanding abstract ideas (-I)	776	3.18	1.11
Have a vivid imagination (+I)	772	2.49	1.22
Am not interested in abstract ideas (-I)	777	3.98	0.84
Have excellent ideas (+I)	777	3.90	0.88
Do not have a good imagination (-I)	772	3.75	0.87
Am quick to understand things (+I)	776	2.66	1.18
Use difficult words (+I)	777	2.31	1.18
Spend time reflecting on things (+I)	775	3.73	0.85
Am full of ideas (+I)	776	3.92	0.82
Am always prepared (+C)	775	3.88	0.92
Leave my belongings around (-C)	774	3.29	1.12
Pay attention to details (+C)	775	1.76	1.12
Make a mess of things (-C)	776	3.52	0.94
Get chores done right away (+C)	775	3.95	0.89

Often forget to put things back in their proper place (-C)	773	2.09	1.20
Like order (+C)	775	3.85	0.90
Shirk my duties (-C)	774	2.52	1.17
Follow a schedule (+C)	775	3.91	0.84
Am exacting in my work (+C)	776	2.76	1.05

Note: N = Neuroticism; E = Extraversion, O = Openness-to-experience; A = Agreeableness;

C = Conscientiousness

Table 2

Factor loading matrix for the five factor ESEM.

Items	**F1**	**F2**	**F3**	**F4**	**F5**
Get stressed out easily (+N)	0.29	**0.31**	-0.04	0.11	0.10
Am relaxed most of the time (-N)	-0.24	**0.43**	0.15	0.12	-0.07
Worry about things (+N)	-0.10	0.08	**0.43**	0.22	**0.39**
Seldom feel blue (-N)	0.05	0.18	0.10	0.25	-0.11
Am easily disturbed (+N)	**0.41**	**0.45**	0.01	-0.02	0.09
Get upset easily (+N)	**0.40**	**0.54**	-0.02	0.03	-0.02
Change my mood a lot (+N)	**0.35**	**0.46**	0.07	-0.02	0.10
Have frequent mood swings (+N)	**0.47**	**0.51**	0.00	0.03	-0.06
Get irritated easily (+N)	**0.48**	**0.46**	-0.05	0.10	-0.03
Often feel blue (+N)	**0.33**	**0.49**	-0.07	0.13	0.08
Am the life of the party (+E)	-0.23	0.08	**0.37**	0.14	-0.12
Don't talk a lot (-E)	0.05	**0.48**	-0.04	-0.04	**0.31**
Feel comfortable around people (+E)	-0.19	-0.05	**0.40**	0.20	0.07
Keep in the background (-E)	0.02	**0.42**	0.12	0.03	0.28
Start conversations (+E)	-0.13	0.03	**0.45**	0.29	-0.22
Have little to say (-E)	0.05	**0.55**	0.06	-0.02	0.24
Talk to a lot of different people at parties (+E)	-0.05	0.16	**0.41**	0.05	-0.22
Don't like to draw attention to myself (-E)	**0.33**	0.07	0.20	0.08	0.00
Don't mind being the center of attention (+E)	**0.33**	0.08	0.21	0.20	-0.10
Am quiet around strangers (-E)	0.26	0.20	-0.02	0.08	0.20
Feel little concern for others (-A)	-0.01	**0.38**	0.24	-0.08	0.15
Am interested in people (+A)	-0.10	-0.06	**0.43**	**0.30**	0.13
Insult people (-A)	0.13	**0.70**	0.03	-0.05	-0.14
Sympathize with others' feelings (+A)	0.01	0.07	0.08	**0.65**	0.28
Am not interested in other people's problems (-A)	-0.04	**0.75**	0.09	**-0.32**	0.01
Have a soft heart (+A)	0.08	0.05	0.08	**0.54**	0.21
Am not really interested in others (-A)	0.02	**0.78**	0.02	**-0.33**	0.02
Take time out for others (+A)	0.08	-0.03	**0.46**	**0.32**	0.01
Feel others' emotions (+A)	0.14	-0.06	**0.33**	**0.53**	0.01
Make people feel at ease (+A)	-0.13	-0.04	**0.61**	0.08	0.06
Have a rich vocabulary (+I)	-0.11	0.09	**0.50**	0.07	-0.04
Have difficulty understanding abstract ideas (-I)	-0.10	**0.65**	-0.08	0.06	0.13
Have a vivid imagination (+I)	-0.06	-0.02	**0.52**	0.11	-0.02
Am not interested in abstract ideas (-I)	-0.04	**0.63**	0.05	-0.04	0.00
Have excellent ideas (+I)	0.08	0.01	**0.78**	-0.11	-0.12
Do not have a good imagination (-I)	-0.05	**0.72**	-0.08	-0.06	0.07
Am quick to understand things (+I)	0.17	-0.17	**0.68**	-0.10	0.04
Use difficult words (+I)	0.29	**0.32**	**0.35**	-0.03	-0.23
Spend time reflecting on things (+I)	0.16	0.00	**0.44**	0.11	0.14
Am full of ideas (+I)	0.04	-0.02	**0.73**	-0.06	-0.11
Am always prepared (+C)	-0.07	0.04	**0.57**	-0.05	0.23
Leave my belongings around (-C)	-0.01	**0.58**	-0.05	0.18	-0.24
Pay attention to details (+C)	-0.17	-0.02	**0.50**	0.09	**0.30**
Make a mess of things (-C)	-0.03	**0.61**	-0.09	0.15	-0.29

Get chores done right away (+C)		0.00	-0.09	**0.50**	0.05	0.33
Often forget to put things back in their proper place (-C)		0.09	**0.56**	-0.13	0.23	-0.12
Like order (+C)		0.13	-0.15	**0.42**	-0.01	**0.44**
Shirk my duties (-C)		0.08	**0.74**	0.02	-0.05	-0.16
Follow a schedule (+C)		0.02	-0.07	**0.52**	0.03	0.07
Am exacting in my work (+C)		0.02	0.08	**0.65**	-0.10	0.15
Factor correlations		**F1**	**F2**	**F3**	**F4**	**F5**
	F1	-				
	F2	.29	-			
	F3	-.08	-.03	-		
	F4	.07	.24	.27	-	
	F5	.04	-.13	..27	.05	-

Note: Loadings in bold show those above 0.30. N = Neuroticism; E = Extraversion, O = Openness-to-experience; A = Agreeableness; C = Conscientiousness

Table 3

Model fit statistics for the method artefact measurement models

	x^2	df	CFI	TLI	RMSEA	WRMR
M1: Five-factor + positive & negative valence	2958.883*	1114	.92	.91	.046	1.441
M2: Five-factor + general method	2968.610*	1115	.92	.91	.046	1.444
M3: Five-factor + general, positive & negative valence	2265.253*	1064	.95	.94	.038	1.174

Note: * $p < .001$

Table 3

Factor loading matrix for the five factor CFA with a general method factor, and positive and negative valence factors.

Items	Method	Positive	Negative	N	E	I	A	C
Get stressed out easily (+N)	-0.15		.40	0.32				
Am relaxed most of the time (-N)	0.01	-.48		-0.25				
Worry about things (+N)	0.65		.26	0.15				
Seldom feel blue (-N)	0.01	-.38		-0.03				
Am easily disturbed (+N)	-0.23		.53	0.38				
Get upset easily (+N)	-0.32		.62	0.34				
Change my mood a lot (+N)	-0.16		.54	0.34				
Have frequent mood swings (+N)	-0.33		.63	0.37				
Get irritated easily (+N)	-0.32		.60	0.41				
Often feel blue (+N)	-0.25		.59	0.30				
Am the life of the party (+E)	0.33	-.20			0.38			
Don't talk a lot (-E)	-0.08		.42		-0.31			
Feel comfortable around people (+E)	0.53	-.13			0.12			
Keep in the background (-E)	0.11		.45		-0.18			
Start conversations (+E)	0.39	-.32			0.40			
Have little to say (-E)	-0.05		.53		-0.20			
Talk to a lot of different people at parties (+E)	0.20	-.33			0.31			
Don't like to draw attention to myself (-E)	0.12		.30		-0.26			
Don't mind being the center of attention (+E)	0.08	-.41			-0.22			
Am quiet around strangers (-E)	-0.01		.32		-0.39			
Feel little concern for others (-A)	0.13		.41			-0.11		
Am interested in people (+A)	0.60	-.20				0.14		
Insult people (-A)	-0.33		.69			0.01		
Sympathize with others' feelings (+A)	0.36	-.39				0.56		
Am not interested in other people's problems (-A)	-0.28		.59			-0.30		
Have a soft heart (+A)	0.28	-.36				0.49		
Am not really interested in others (-A)	-0.37		.61			-0.29		
Take time out for others (+A)	0.51	-.34				0.16		
Feel others' emotions (+A)	0.44	-.38				0.37		

Make people feel at ease (+A)	0.66	-.19			-0.09			
Have a rich vocabulary (+I)	0.42	-.26				0.15		
Have difficulty understanding abstract ideas (-I)	-0.18		.56			-0.18		
Have a vivid imagination (+I)	0.47	-.19				0.26		
Am not interested in abstract ideas (-I)	-0.17		.56			-0.09		
Have excellent ideas (+I)	0.52	-.27				0.55		
Do not have a good imagination (-I)	-0.28		.59			-0.17		
Am quick to understand things (+I)	0.58	-.11				0.38		
Use difficult words (+I)	-0.09	-.58				0.32		
Spend time reflecting on things (+I)	0.44	-.31				0.00		
Am full of ideas (+I)	0.55	-.23				0.30		
Am always prepared (+C)	0.59	-.20						-0.11
Leave my belongings around (-C)	-0.26		.59					0.14
Pay attention to details (+C)	0.65	-.13						0.01
Make a mess of things (-C)	-0.34		.59					0.56
Get chores done right away (+C)	0.62	-.14						-0.30
Often forget to put things back in their proper place (-C)	-0.29		.62					0.49
Like order (+C)	0.56	-.08						-0.29
Shirk my duties (-C)	-0.36		.70					0.16
Follow a schedule (+C)	0.53	-.16						0.37
Am exacting in my work (+C)	0.56	-.29						-0.09

Factor correlations	**Method**	**Positive**	**Negative**	**N**	**E**	**I**	**A**	**C**
Method	-							
Positive	-	-						
Negative	-	-.81	-					
N	-	-	-	-				
E	-	-	-	-.31	-			
I	-	-	-	.16		-		
A	-	-	-	.42	-.10	-.20	-	
C	-	-	-	-.34	.25	-.25	.32	-

Note: N = Neuroticism; E = Extraversion, O = Openness-to-experience; A = Agreeableness; C = Conscientiousness

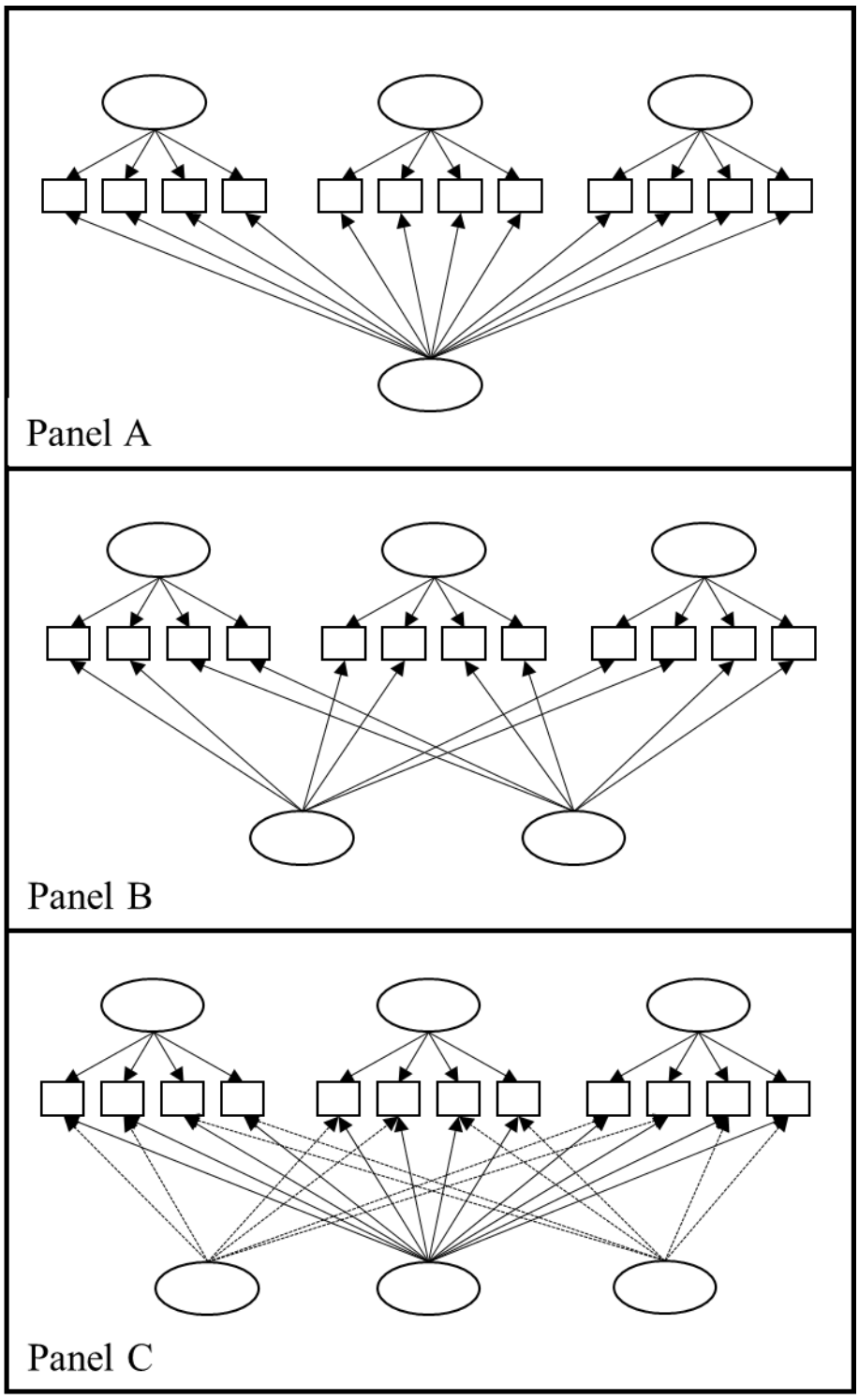

Figure 1. Diagrammatic representation of models estimated to investigate method artefacts: a general aquiesence factor (Panel A), positive and negative valence factors (Panel B), model with all three potential sources of method effect included (Panel C). In all Panels, example personality factors are depicted above the factor indicators and method factors depicted below the factor indicators.

An examination of the Spanish translation of the 50-item IPIP Big-five inventory in a Spanish speaking Peruvian sample

SUPPLEMENTARY TABLES

Table S1: Spanish translation of IPIP-50-S

English	Spanish
Get stressed out easily (+N)	Me estreso con facilidad (+N)
Am relaxed most of the time (-N)	Estoy relajado la mayor parte del tiempo (-N)
Worry about things (+N)	Me preocupo por todo (+N)
Seldom feel blue (-N)	Rara vez me siento triste (-N)
Am easily disturbed (+N)	Me molesto fácilmente (+N)
Get upset easily (+N)	Me disgusto con facilidad (+N)
Change my mood a lot (+N)	Cambio mucho de humor (+N)
Have frequent mood swings (+N)	Tengo cambios frecuentes de estado de ánimo (+N)
Get irritated easily (+N)	Me irrito fácilmente (+N)
Often feel blue (+N)	Me siento triste frecuentemente (+N)
Am the life of the party (+E)	Soy el alma de la fiesta (+E)
Don't talk a lot (-E)	No hablo mucho (-E)
Feel comfortable around people (+E)	Me siento cómodo con la gente (+E)
Keep in the background (-E)	Prefiero mantenerme al margen (-E)
Start conversations (+E)	Comienzo las conversaciones (+E)
Have little to say (-E)	No tengo mucho que decir (-E)
Talk to a lot of different people at parties (+E)	En las fiestas hablo con muchas personas diferentes (+E)
Don't like to draw attention to myself (-E)	No me gusta llamar la atención (-E)
Don't mind being the centre of attention (+E)	No me importa ser el centro de atención (+E)
Am quiet around strangers (-E)	Cuando estoy entre desconocidos me mantengo callado (-E)
Feel little concern for others (-A)	Me preocupo poco por los demás (-A)
Am interested in people (+A)	Me intereso por la gente (+A)
Insult people (-A)	Ofendo a la gente (-A)
Sympathize with others' feelings (+A)	Soy sensible hacia las emociones de otros (+A)
Am not interested in other people's problems (-A)	No me interesan los problemas de otras personas (-A)
Have a soft heart (+A)	Tengo un corazón sensible (+A)
Am not really interested in others (-A)	En realidad, no me intereso por los demás (-A)
Take time out for others (+A)	Dedico tiempo a los demás (+A)
Feel others' emotions (+A)	Siento las emociones de los otros (+A)
Make people feel at ease (+A)	Hago sentir cómoda a la gente (+A)
Have a rich vocabulary (+I)	Tengo un vocabulario amplio (+I)
Have difficulty understanding abstract ideas (-I)	Me cuesta entender ideas abstractas (-I)
Have a vivid imagination (+I)	Tengo mucha imaginación (+I)

Am not interested in abstract ideas (-I)	No me interesan las ideas abstractas (-I)
Have excellent ideas (+I)	Tengo excelentes ideas (+I)
Do not have a good imagination (-I)	No tengo una buena imaginación (-I)
Am quick to understand things (+I)	Soy rápido para entender las cosas (+I)
Use difficult words (+I)	Utilizo palabras difíciles (+I)
Spend time reflecting on things (+I)	Dedico tiempo a reflexionar (+I)
Am full of ideas (+I)	Estoy lleno de ideas (+I)
Am always prepared (+C)	Siempre estoy preparado (+C)
Leave my belongings around (-C)	Dejo mis pertenencias en cualquier lado (-C)
Pay attention to details (+C)	Pongo atención en los detalles (+C)
Make a mess of things (-C)	Soy desordenado (-C)
Get chores done right away (+C)	Realizo mis tareas inmediatamente (+C)
Often forget to put things back in their proper place (-C)	A menudo olvido poner las cosas en su lugar (-C)
Like order (+C)	Me gusta el orden (+C)
Shirk my duties (-C)	Evado mis obligaciones (-C)
Follow a schedule (+C)	Hago un programa y lo sigo (+C)
Am exacting in my work (+C)	Soy perfeccionista en mi trabajo (+C)

Table S2: Model fit indices for single factor CFA models

	x^2	df	CFI	TLI	RMSEA	WRMR
Neuroticism	180.562*	35	.97	.96	.073	1.119
Extraversion	690.143*	35	.44	.27	.155	2.818
Agreeableness	1678.044*	35	.45	.29	.246	4.303
Intellect	1040.536*	35	.65	.55	.192	3.279
Conscientiousness	1221.211*	35	.70	.61	.209	3.606

Note: * $p < .001$

Table S3: Standardized factor loadings for the single factor CFA model for Neuroticism

Item	Loading	*p*-value
Get stressed out easily (+N)	.522	<.001
Am relaxed most of the time (-N)	.203	<.001
Worry about things (+N)	.048	.198
Seldom feel blue (-N)	.243	<.001
Am easily disturbed (+N)	.692	<.001
Get upset easily (+N)	.777	<.001
Change my mood a lot (+N)	.661	<.001
Have frequent mood swings (+N)	.797	<.001
Get irritated easily (+N)	.798	<.001
Often feel blue (+N)	.685	<.001

Table S4: Standardized factor loadings for the single factor CFA model for Extraversion

Item	Loading	*p*-value
Am the life of the party (+E)	.248	<.001
Don't talk a lot (-E)	.316	<.001
Feel comfortable around people (+E)	.253	<.001
Keep in the background (-E)	.470	<.001
Start conversations (+E)	.294	<.001
Have little to say (-E)	.460	<.001
Talk to a lot of different people at parties (+E)	.342	<.001
Don't like to draw attention to myself (-E)	.471	<.001
Don't mind being the center of attention (+E)	.486	<.001
Am quiet around strangers (-E)	.340	<.001

Table S5: Standardized factor loadings for the single factor CFA model for Agreeableness

Item	Loading	*p*-value
Feel little concern for others (-A)	.121	<.001
Am interested in people (+A)	.597	<.001
Insult people (-A)	-.207	<.001
Sympathize with others' feelings (+A)	.675	<.001
Am not interested in other people's problems (-A)	-.337	<.001
Have a soft heart (+A)	.562	<.001
Am not really interested in others (-A)	-.375	<.001
Take time out for others (+A)	.597	<.001
Feel others' emotions (+A)	.683	<.001
Make people feel at ease (+A)	.516	<.001

Table S6: Standardized factor loadings for the single factor CFA model for Intellect

Item	Loading	*p*-value
Have a rich vocabulary (+I)	.476	<.001
Have difficulty understanding abstract ideas (-I)	-.115	.001
Have a vivid imagination (+I)	.571	<.001
Am not interested in abstract ideas (-I)	-.080	.023
Have excellent ideas (+I)	.783	<.001
Do not have a good imagination (-I)	-.166	<.001
Am quick to understand things (+I)	.667	<.001
Use difficult words (+I)	.242	<.001
Spend time reflecting on things (+I)	.429	<.001
Am full of ideas (+I)	.674	<.001

Table S7: Standardized factor loadings for the single factor CFA model for Conscientiousness

Item	Loading	*p*-value
Am always prepared (+C)	.537	<.001
Leave my belongings around (-C)	-.615	<.001
Pay attention to details (+C)	.595	<.001
Make a mess of things (-C)	-.662	<.001
Get chores done right away (+C)	.629	<.001
Often forget to put things back in their proper place (-C)	-.584	<.001
Like order (+C)	.627	<.001
Shirk my duties (-C)	-.544	<.001
Follow a schedule (+C)	.453	<.001
Am exacting in my work (+C)	.485	<.001

Table S8: Factor loading matrix for the five factor CFA with positive and negative valence factors.

Items	Positive	Negative	N	E	A	I	C
Get stressed out easily (+N)	.38		.33				
Am relaxed most of the time (-N)		-.36	.10				
Worry about things (+N)	.32		-.62				
Seldom feel blue (-N)		-.53	.09				
Am easily disturbed (+N)		-.46	.48				
Get upset easily (+N)		-.50	.60				
Change my mood a lot (+N)		-.49	.40				
Have frequent mood swings (+N)		-.52	.61				
Get irritated easily (+N)		-.50	.59				
Often feel blue (+N)		-.49	.50				
Am the life of the party (+E)	.26			-.41			
Don't talk a lot (-E)		-.39		.35			
Feel comfortable around people (+E)	.29			-.65			
Keep in the background (-E)		-.47		.09			
Start conversations (+E)	.39			-.46			
Have little to say (-E)		-.49		.33			
Talk to a lot of different people at parties (+E)	.34			-.20			
Don't like to draw attention to myself (-E)		-.33		.02			
Don't mind being the center of attention (+E)	.40			.07			
Am quiet around strangers (-E)		-.32		.22			
Feel little concern for others (-A)		-.41			.01		
Am interested in people (+A)	.38				-.55		
Insult people (-A)		-.55			.60		
Sympathize with others' feelings (+A)	.53				-.24		
Am not interested in other people's problems (-A)		-.43			.51		
Have a soft heart (+A)	.47				-.18		
Am not really interested in others (-A)		-.43			.62		
Take time out for others (+A)	.48				-.42		
Feel others' emotions (+A)	.51				-.33		
Make people feel at ease (+A)	.37				-.62		
Have a rich vocabulary (+I)	.37					-.36	
Have difficulty understanding abstract ideas (-I)		-.46				.41	

Have a vivid imagination (+I)	.34			-.45	
Am not interested in abstract ideas (-I)		-.47		.38	
Have excellent ideas (+I)	.43			-.52	
Do not have a good imagination (-I)		-.46		.52	
Am quick to understand things (+I)	.31			-.60	
Use difficult words (+I)	.51			.20	
Spend time reflecting on things (+I)	.42			-.34	
Am full of ideas (+I)	.40			-.53	
Am always prepared (+C)	.38				-.53
Leave my belongings around (-C)		-.45			.51
Pay attention to details (+C)	.34				-.61
Make a mess of things (-C)		-.41			.59
Get chores done right away (+C)	.34				-.60
Often forget to put things back in their proper place (-C)		-.47			.53
Like order (+C)	.27				-.57
Shirk my duties (-C)		-.54			.60
Follow a schedule (+C)	.32				-.48
Am exacting in my work (+C)	.45				-.48

Factor correlations	**Positive**	**Negative**	**N**	**E**	**A**	**I**	**C**
Positive	-						
Negative	-.89	-					
N	-	-	-				
E	-	-	.59	-			
A	-	-	.68	.63	-		
I	-	-	.67	.60	.77	-	
C	-	-	.74	.48	.74	.85	-

Table S9: Factor loading matrix for the five factor CFA with general method factor.

Items	Method	N	E	A	I	C
Get stressed out easily (+N)	.35	.35				
Am relaxed most of the time (-N)	.36	.08				
Worry about things (+N)	.52	-.57				
Seldom feel blue (-N)	.31	.07				
Am easily disturbed (+N)	.45	.49				
Get upset easily (+N)	.49	.61				
Change my mood a lot (+N)	.47	.42				
Have frequent mood swings (+N)	.50	.62				
Get irritated easily (+N)	.48	.61				
Often feel blue (+N)	.48	.52				
Am the life of the party (+E)	.26		.41			
Don't talk a lot (-E)	.38		-.36			
Feel comfortable around people (+E)	.28		.64			
Keep in the background (-E)	.46		-.12			
Start conversations (+E)	.38		.47			
Have little to say (-E)	.48		-.35			
Talk to a lot of different people at parties (+E)	.33		.22			
Don't like to draw attention to myself (-E)	.33		-.04			
Don't mind being the center of attention (+E)	.39		-.04			
Am quiet around strangers (-E)	.31		-.24			
Feel little concern for others (-A)	.40			-.03		
Am interested in people (+A)	.37			.56		
Insult people (-A)	.54			-.62		
Sympathize with others' feelings (+A)	.51			.26		
Am not interested in other people's problems (-A)	.42			-.52		
Have a soft heart (+A)	.46			.20		
Am not really interested in others (-A)	.42			-.63		
Take time out for others (+A)	.46			.43		
Feel others' emotions (+A)	.50			.36		
Make people feel at ease (+A)	.36			.63		
Have a rich vocabulary (+I)	.36				.37	
Have difficulty understanding abstract ideas (-I)	.45				-.42	
Have a vivid imagination (+I)	.33				.46	
Am not interested in abstract ideas (-I)	.46				-.40	
Have excellent ideas (+I)	.42				.53	
Do not have a good imagination (-I)	.44				-.53	
Am quick to understand things (+I)	.30				.60	

Use difficult words (+I)	.49			-.17	
Spend time reflecting on things (+I)	.41			.36	
Am full of ideas (+I)	.38			.54	
Am always prepared (+C)	.37				.54
Leave my belongings around (-C)	.44				-.52
Pay attention to details (+C)	.34				.61
Make a mess of things (-C)	.40				-.60
Get chores done right away (+C)	.34				.60
Often forget to put things back in their proper place (-C)	.46				-.54
Like order (+C)	.27				.57
Shirk my duties (-C)	.53				-.61
Follow a schedule (+C)	.31				.49
Am exacting in my work (+C)	.44				.50

Factor correlations	**Method**	**N**	**E**	**A**	**I**	**C**
Method	-					
N	-	-				
E	-	-.60	-			
A	-	-.68	.64	-		
I	-	-.67	.61	.77	-	
C	-	-.74	.50	.75	.86	-

Table S10: Factor loading matrix for the five factor ESEM using CF-Parsimax Oblique rotation.

Items	1	2	3	4	5
Get stressed out easily (+N)	**0.412**	0.145	0.109	-0.083	-0.005
Am relaxed most of the time (-N)	-0.182	0.218	**0.347**	0.141	-0.255
Worry about things (+N)	-0.09	**0.459**	0.206	0.132	**0.378**
Seldom feel blue (-N)	0.097	0.258	0.013	0.109	-0.225
Am easily disturbed (+N)	**0.58**	0.031	0.195	-0.025	0.025
Get upset easily (+N)	**0.581**	0.049	0.21	0.003	-0.141
Change my mood a lot (+N)	**0.505**	0.053	0.232	0.02	0.033
Have frequent mood swings (+N)	**0.655**	0.034	0.151	0.035	-0.155
Get irritated easily (+N)	**0.664**	0.1	0.1	-0.026	-0.144
Often feel blue (+N)	**0.503**	0.177	0.214	-0.098	-0.085
Am the life of the party (+E)	-0.255	0.207	0.088	**0.334**	-0.14
Don't talk a lot (-E)	0.185	0.112	**0.433**	-0.166	0.173
Feel comfortable around people (+E)	-0.232	**0.324**	0.041	0.262	0.086
Keep in the background (-E)	0.123	0.208	**0.388**	-0.031	0.166
Start conversations (+E)	-0.149	**0.336**	-0.053	**0.431**	-0.239
Have little to say (-E)	0.186	0.136	**0.46**	-0.057	0.092
Talk to a lot of different people at parties (+E)	-0.035	0.08	0.066	**0.423**	-0.187
Don't like to draw attention to myself (-E)	**0.39**	0.092	-0.087	0.154	0.056
Don't mind being the center of attention (+E)	**0.39**	0.192	-0.148	0.2	-0.092
Am quiet around strangers (-E)	**0.359**	0.147	0.095	-0.112	0.148
Feel little concern for others (-A)	0.067	0.065	**0.358**	0.135	0.115
Am interested in people (+A)	-0.128	**0.446**	-0.006	0.245	0.139
Insult people (-A)	**0.304**	-0.007	**0.407**	0.106	**-0.314**
Sympathize with others' feelings (+A)	0.06	**0.798**	-0.015	-0.132	0.03
Am not interested in other people's problems (-A)	0.114	-0.204	**0.628**	0.109	-0.095
Have a soft heart (+A)	0.129	**0.65**	-0.055	-0.087	0.022
Am not really interested in others (-A)	0.193	-0.232	**0.627**	0.047	-0.098
Take time out for others (+A)	0.084	**0.418**	-0.1	**0.33**	0.037
Feel others' emotions (+A)	0.156	**0.594**	-0.202	0.207	-0.063
Make people feel at ease (+A)	-0.177	0.232	0.064	**0.443**	0.179
Have a rich vocabulary (+I)	-0.125	0.183	0.111	**0.403**	0.023
Have difficulty understanding abstract ideas (-I)	0.05	0.185	**0.521**	-0.124	-0.138
Have a vivid imagination (+I)	-0.083	0.207	0.006	**0.407**	0.081
Am not interested in abstract ideas (-I)	0.096	0.059	**0.468**	0.054	-0.184
Have excellent ideas (+I)	0.06	-0.007	0.008	**0.684**	0.145
Do not have a good imagination (-I)	0.109	0.043	**0.557**	-0.08	-0.17
Am quick to understand things (+I)	0.134	0	-0.105	**0.533**	**0.347**
Use difficult words (+I)	**0.382**	-0.026	0.06	**0.397**	-0.183
Spend time reflecting on things (+I)	0.172	0.232	-0.011	0.275	0.235
Am full of ideas (+I)	0.007	0.032	-0.007	**0.635**	0.127

Am always prepared (+C)	-0.085	0.15	0.18	**0.347**	**0.372**
Leave my belongings around (-C)	0.126	0.174	0.278	0.063	**-0.499**
Pay attention to details (+C)	-0.204	**0.302**	0.164	0.242	**0.376**
Make a mess of things (-C)	0.113	0.127	0.295	0.053	**-0.564**
Get chores done right away (+C)	-0.021	0.243	0.079	0.235	**0.474**
Often forget to put things back in their proper place (-C)	0.239	0.243	0.254	-0.06	**-0.403**
Like order (+C)	0.113	0.188	0.032	0.122	**0.624**
Shirk my duties (-C)	0.262	-0.006	**0.442**	0.1	**-0.356**
Follow a schedule (+C)	-0.011	0.148	-0.005	**0.374**	0.226
Am exacting in my work (+C)	0.019	0.077	0.171	**0.454**	**0.336**

Table S11: Factor loading matrix for the five factor ESEM using Oblimin Oblique rotation.

Items	1	2	3	4	5
Get stressed out easily (+N)	**0.444**	-0.062	0.074	0.134	-0.064
Am relaxed most of the time (-N)	-0.167	0.104	**0.44**	0.18	0.205
Worry about things (+N)	-0.107	**0.342**	0.156	**0.416**	-0.262
Seldom feel blue (-N)	0.133	0.062	0.062	0.223	0.204
Am easily disturbed (+N)	**0.616**	0.006	0.136	0.013	-0.103
Get upset easily (+N)	**0.631**	-0.022	0.188	0.024	0.031
Change my mood a lot (+N)	**0.537**	0.061	0.181	0.029	-0.096
Have frequent mood swings (+N)	**0.712**	0.001	0.123	0.005	0.053
Get irritated easily (+N)	**0.723**	-0.056	0.068	0.077	0.038
Often feel blue (+N)	**0.546**	-0.095	0.191	0.161	-0.029
Am the life of the party (+E)	-0.248	**0.329**	0.159	0.154	0.215
Don't talk a lot (-E)	0.181	-0.065	**0.389**	0.114	-0.256
Feel comfortable around people (+E)	-0.237	**0.345**	0.062	0.277	0.031
Keep in the background (-E)	0.122	0.081	**0.356**	0.189	-0.199
Start conversations (+E)	-0.119	**0.399**	0.031	0.263	**0.336**
Have little to say (-E)	0.191	0.025	**0.437**	0.12	-0.168
Talk to a lot of different people at parties (+E)	-0.012	**0.392**	0.122	0.017	0.255
Don't like to draw attention to myself (-E)	**0.42**	0.19	-0.135	0.06	-0.016
Don't mind being the center of attention (+E)	**0.437**	0.19	-0.163	0.147	0.124
Am quiet around strangers (-E)	**0.375**	-0.038	0.031	0.143	-0.183
Feel little concern for others (-A)	0.064	0.22	**0.34**	0.034	-0.111
Am interested in people (+A)	-0.125	**0.356**	-0.005	**0.392**	-0.011
Insult people (-A)	**0.346**	0.03	**0.456**	-0.042	0.183
Sympathize with others' feelings (+A)	0.091	-0.044	-0.004	**0.768**	-0.029
Am not interested in other people's problems (-A)	0.116	0.108	**0.648**	-0.226	-0.012
Have a soft heart (+A)	0.161	-0.017	-0.055	**0.622**	-0.016
Am not really interested in others (-A)	0.198	0.039	**0.638**	-0.246	-0.035
Take time out for others (+A)	0.111	**0.401**	-0.1	**0.351**	0.086
Feel others' emotions (+A)	0.201	0.245	-0.186	**0.532**	0.148
Make people feel at ease (+A)	-0.185	**0.563**	0.06	0.165	-0.004
Have a rich vocabulary (+I)	-0.121	**0.462**	0.134	0.12	0.092
Have difficulty understanding abstract ideas (-I)	0.063	-0.122	**0.563**	0.175	-0.005
Have a vivid imagination (+I)	-0.079	**0.483**	0.011	0.144	0.062
Am not interested in abstract ideas (-I)	0.115	0.033	**0.512**	0.032	0.078
Have excellent ideas (+I)	0.066	**0.778**	-0.018	-0.097	0.067
Do not have a good imagination (-I)	0.123	-0.099	**0.597**	0.033	0.016
Am quick to understand things (+I)	0.128	**0.685**	-0.187	-0.067	-0.118
Use difficult words (+I)	**0.428**	**0.358**	0.068	-0.09	0.207
Spend time reflecting on things (+I)	0.18	**0.403**	-0.068	0.181	-0.11
Am full of ideas (+I)	0.011	**0.722**	-0.024	-0.052	0.076
Am always prepared (+C)	-0.108	**0.534**	0.123	0.097	-0.208
Leave my belongings around (-C)	0.177	-0.076	**0.387**	0.14	**0.356**
Pay attention to details (+C)	-0.231	**0.437**	0.122	0.258	-0.221
Make a mess of things (-C)	0.167	-0.114	**0.417**	0.096	**0.401**
Get chores done right away (+C)	-0.045	**0.454**	-0.008	0.202	**-0.303**

Often forget to put things back in their proper place (-C)	0.291	-0.164	**0.331**	0.22	0.246
Like order (+C)	0.083	**0.383**	-0.105	0.164	**-0.456**
Shirk my duties (-C)	**0.304**	0.01	**0.505**	-0.041	0.212
Follow a schedule (+C)	-0.015	**0.495**	-0.042	0.093	-0.065
Am exacting in my work (+C)	0.005	**0.626**	0.111	0.011	-0.161

Table S12: Factor loading matrix for the five factor ESEM using Target rotation.

Items	1	2	3	4	5
Get stressed out easily (+N)	**0.462**	0.066	0.096	-0.048	0.047
Am relaxed most of the time (-N)	-0.158	0.296	0.121	0.142	**0.34**
Worry about things (+N)	-0.015	**0.376**	**0.392**	0.091	**-0.328**
Seldom feel blue (-N)	0.098	-0.011	0.254	0.088	0.261
Am easily disturbed (+N)	**0.637**	0.083	-0.046	0.052	0.017
Get upset easily (+N)	**0.627**	0.056	-0.03	0.081	0.195
Change my mood a lot (+N)	**0.562**	0.128	-0.032	0.093	0.013
Have frequent mood swings (+N)	**0.692**	-0.017	-0.027	0.115	0.197
Get irritated easily (+N)	**0.706**	-0.035	0.052	0.039	0.186
Often feel blue (+N)	**0.568**	0.13	0.094	-0.045	0.154
Am the life of the party (+E)	-0.276	0.093	0.197	0.297	0.161
Don't talk a lot (-E)	0.283	**0.422**	-0.035	-0.107	-0.086
Feel comfortable around people (+E)	-0.227	0.141	**0.321**	0.206	-0.069
Keep in the background (-E)	0.209	**0.4**	0.079	0.004	-0.086
Start conversations (+E)	-0.188	-0.047	**0.369**	**0.37**	0.25
Have little to say (-E)	0.275	**0.418**	-0.015	0.003	-0.001
Talk to a lot of different people at parties (+E)	-0.069	-0.015	0.075	**0.422**	0.191
Don't like to draw attention to myself (-E)	**0.395**	-0.121	0.112	0.17	-0.07
Don't mind being the center of attention (+E)	**0.38**	-0.19	0.232	0.195	0.083
Am quiet around strangers (-E)	**0.419**	0.104	0.101	-0.085	-0.115
Feel little concern for others (-A)	0.119	**0.317**	-0.045	0.181	-0.062
Am interested in people (+A)	-0.11	0.129	**0.452**	0.176	-0.119
Insult people (-A)	**0.339**	0.2	-0.134	0.192	**0.397**
Sympathize with others' feelings (+A)	0.134	0.194	**0.787**	-0.234	0.055
Am not interested in other people's problems (-A)	0.169	**0.423**	**-0.394**	0.231	0.181
Have a soft heart (+A)	0.186	0.105	**0.653**	-0.167	0.039
Am not really interested in others (-A)	0.254	**0.409**	**-0.425**	0.179	0.185
Take time out for others (+A)	0.083	-0.027	**0.451**	0.274	-0.033
Feel others' emotions (+A)	0.161	-0.092	**0.652**	0.12	0.081
Make people feel at ease (+A)	-0.181	0.13	0.226	**0.408**	-0.184
Have a rich vocabulary (+I)	-0.133	0.116	0.162	**0.386**	-0.013
Have difficulty understanding abstract ideas (-I)	0.134	**0.456**	0.019	-0.076	0.261
Have a vivid imagination (+I)	-0.097	0.04	0.216	**0.377**	-0.089
Am not interested in abstract ideas (-I)	0.148	**0.34**	-0.084	0.118	0.277
Have excellent ideas (+I)	0.019	-0.051	0.008	**0.699**	-0.194
Do not have a good imagination (-I)	0.183	**0.428**	-0.132	-0.002	0.284
Am quick to understand things (+I)	0.109	-0.09	0.041	**0.537**	**-0.416**
Use difficult words (+I)	**0.36**	-0.112	-0.04	**0.45**	0.18
Spend time reflecting on things (+I)	0.191	0.042	0.234	0.262	-0.242
Am full of ideas (+I)	-0.033	-0.044	0.051	**0.637**	-0.171
Am always prepared (+C)	-0.055	0.25	0.101	**0.347**	**-0.37**
Leave my belongings around (-C)	0.139	0.126	0.091	0.09	**0.59**
Pay attention to details (+C)	-0.16	**0.308**	0.256	0.206	**-0.356**
Make a mess of things (-C)	0.121	0.115	0.04	0.088	**0.657**

Get chores done right away (+C)	0.022	0.216	0.218	0.213	**-0.477**
Often forget to put things back in their proper place (-C)	0.276	0.141	0.159	-0.035	**0.5**
Like order (+C)	0.172	0.191	0.169	0.114	**-0.642**
Shirk my duties (-C)	0.297	0.227	-0.142	0.186	**0.447**
Follow a schedule (+C)	-0.014	0.043	0.157	**0.357**	-0.248
Am exacting in my work (+C)	0.036	0.186	0.032	**0.473**	**-0.346**