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Take 2 personality factors: A study of two fundamental ways of trait differentiation in eleven trait taxonomies

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We investigated a two-dimensional structure of traits in eleven trait-taxonomies. Ratings from 7,104 participants on 4,642 trait variables were used. We studied exploratory two-factor (PCA) results, hierarchies of solutions with two and five factors, second-order structures of solutions with five factors, and confirmatory analyses. Moreover, we did the same analyses on the joint data set (using Simultaneous Components Analyses), initially consisting of 4,642 trait variables, but reduced on the basis of common trait terms to 922 terms. The two factors were easily identified in the separate data sets, though the relation with the Big Five factors was not consistently the same for those data sets. The analyses of the joint data set clearly supported the two-factor model.

Keywords: psycho-lexical approach, trait structure, cross-cultural, big two

Different perspectives seem to converge on the understanding that a two-dimensional structure of personality traits is robust across samples, variables, conceptualizations, and languages and cultures. That emerging two-dimensional structure suggests that there are two fundamental, relatively independent, ways in which people differ from each other in terms of personality traits. The profile of the first is characterized by an emphasis on individual strivings (e.g., achievement; self-actualization); the profile of the second is characterized by an emphasis on interdependence and common interest (e.g., cooperation; shared goals). These two ways of differentiation can be identified in various concept-pairs in different psychological disciplines. Wiggins (1991) brought several such concept-pairs together under a common denominator, formed by the much referred to conceptualization of Bakan (1966), who distinguished two basic mental qualities, namely *Agency*, referring to the individual's striving and differentiation from others, and *Communion*, referring to the need to be part of a larger whole and social interest.

In his socio-analytic theory, for example, Hogan (1983; see also Hogan, Jones, & Cheek, 1985) makes the related distinction between two orientations, expressed in the need for power and control (status) and the need for acceptance and approval (popularity). Wolfe, Lennox, and Cutler (1986) termed those orientations in the catching phrases "getting ahead" and "getting along", respectively. Another example is in social psychology, where the popularity of the distinction between Agency and Communion is witnessed in extensive literature (e.g., Abele & Wojciszke, 2014; cf. Fiske, Cuddy, & Glick, 2007). Abele and Wojciszke (2007) found a "communal" factor be related to Collectivism, Morality, and Femininity, and an "agentic" factor to be related to Individualism, Competence, and Masculinity.

The suggestion of fundamentality of that emergent distinction is precarious. While it may be useful for theory development to bring concepts from different disciplines together under a common denominator, it may also involve a disregard of distinctive characteristics of those different disciplines. Such characteristics can be observed in expressions in previous paragraphs such as "individual strivings" or "need for power". Strivings, needs, motives, interests, values, etc. belong to what Alston (1975) referred to as the set of purposive-cognitive concepts, as distinguished from trait or dispositional concepts. Winter, John, Stewart, Klohnen, and Duncan (1998), for example, compared traits and motives, both considered fundamental units but from different perspectives of investigation, and they demonstrated that the two are not reducible to each other in their explanatory role.

Trait taxonomy deals with dispositional concepts, giving a perspective from which the concept-pair Agency and Communion is to be read in its dispositional sense. In this regard, studying the trait structure in Greek language, Saucier, Georgiades, Tsaousis, and Goldberg (2005) described a two-factor representation to summarize the Greek trait-lan-

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guage, with one factor involving traits with an agentic connotation (*dynamic*, *exciting*, *energetic* versus *gutless*, *hesitant*, *boring*) and the other factor involving traits with a communal connotation (*considerate*, *humble*, *responsible* versus *bad-tempered*, *gross*, *disrespectful*). These factors were called Dynamism and Morality/Social Propriety, respectively. Saucier et al. (2005) suggested that these very broad factors have a high degree of cross-cultural generalizability. The extraction of only two factors in a Dutch study of traits (De Raad & Barelds, 2008) revealed similar factors, with one called Dynamism (*enthusiasm*, *vigor*, *energy*, *determination*) and the other called Virtue (*decent*, *good*, *reliable*, *balanced*). Central to the factor referred to as Dynamism in these two studies are many traits that are especially typical of Big Five Extraversion, and central to the factor referred to as Morality/Propriety or Virtue are characteristics especially typical of Big Five Agreeableness. Based on an evaluation of contents alone, such two-dimensional differentiations can also be observed in several other psycholexical studies from the recent past (Boies, Lee, Ashton, Pascal, & Nicol, 2001; Szarota, Ashton, & Lee, 2007; Zhou, Saucier, Gao, & Liu, 2009; Ashton, Lee, & Boies, 2015; Livaniene & De Raad, 2017; Burtaverde & De Raad, in press; De Raad, Nagy, Szirmak, & Barelds, 2018). In other studies corresponding factors only emerged in structures with more factors (e.g., Farahani, De Raad, Farzad, & Fotoohie, 2016), or they made no apparent appearance (e.g., Singh, Misra, & De Raad, 2013).

Digman's higher order factoring of the Big Five

An inspiring development in regards to the delineation of the two dimensions and of their meaning, was the study by Digman (1997) of correlations of Big Five constructs measured by a variety of Big Five scales in 14 different studies. Both exploratory and confirmatory analyses were performed, leading him to conclude that the Big Five factor-scales could be subsumed under two higher-order constructs, namely *Alpha* and *Beta*, suggested to parallel Bakan's concepts *Communion* and *Agency*. While in the review above on the emergence of two basic factors, occasionally links have been suggested to the two Big Five factors Agreeableness and Extraversion or their defining traits, in Digman's study the meaning of the two dimensions was explicitly put in terms of all of the Big Five factors, thus suggesting articulate descriptive semantics: Digman found *Alpha* to be related to Agreeableness, Conscientiousness, and Emotional Stability, and interpreted as a socialization factor, and *Beta* was found to be related to Extraversion and Intellect, and interpreted as a personal growth factor.

De Young, Peterson, and Higgins (2002) clearly replicated Digman's higher-order solution of the Big Five, but, reasoning from a neural network modeling point of view, suggested the labels Stability (related to Alpha) and Plasticity (related to Beta). While Mutch (2005) casted doubt on the appropriateness of Digman's methods and on the adequacy of a consistent two-factor interpretation, De Young (2006) found further confirmation for this two-dimensional framework in a multi-informant sample in the US, and further specified Stability as "the need to maintain a stable organization of psychosocial function," and Plasticity as "the need to explore and incorporate novel information into that organization" (p.1149).

Table 1. Mean loadings on higher order factors of the Big Five in Digman (1997)

	α	β
Extraversion	.17	**.60**
Agreeableness	**.57**	.08
Conscientiousness	**.47**	.20
Emotional Stability	**.64**	.20
Intellect	.07	**.57**

The study of hierarchy in Digman (1997) and De Young et al. (2002), introduces an emphasis on the *vertical* relations among more specific and more abstract variables, as distinguished from *horizontal* relations among variables in the factor space, where the interest is in the relative locations of variables at the same level of abstraction (Rosch, 1978; Goldberg, 1993; Goldberg & Digman, 1994). Because of the clarity and explicitness of Digman's model and because it has formed a point of reference in various studies, the model is depicted in Table 1. Also in the present study this model is taken as one of the reference points. In terms of factor contents Digman's higher-order factors agree well with the findings in most or all studies that have described two-factor trait-structures.

Use of trait taxonomies for the study of hierarchy

With a focus on finding a basic cross-cultural structure of personality traits, Saucier and Goldberg (2001) suggested a two-factor solution in several psycho-lexically based studies to show a consistent pattern, with one factor referred to as Social Propriety and the other as Dynamism. Saucier et al. (2014) found support for a basic bivariate structure in nine diverse languages for which they used the labels Social Self-Regulation and Dynamism, and they hypothesized that those factors were related to psychological constructs such as to the interpersonal circumplex, to the distinction morality/warmth and competence, to internalizing and externalizing tendencies, and to approach and avoidance tendencies, but the hypothesis was only partially confirmed. In a study involving a joint analysis of eleven psycho-lexical studies, De Raad, Barelds, Timmerman, De Roover, Mlačić, and Church (2014) found that the first cross-culturally stable differentiation was into a factor describing Dynamism, and the other factor capturing traits of Agreeableness and Conscientiousness (cf. De Raad et al., 2010).

Systematic integrative study of the two factors or dimensions, in their own respect, in relation to the Big Five, and including higher-order structuring, using a series of large-scale trait-taxonomies from various languages or cultures has not yet been performed. This study aims to do so. Unlike Digman's (1997) study which was based on correlations among Big Five scale scores, we rely fully on complete lexically based Big Five factor scores. Such a study of a two-dimensional model does, however, not stand alone. There is growing interest in what defines the so-called *p* factor (Hofstee, 2001), or the Primordial One (Hofstee, 2003), a general factor of personality (Musek, 2007), analogous to the *g* factor of intelligence, placed on top of a hierarchy of factors, with a two-factor solution at the next level, followed by a

three-factor solution, etc. It is of great importance to find out about the hierarchical characteristics of the relations between such different solutions, particularly regarding their substantial cross-cultural consistency. The focus on two dimensions does not allow a detailed analysis of cross-cultural hierarchy, but where relevant brief sidesteps are made. It should be noted, however, that such relationships between factors from different levels of factor-extraction are not just simply hierarchical, in the sense that the contents of lower level factors are subsumed under a higher order factor (as in the case of simple structure). Higher-order factors cover less semantics, notwithstanding their stronger psychometric character, e.g., higher internal consistency. In case of the a general factor of personality, for example, its meaning is interpreted in terms of what is shared by factors at a lower level, often a reduction to an evaluation-related understanding.

The main issue with the search for a smaller trait dimensionality is that recurrence of trait factors in a great variety of languages and cultures is probably not to be found in a detailed, high-dimensionality system of traits but rather in outlining some basic and marking trails of distinction identifiable cross-culturally. The assessment of such a cross-cultural kernel system, with one, two, or three dimensions, would, both practically and theoretically, form a very useful frame of reference, for regional assessment purposes to be extended with a variety of dimensions with a narrower scope and socio-geographic validity, such as the Big Five, Six-factor models (Ashton, Lee, Perugini, et al., 2004; Saucier, 2009), and trait models with seven (e.g., Almagor, Tellegen, & Waller, 1995) or even eight factors (De Raad & Barelds, 2008). The presence of such a reference system may enhance communication on individual differences across borders.

The cross-cultural study of a small set of basic factors, especially in relation to the Big Five factors, and partially hierarchically organized, may help clarify relationships with other constructs that have emerged in the past of personality theorizing, and purported to be of fundamental importance. This is especially the case where it concerns trait concepts from different levels of abstraction. A known example is the meaning and the position of Psychoticism in Eysenck's PEN model in relation to Agreeableness (A) and Conscientiousness (C) of the Big Five (see, e.g., Eysenck, 1994; Goldberg & Rosolack, 1994).

Broad and abstract constructs are possibly less sensitive to differences in method. Yet, the different pairs of labels (Alpha & Beta, Social Self-Regulation & Dynamism, Stability & Plasticity, etc.) do represent not only repeated trials to best capture the meanings of the underlying factors, they also may be considered as representing differences in theoretical viewpoint and differences in methods used. We prefer to keep some detachment with respect to the various sets of labels, and therefore use them sometimes interchangeably. Yet, in agreement with labels we used in previous psycho-lexical studies we prefer the labels Affiliation and Dynamism, but do so in combination with the Digman labels since they have been repeatedly referred to in the literature, thus Alpha/Affiliation and Beta/Dynamism. Differences in labels are possibly partly a consequence of varying semantic densities. For this reason we also use the circular representation or circumplex (e.g., De Raad, Hendriks, & Hofstee, 1992; Hofstee, De Raad, & Goldberg, 1992; Wiggins, 1980), because the circumplex representation is particularly apt to show such variation.

With a two-dimensional system trait variables can be put in a circular arrangement by using the pairs of loadings as coordinate values. The most important reason to use circumplexes is the repeated observation that while certain traits are orthogonal to each other, and can thus be seen as hierarchically related to the underlying factors (e.g., talkative is an expression of the more abstract Extraversion), most traits represent blends of factors, thus obscuring simple hierarchy (e.g., humble is a blend of Agreeableness and Introversion). The circular arrangement emphasizes relations between traits at the same level of abstraction, their opposites, traits in adjacent segments of the circle, and in particular, indeed, traits depicted as blends of such adjacent sectors. The circular arrangement gives more detail about distinctive vectors representing blends of traits and of factors. The different labels for two dimensions referred to above may turn out to represent, at least in part, rotational variants of each other. Such variation is easily identified in a circumplex. Strus, Cieciuch, and Rowiński (2014), who thoroughly reviewed problems with the Big Five, especially where confronted with questions of cross-cultural validity, argued the circumplex representation to have integrative capacity with respect to different views of personality.

The different lines of research sketched above are all about some basic or abstract factors amidst a larger number of less abstract factors or trait-variables, partly in a hierarchical constellation. It is important to arrive at an articulation of that constellation, especially where it concerns structures with one up to three factors, in relation to the Big Five factors. The contents must be specified, and it is important to have a clear view on the relations between the various factors from different levels of abstraction. Musek (2007), who tried to understand the meaning of the Big One, the single factor at the apex of a hierarchy of trait factors, listed several correlates of the Big One, such as with Positive Emotionality, Self-esteem, motivation, and socialization. Strus et al. (2014), focusing on two-factors, suggested the Big One to be a derivative of the Big Two, and therefore denied the Big One the hierarchical top position. These discussions take place in a context where three factors (De Raad et al., 2014) roughly define what is possibly maximally attainable as a structure that is cross-culturally replicable.

Summarizing trait semantics into two clusters and grouping the Big Five[1] factors into two more abstract or higher order factors confirm two conditions of social life, that of the importance of being a competent individual and that of emphasizing membership of a larger social entity. The competent individual is manifested in determined action, versatility, effective communication, and entrepreneurship. The content of this dimension is expressed in such

[1] During recent years structures with more than five factors, in particular six (Ashton et al., 2004) and seven (Almagor et al., 1995), have claimed a descriptive and explanatory position in the field of personality, next to the Big Five. Such systems with more factors are not used here, mainly because the discussion in the literature was about the role of five factors in relation to a basic two. Introducing systems with more factors would unnecessarily complicate the discussion, and there is no reason to expect that the description of a two-factor solution would be different by that.

Table 2. The eleven taxonomies used in the present study

Language	Code	Authors	Sample size	Number of variables	self	peer
American-English	ENG	Goldberg (1990)	636	540	+	+
Dutch	DUT	De Raad et al. (1992)	600	551	+	+
German	GER	Ostendorf (1990)	776	430	+	+
Italian-Triestean	IT-T	Di Blas & Forzi (1999)	369	369	+	
Italian-Roman	IT-R	Caprara & Perugini (1994)	961	285	+	+
Hungarian	HUN	Szirmák & De Raad (1994)	400	561	+	
Polish	POL	Szarota (1996)	719	287	+	+
Czech	CZE	Hřebíčková (2007)	397	358	+	
Filipino	FIL	Church et al. (1997)	740	405	+	
Greek	GRE	Saucier et al. (2005)	991	400	+	
Croatian	CRO	Mlačić & Ostendorf (2005)	515	456	+	

traits as dynamic, sociable, enterprising, and extraverted, *versus* withdrawn, timid, taciturn, and introverted. This dimension is usually associated with the personality dimension of Extraversion. Tanaka and Osgood (1965) used the term Dynamism as a summary meaning. People differ in the extent to which they are dynamic, and this may be recognized in different manifestations (e.g., Agency, Individualism, Liberalism, Self-actualization) on the stages of a variety of disciplines, such as psychology, philosophy, sociology, and politics. The social connection is manifested in strivings for intimacy, union, and solidarity within the larger social entity. The content of this dimension is expressed in such traits as kind, helpful, sympathetic, peaceful, and compassionate, *versus* egoistic, quarrelsome, domineering, and aggressive. This dimension is usually associated with the personality dimension of Agreeableness. Leary (1957) used the term Affiliation to summarize the meaning, and it is related to concepts such as Communion, Collectivism, Socialism, and Solidarity.

Present study

We take the two-dimensional structure with Beta/Dynamism and Alpha/Affiliation as the hypothetical structure to be tested and articulated in the present study. We make use of the large-scale data-sets of eleven taxonomies, as used in De Raad et al. (2014). We test the model in five different ways using exploratory two-factor results of the trait taxonomies, using hierarchies of two- and five-factor results, using second-order factoring of five-factor structures, using a confirmatory approach in which Digman's model is tested in the different taxonomies, and finally using two-factor results of a joint data set including all eleven taxonomies.

The eleven referred to taxonomy-based five-factor results are not all perfect representations of the Big Five (for details in variations, see further on). The trait vocabularies from different languages do not show semantic trait clusters with equal densities, which may lead to an allotment of traits to factors with more or less of the expected Big Five characteristics. Stronger factors, explaining more variance, for example Extraversion and Agreeableness, may be expected to emerge more easily. Part of the reason for this study of the cross-cultural Big Two resides in the expectation that variations in Big Five findings are dissolved in a more abstract clustering into two, in which the kernel of one cluster is most typically characterized indeed by traits of Extraversion and Intellect, that is Beta/Dynamism, and the other cluster by traits of Agreeableness and Conscientiousness, that is Alpha/Affiliation.

METHOD

Materials

We used the data of eleven taxonomies, all used in De Raad et al. (2014) for different purposes; they are listed in Table 2. The differences in numbers of trait-terms and numbers of participants as given in Table 2 may form part of the explanation of the differences found between the taxonomies as published, together with differences in selection procedures, and differences in types of dictionaries used. Moreover, all are based on self-ratings, and some on both self- and peer-ratings. In all these trait-taxonomies, the aim was to catalogue all trait-descriptive words in the relevant languages. In order to arrive at full but manageable lists of traits, understood by most and useful for personality description, reductions of the collections were made on the basis of criteria such as familiarity and clarity.

Four of the eleven data sets contained occasional random missing data, namely German (1.1 % missing across all participants and items), Italian-Triestean (0.6 % missing), Polish (0.6 % missing), and Hungarian (1.4 % missing). Those missing values were, individually for each data set, filled in using regression estimates (using a multiple imputation module for missing data in SPSS, version 18.0, SPSS Inc., 2009), which is appropriate when missing data are missing at random (see the classification by Rubin, 1976). We presume the latter to be the case, and note that possible violations of this assumption would be of little influence given the relative small amount of incidental missing scores.

The data sets of the taxonomies were separately ipsatized (standardized per person). Although such ipsatizations are not without problems (for a brief discussion, see De Raad & Barelds, 2008), they were kept on for the present study for two reasons. One is that the eleven original published structures taking part in the present study were all based on ipsatized data. The other is that the original raw data sets were based on varying rating-scales, and ipsatization forms an adequate correction in that respect. Further

Table 3. Average correlatons across 11 data sets between two and five components

	A	C	ES	E	I
Alpha/Affiliation	.73	.53	.19	.19	.18
Beta/Dynamism	.09	.25	.37	.72	.32

details are to be found in the various publications (see also De Raad et al., 2010; De Raad et al., 2014).

For the joint analyses, the eleven taxonomies were put together, thus counting 4,642 trait terms and 7,104 participants. After having turned all trait terms into English, there was quite some overlap between the different sets with only 1,993 unique trait terms, and many terms occurring in more than one language. Of the 1,993 terms, 1,071 occurred in only one of the languages, with the consequence of large areas of missing data. Leaving out this latter set of terms resulted in 922 terms that occurred in at least two languages, thus providing connectivity among the languages. For a more detailed account of the merging process and the resulting joint set of data, see De Raad et al. (2014).

RESULTS BASED ON ELEVEN DATA-SETS

Exploratory two-factor results

Two-factor structures were prepared, using Principal Components Analysis, for each of the eleven taxonomies, all based on ipsatized data. The analyses were followed by varimax rotation. For all component matrices lists of English variable names were available. The two top boxes in the panels a to k of Figure 1 contain five high loading traits for each of the poles of the two components. On the basis of the contents alone, one might easily conclude that in all eleven cases one component conveys characteristics typical of Beta/Dynamism and the other conveys mainly characteristics of Agreeableness and Conscientiousness, more typical of Alpha/Affiliation.

Hierarchies of two- and five-component results

In order to have a detailed view of both these exploratory two-component results and the five-component solutions of the 11 taxonomies as they have been published before, Figure 1 also contains the five-component representations, with all solutions based on varimax-rotations. Moreover, to provide one more answer to the question of the relation between the two- and five-results, the correlations (|.30| or higher) are given between the components from the two levels of extraction.

The five-component solutions were as much as possible put in the same order (A, C, ES, E, and I). The Big Five were identifiable in eight of the structures. The Italian-Triestean and the Hungarian five-component structures deviated in that the Intellect component was replaced by a Trustworthiness component and an Integrity component, respectively, and in the Greek structure it was replaced by a Negative Valence component. Several other observations can be made on this table. While the two-component solutions without exception reflected the two hypothesized factors, they did not all systematically relate to corresponding components in the five-solutions. For a summary orientation, Table 3 contains the average correlations between the two components supposedly representing Alpha/Affiliation and Beta/Dynamism, and the five components supposedly representing the Big Five. The averages across all 11 correlations of "Alpha/Affiliation" and "Dynamism" with the "Agreeableness" and "Extraversion" components were .73 and .72, respectively. In addition, "Conscientiousness" had a substantial average correlation of .53 with the "Alpha/Affiliation" component.

When reviewing the highest correlations the components of the two-solutions had with those of the five-solutions, it turned out that in seven of the 11 hierarchies the highest correlations were with the "Agreeableness" and "Extraversion" components, respectively. Hungarian could be added to this list of seven if the first factor (*humanitarian*, *benevolent*) and the fifth factor (*veracious*, *fair*) were considered as facets of Agreeableness. German deviated: although the second component of the two-solution (*self-confident*, *knowledgeable*) correlated moderately (.56) with the "Extraversion" component (*sociable*, *gregarious*), it had a stronger correlation of .73 with the Intellect component (*clever*, *talented*). Big Five "Intellect" significantly correlated in seven cases with the second component of the two-solution only. Big Five "Emotional Stability" did not correlate systematically with one of the two components of the two-solution; it had five substantial correlations (.40 to .80) with "Beta/Dynamism" and two (.31 to .49) with "Alpha/Affiliation". With the highest correlations between "Emotional Stability" with the second component of the two-solution, the "Beta/Dynamism" component, the finding seems to disagree with the Digman model. For German, Italian Roman, Czech, and Croatian no correlations above .30 were observed.

Second-order factoring of five-component structures

For the higher-order factoring we followed as much as possible the routines suggested in Digman (1997). For each of the 11 taxonomies, five components were extracted on the basis of ipsatized data using Principal Components Analyses. To allow higher-order factoring, correlated factors were obtained through Oblimin rotation (delta: 0). The Oblimin-rotated components turned out to be virtually almost all the same as the varimax-rotated components, with an average of .98 across the 55 correlations between the corresponding pairs of components. Most of the components could well be interpreted in terms of Big Five labels, except a few. The Italian Triestean structure had an Honesty component instead of an Intellect or Openness component. The Italian Roman structure had, instead of Emotional Stability, a Sensitivity component in which traits of Emotional Stability and of Agreeableness were combined. The Hungarian structure had, instead of an Intellect component, a component labelled "Unaffected", featuring candid, overt charac-

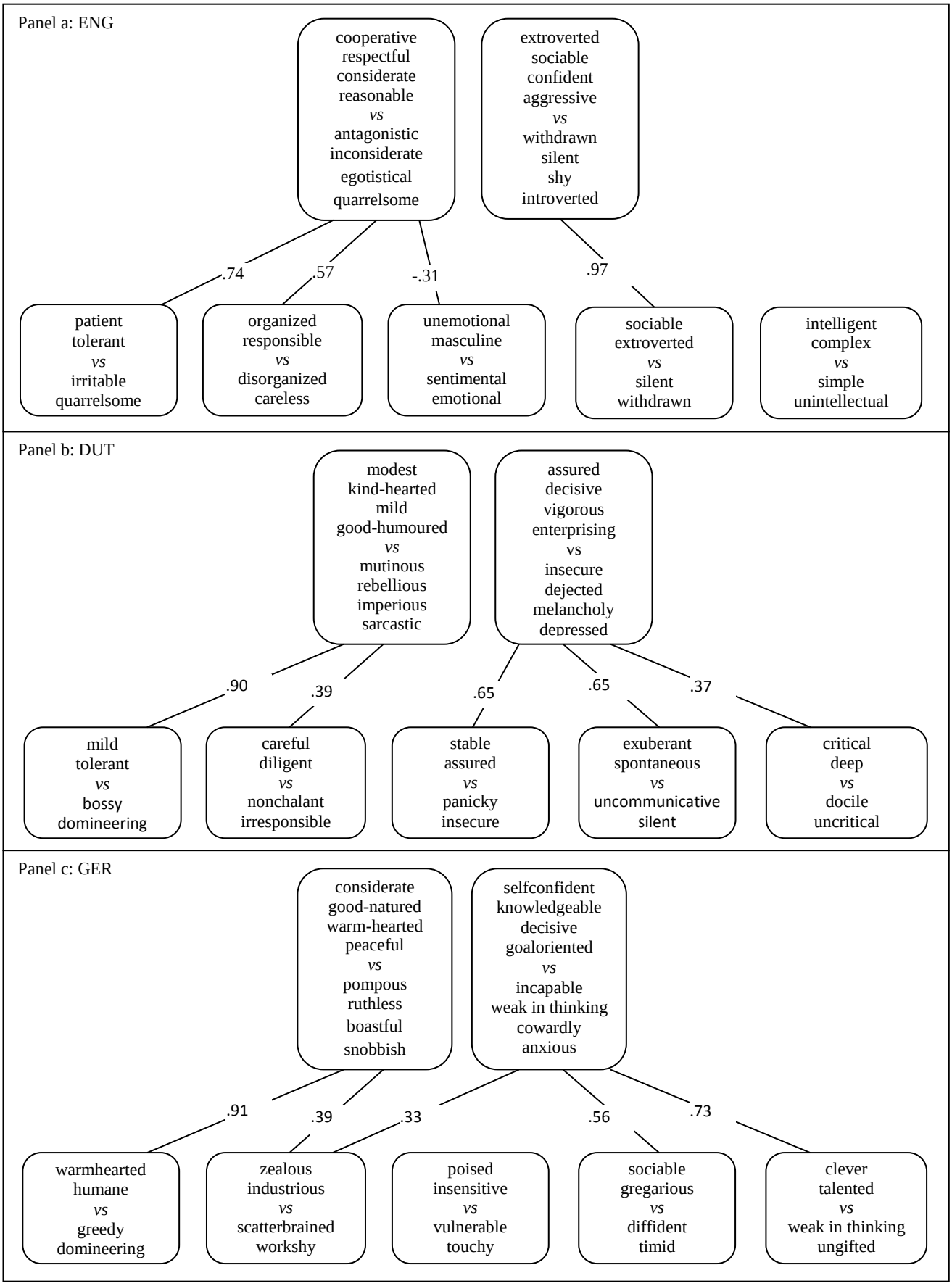

Figure 1. Hierarchies of two- and five-component solutions in 11 languages (panel a to c)

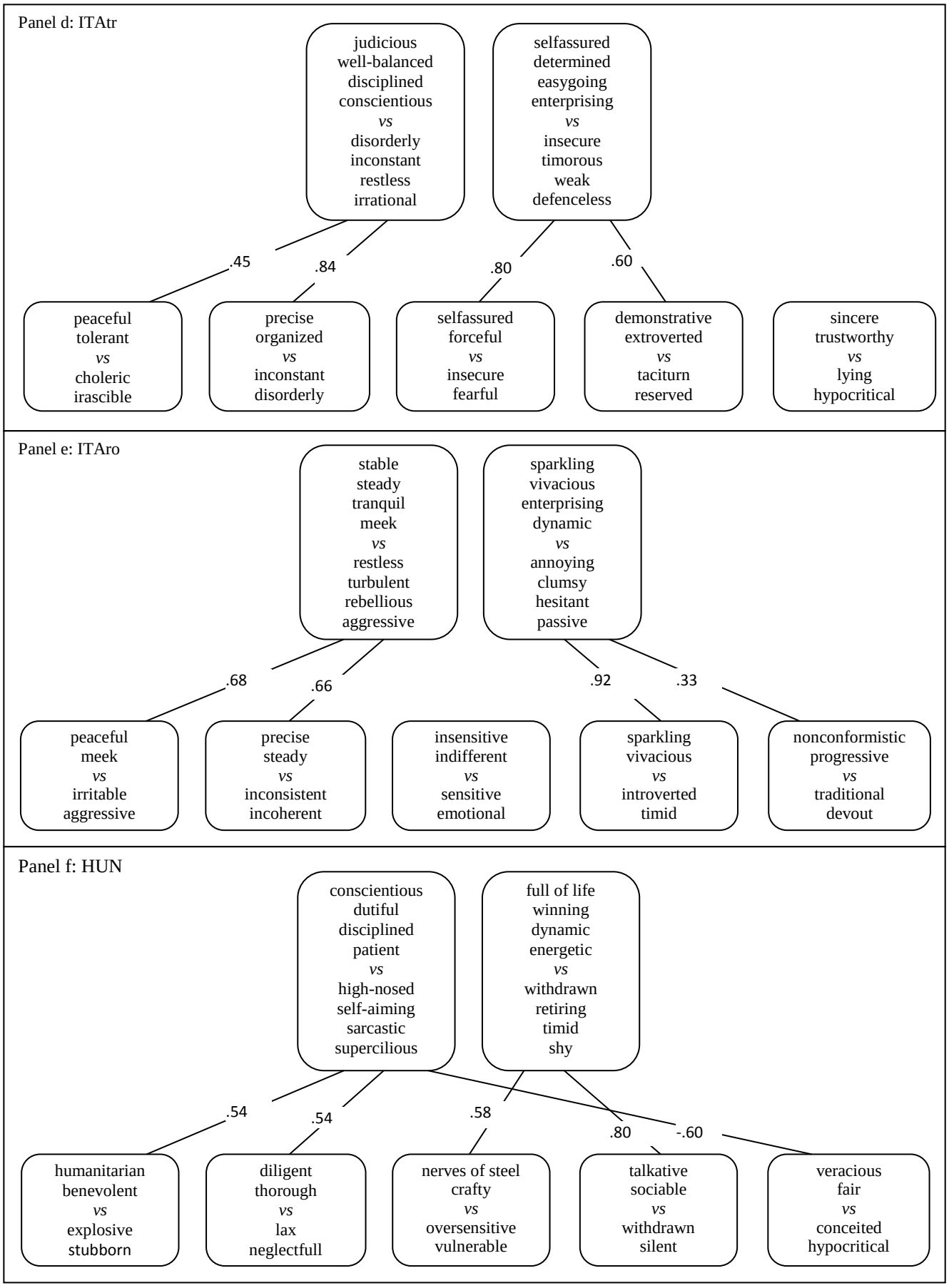

Figure 1. Continued: Hierarchies of two- and five-component solutions in 11 languages (panel d to f).

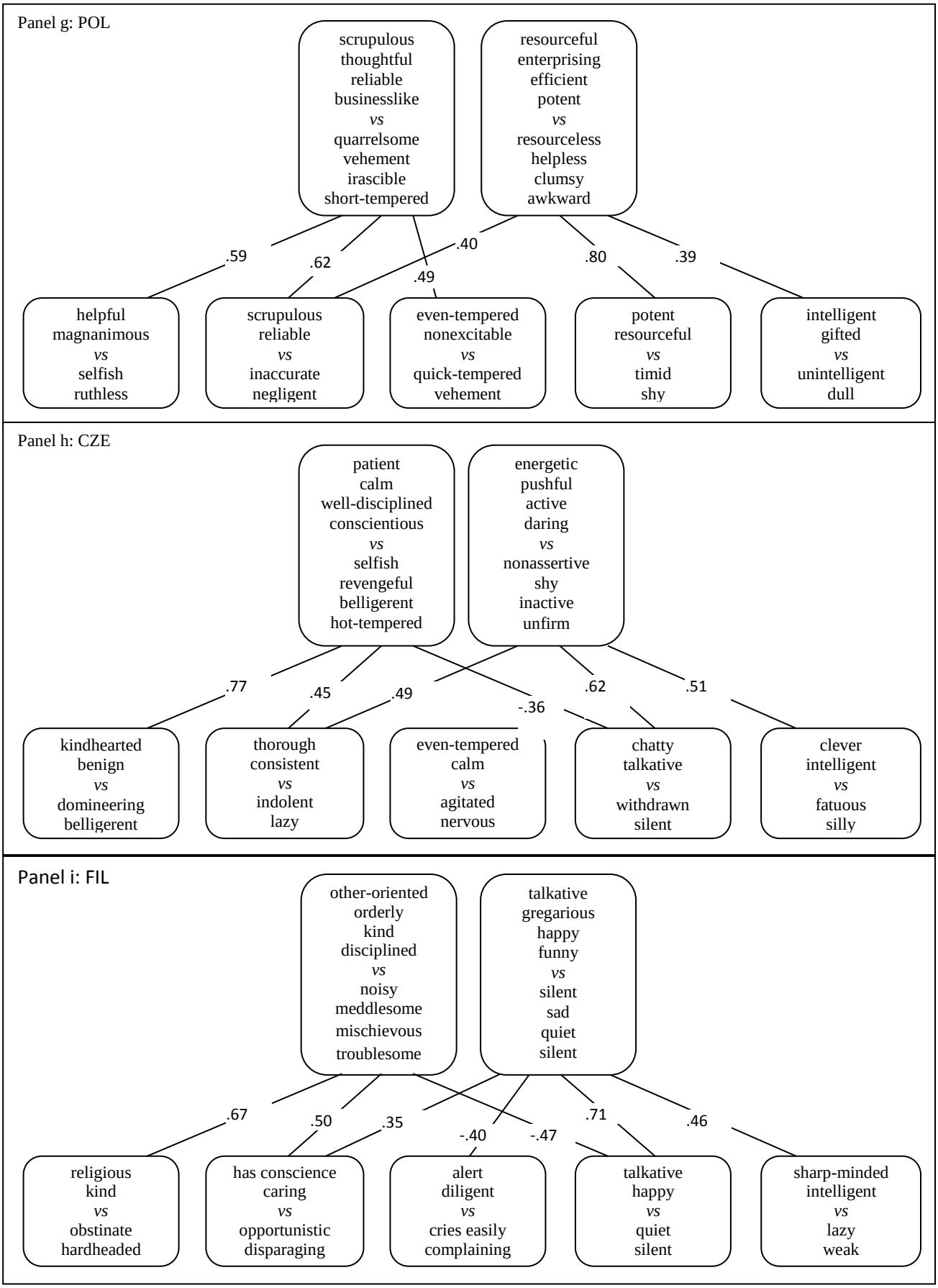

Figure 1. Continued: Hierarchies of two- and five-component solutions in 11 languages (panel g to i).

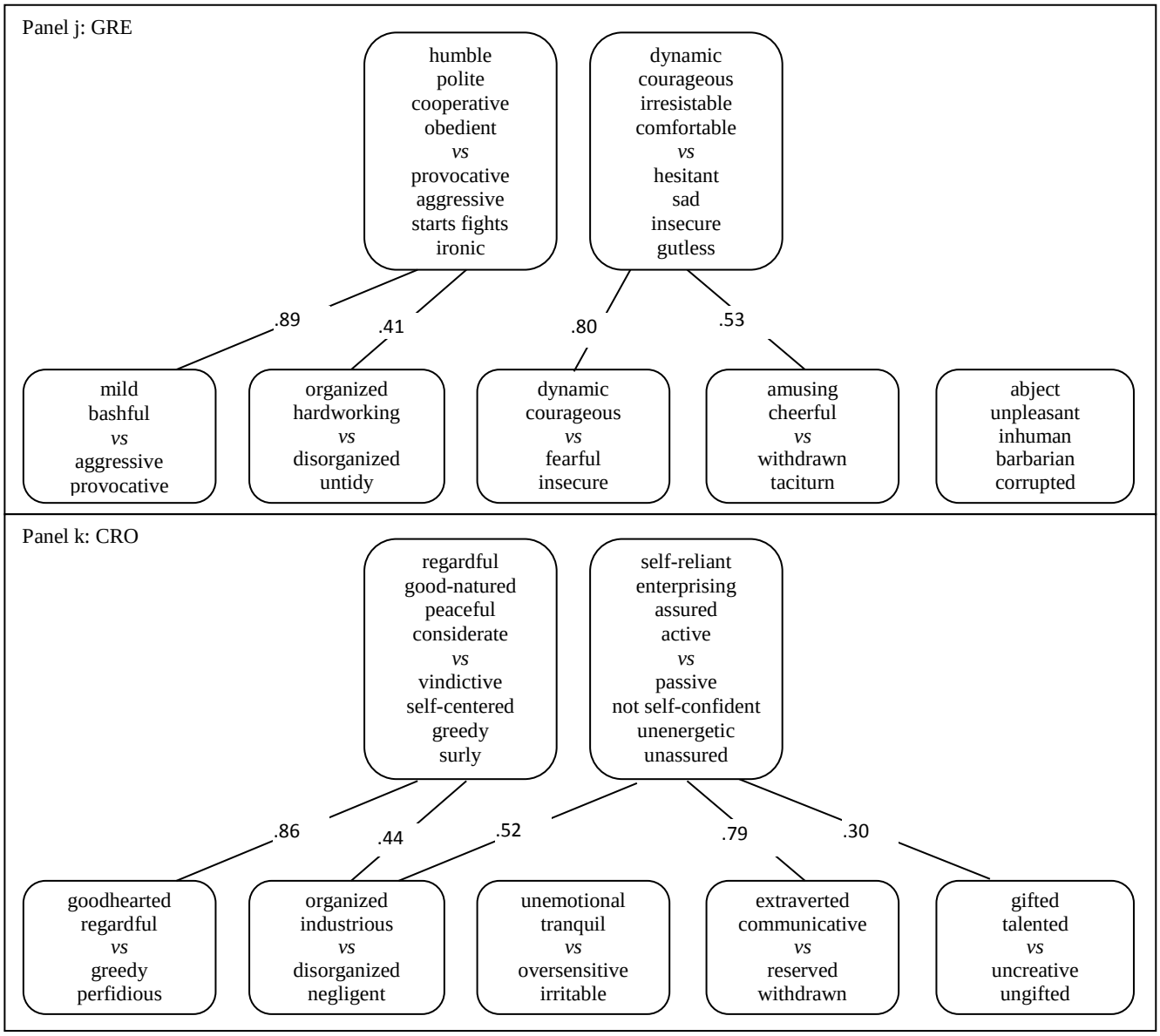

Figure 1. Continued: Hierarchies of two- and five-component solutions in 11 languages (panel j to k).

teristics as opposed to traits conveying pretense and make-belief. The factor showed a trace of Honesty versus Dishonesty, but with a more direct and unswerving tone. Finally, the Greek structure had clear Agreeableness, Conscientiousness, and Extraversion components, a Negative Valence component, and a component called Confidence, representing traits like *dynamic*, *inventive*, *optimistic*, and *determined*, versus traits like *fearful*, *insecure*, and *pessimistic*.

Subsequently, each set of five components was again factor-analyzed, extracting two components, this time again followed by varimax rotation. The resulting 11 loading matrices of 5 (rows) by 2 (columns), together with the corresponding Digman findings from Table 1, are represented in Figure 2, using the pairs of loadings for each of the components factors as coordinate values.

Taking into account that not all five-component structures were good representations of the Big Five, and that all five-component structures were based on different sets of trait-variables, Figure 2 provides good indications that one higher-order component, plotted as the horizontal dimension "Alpha/Affiliation", is most typically characterized by Agreeableness and Conscientiousness, and the other higher-order component, the vertical dimension "Beta/Dynamism" is most typically characterized by Extraversion and Intellect. Emotional Stability loaded in about half of the cases highest on the one higher-order component and in about half of the cases on the other higher-order component, while in a few cases it loaded substantially on both.

Confirmatory approach to test Digman's model: 11 tests

Next, the eleven sets of Oblimin rotated five components were subjected to a CFA, using the Digman findings presented in Table 1 as the model to be tested (that is, two higher order factors). The CFA was conducted in Lisrel. The results are presented in Table 4 (Individual data sets). RMSEA values of .06 or less can be interpreted as indicative of good model fit, as are CFI values of .95 or higher (Hu & Bentler, 1999). The RMSEA values were moderate to good

Table 4. Summary of CFAs per individual structure and for the joint structure

	X^2 (4)	RMSEA	90% CI	CFI
Individual data sets:				
Dutch	11.07	0.05	0.02-0.09	0.82
German	1.59	0.00	0.00-0.05	1.00
Italian (Trieste)	9.04	0.06	0.00-0.11	0.79
Italian (Rome)	11.41	0.04	0.02-0.08	0.88
Hungarian	8.54	0.05	0.00-0.10	0.85
Polish	9.49	0.05	0.01-0.08	0.95
Czech	6.38	0.04	0.00-0.09	0.97
Filipino	18.81	0.07	0.04-0.10	0.90
Greek	30.21	0.08	0.05-0.11	0.81
Croatian	8.24	0.05	0.00-0.09	0.94
English	7.41	0.04	0.00-0.08	0.86
Joint data set:	132.37	0.067		0.95

Note: RMSEA=Root Mean Square Error of Approximation; CFI=Comparative Fit Index; CI=Confidence Interval

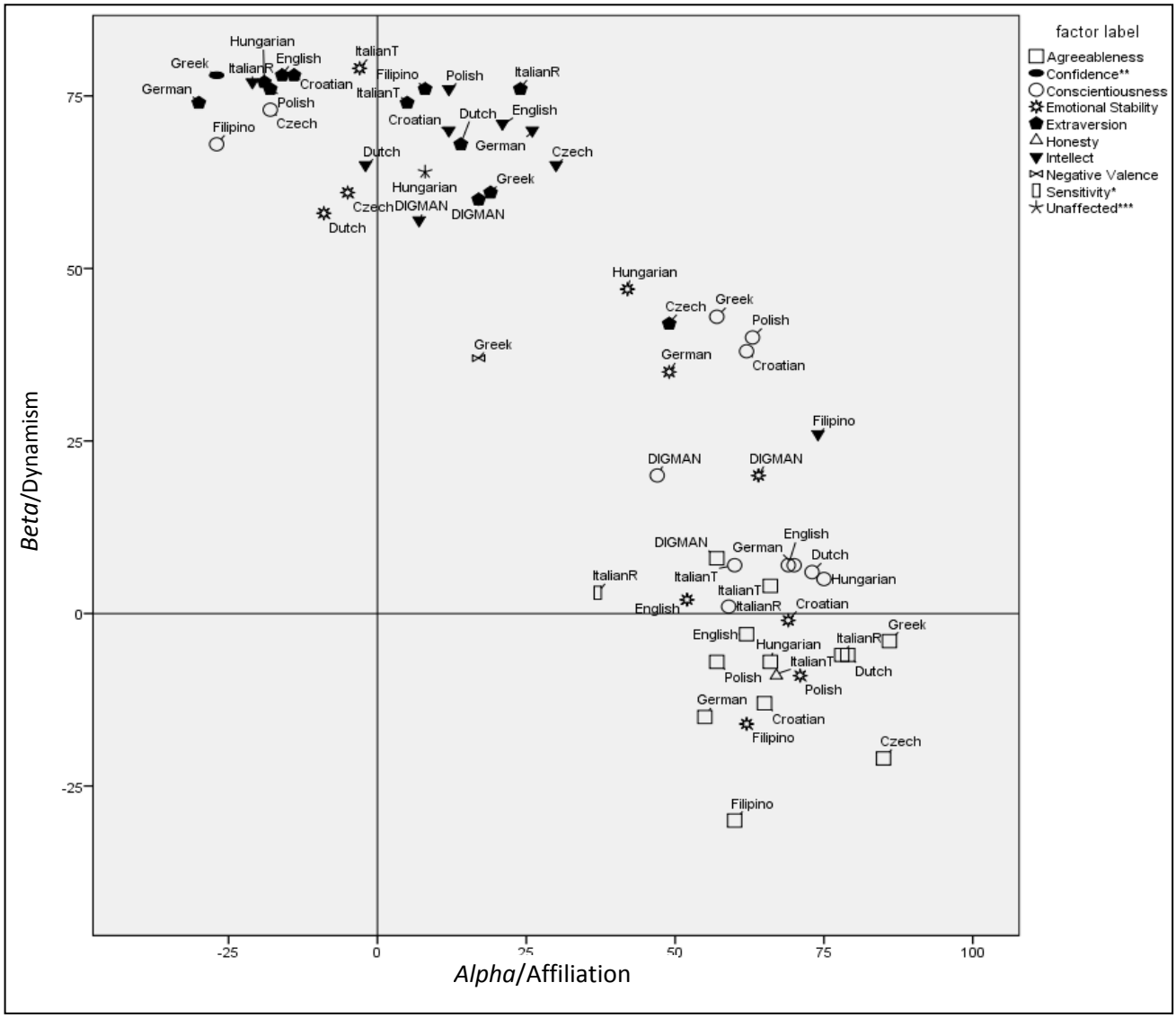

Figure 2. Plot of higher order components of eleven five-component structures and of Digman's higher order factors

Table 5. Two-component results based on the joint data-set

Factor 1: Alpha/Affiliation	
+	solid, disciplined, tranquil, peace-loving, patient, sober, mild-tempered, good-natured, considerate, humane, gentle, mild, obedient, responsible, well-balanced, conscientious, dutiful, sedulous, veracious, careful, kind, moral, polite, decent, serene/quiet, tolerant, humble, well-intentioned, reasonable, understanding, businesslike, deep-good, stable, kindhearted, respectful, cooperative, helpful, modest, faithful, hard-working, even-tempered, honest, calm, sincere, moderate, fair, upright, sensible, reliable, prudent, willing, forgiving, soft-hearted, charitable, loyal, virtuous, steady, diligent, courteous, respectful, cautious, nice/good, trustworthy, quiet, dependable, meek, thorough, ethical, tactful, unaggressive, just, attentive, noble, warmhearted
-	rapacious, short-tempered, mutinous, vehement, quarrelsome, domineering, bigmouthed, hotheaded, uncontrolled, egotistical, obstinate, abrupt, self-interested, boastful, quick-tempered, choleric, conceited, show-off , immoderate, bossy, aggressive, rebellious, hard-headed, chaotic, disobedient, reckless, overbearing
Factor 2: Beta/Dynamism	
+	assured, dynamic, winning, enterprising, self-confident, energetic, goal-oriented, vigorous, active, qualified, assertive, fast, determined, vivacious, witty, loquacious, resolute, strong, brisk, nimble, decisive, aspiring, courageous, adroit, bold, capable, perspicacious, sociable, lively, expert, perseverant, extroverted, brave, agile, firm, temperamental, productive, serene/quiet, quick, purposeful, combative, merry, optimistic, eloquent, resourceful, cheerful, valiant, knowledgeable, communicative, exuberant, charismatic, spirited, intrepid, efficient
-	insecure, hesitating, closed, shy, unenergetic, timorous, depressed, passive, sad, untalented, pessimistic, taciturn, timid, withdrawn, diffident, un-talkative, self-pitying, fearful, cowardly, inactive, unskillful, awkward, unimaginative, fragile/delicate, uncommunicative, timid, fainthearted, introverted, half-hearted, irresolute, boring, sedentary, silent, melancholic, weak, reserved, coward, slow, inefficient, inhibited, silent, bashful, ungifted, gawky, unsociable, weak, clumsy, moaning, negativistic, unwise, pessimistic, unspontaneous, ineffective, somber, anxious

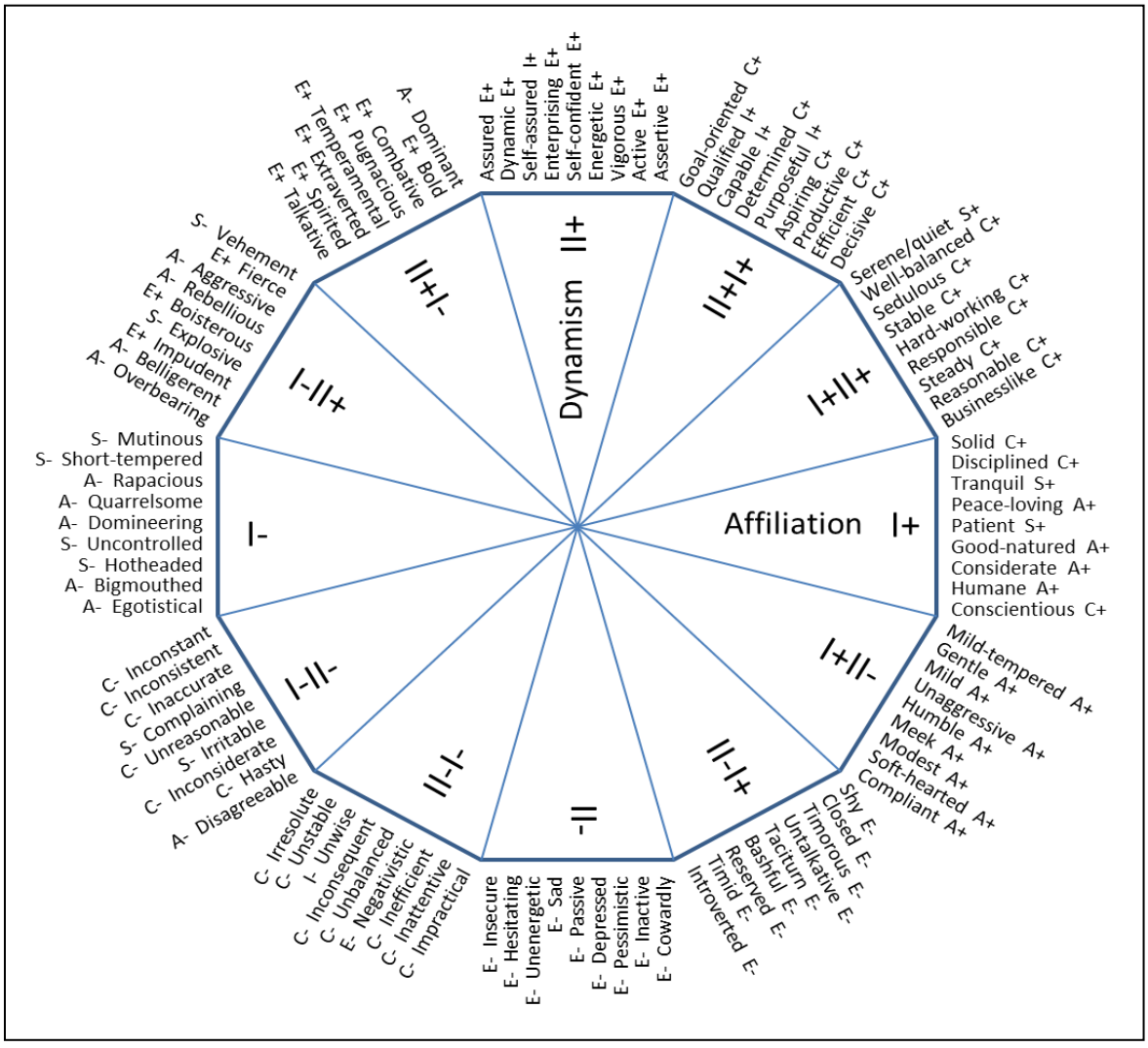

Figure 3. Circumplex of SCA with two components (The capital letters E, A, C, ES, & I represent Big Five.

in all 11 samples, with the weakest results for Italian-Trieste, Greek, and Filipino. Of the CFI's, five were greater than .90, with the German CFI reaching a value of 1.0. The lowest CFI's were found for the Triestan, Greek, and Dutch data sets (values between 0.79 and 0.82). This means that the confirmatory analyses supported the Digman model in some, but not all data sets. It must be noted, however, that the five components that were used per data set for the CFA's, were not all the same, nor were all equivalent to those reported in the Digman model. More specifically, there were variations between countries in the meaning of the five components. A way to solve this incompatibility would be to estimate joint components that are equivalent across data sets.

RESULTS BASED ON A JOINT DATA-SET

The joint data set was used to find the structure that is common to the various taxonomies. To find the kernel structure that is common to the various taxonomies that are part of this joint data set, Simultaneous Components Analysis (SCA) was applied, an analysis indeed particularly adequate in finding the common structure across different data sets that share the same variables. The differences in variability across the various taxonomies were removed, so that the joint analysis was done on the common correlation structure. Of the different variants of SCA (see, De Roover, Ceulemans, & Timmerman, 2012; Kiers & ten Berge, 1994; Timmerman & Kiers, 2003), here the SCA-ECP version was used, the SCA with equal cross-products. A problem with applying this procedure to the joint data set is that a substantial amount of variables is lacking for specific data sets. In the SCA-ECP analysis, iterative imputation (De Roover et al., 2012) was used to deal with the missing data (for more details on this procedure and on the application of the SCA-ECP, see De Raad et al., 2014).

Two-component and five-component results from the joint data-set (SCA)

Both two components and five components were extracted and varimax rotated. Of the two-component solution, trait variables with loadings of |.40| or higher are given in Table 5; repetitions of the same trait-terms were removed. The table provides a rich vocabulary of the Alpha/Affiliation and Beta/Dynamism related factors, each conveying a mix of different Big Five traits. The five-component solution is a fair version of the Big Five. Selections of the highest loading terms on the five components are given in Figure 4.

For a more articulate view of the Big Five origin of the traits that define the two components, but also of the faceted structure of the two-dimensional solution, the five-component results were used. In Figure 3 a circumplex representation is presented of the two dimensions with trait terms depicted on the basis of the pairs of loadings on the two components as coordinate values and placed at unit length from the origin. Each trait is provided with a letter code of the Big Five component on which it has the highest loading.

The segments II+I-, II+, II+I+ and their opposites predominantly represent Beta/Dynamism or agentic traits, mainly E, but also I and some C. The segments I+II+, I+, I+II- and their opposites predominantly represent traits of Alpha/Affiliation or communion, mainly A, C, and some ES.

Table 6. Higher-order components of the Big Five, joint data set

	Alpha/Affiliation	Beta/Dynamism
Extraversion	08	**79**
Agreeableness	**71**	19
Conscientiousness	**76**	30
Emotional Stability	**62**	04
Intellect	14	**83**

Hierarchy of two- and five-component results (SCA)

In Figure 4 the hierarchical relations between the two solutions, with two and with five components, are shown. The components are coded by a two-digit number; the factor 53 (*organized*, *sedulous*, etc.), for example, is the third component of the five-component solution. The hierarchy confirms the representation in the circumplex of Figure 3, with component 21 relating to A (51), C (53), and to a lesser extent to ES (54), and with component 22 relating to E (52), I (55), and to a lesser extent to C.

Second-order factoring of five-component structure

In order to follow again more closely the Digman procedure, next the five SCA components were rotated according to oblimin (delta: 0), so that the resulting factor scores could be used to conduct a PCA. The PCA, in turn, was used to extract two components, which were varimax rotated. The resulting sets of loadings are given in Table 6. The pattern of loadings was very much the same as the Digman results. Congruencies were calculated between the two pairs of factors/components presented in Table 1 and Table 6; the congruencies were 0.96 and 0.85, and after rotation of the present two components to the Digman structure, the congruencies were 0.99 and 0.95 respectively, thus indicating a rather perfect replication of the Digman findings (cf., Haven & Ten Berge, 1977; Lorenzo-Seva & Ten Berge, 2006).

Confirmatory approach to test Digman's model: Joint data

The oblimin rotated SCA five-component solution was subjected to CFA using the Digman findings presented in Table 1 as the model to be tested. The results are presented in Table 4 (Joint data set). The fit of the model to the data was good, for both the Comparative Fit Index and the RMSEA.

DISCUSSION

General findings

This paper took the Big Two model, distinguishing agentic or dynamic traits (Beta/Dynamism) from communal or affiliative traits (Alpha/Affiliation), as a point of reference. We checked the validity of that model in various ways such as exploratory analyses, confirmatory analyses, and hierar-

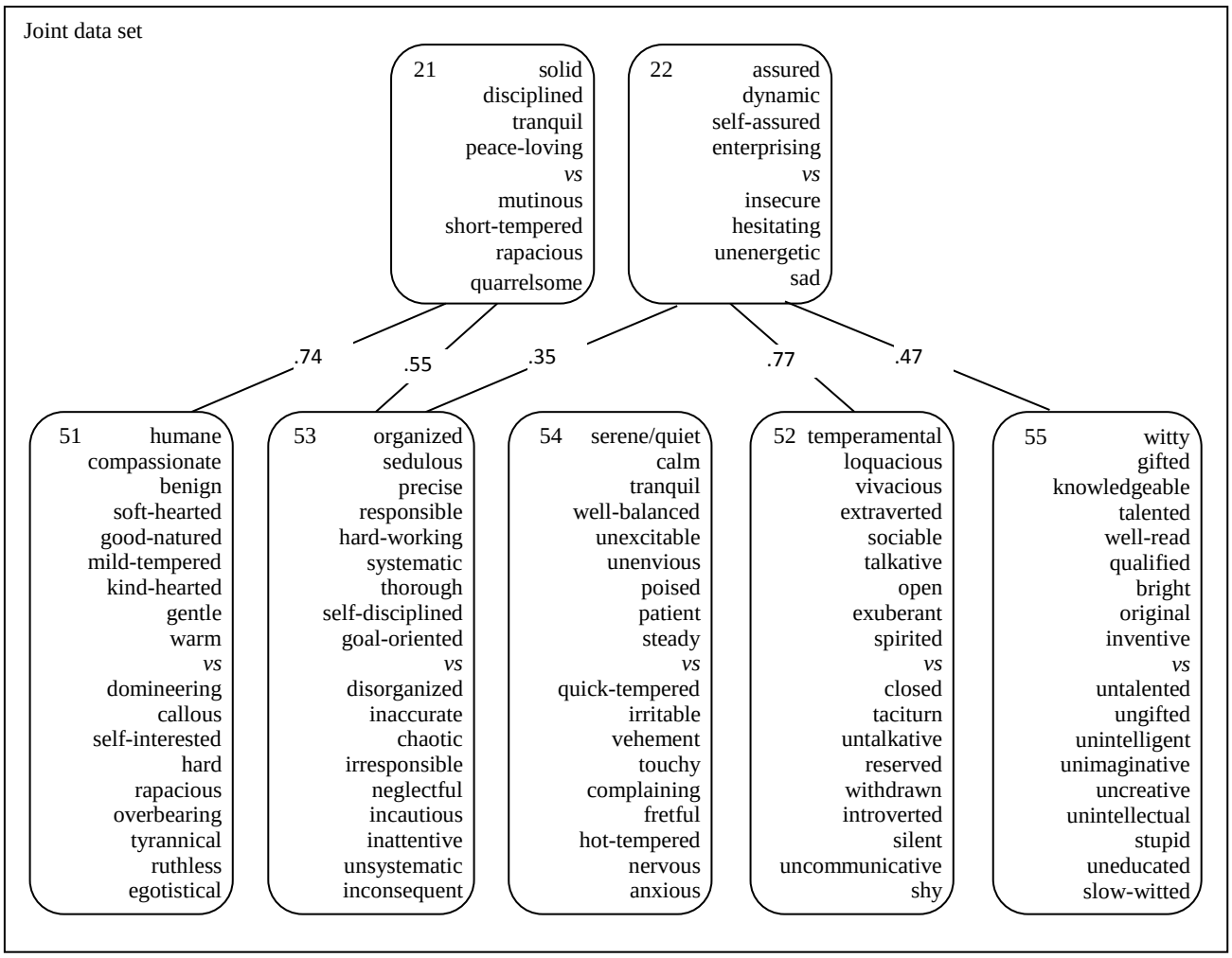

Figure 4. Hierarchy of two- and five-component solutions based on the joint data set

chical orderings of factors, using data from eleven independently constructed trait-taxonomies. We used full trait-taxonomies from eleven different languages or cultures. We analyzed both the eleven separate taxonomies and a joint data set based on trait terms that are shared by those taxonomies.

The analyses of the separate studies, in reference to the Big Two model, virtually without exception formed expressions of the distinction between Beta/dynamism-agency and Alpha/Affiliation-communion at the level of two-component solutions. The eleven hierarchies of five and two components, however, showed that the five components did not consistently contribute in the same way to the two components: A, C, and E did, and to a lesser extent also I, but ES did not; of the seven correlations of |.30| or higher, five were with Beta/Dynamism, and not with Alpha/Affiliation as expected according to the Big Two model.

It should be noted that the five-component solutions were not always typical of the Big Five, with the clearest exceptions being the structures for Italian-Triestean, Hungarian, and Greek. Most consistent were the substantial relations between the Alpha/Affiliation and Beta/Dynamism of the two-solutions and the Agreeableness components and Extraversion components of the five-solutions, which finding corroborated the kernel traits of the components of the two-solutions. The higher-order factoring of the five-factor solutions supported this result: the eleven higher-order components consistently related to Agreeableness and Extraversion from the five-solutions. Also the confirmatory approach generally agreed with these results.

The analyses of the joint data set had the great advantage of the possibility to focus on common kernel characteristics across the 11 individual data sets. The two-component SCA solution provided a clear view on the Alpha/Affiliation and Beta/Dynamism vocabularies with a circumplex presentation showing twelve distinct segments in which adjacent segments were closest in meaning and in which opposite segments represented indeed opposite meanings. The two- and five-component SCA hierarchy tells that the Alpha/Affiliation factor was mainly determined by Agreeableness and Conscientiousness traits, and to a small extent also by Emotional Stability. The Beta/Dynamism factor was mainly determined by Extraversion and Intellect traits. This hierarchy confirmed the hierarchy in the Digman model. Both the second-order factoring and the confirmatory approach, following Digman's route most closely, also again clearly confirmed the model presented by Digman. The rather weak role of Emotional Stability contrasts sharply with its historical prominence. This is possibly due to the fact that natural language as the resource for lexical studies may be less satiated with relevant traits as compared to the rich variety of terms developed in clinical contexts (see also De Raad et al.,

2010). In this regard, in their 1999 chapter, John and Srivastava observed that "English has few adjectives denoting emotional stability" (p. 131).

In sum, the findings give a firm underlining of the two-factor distinction with Dynamic or Agentic and Affiliative or Communal characteristics. The contribution of the Big Five factors to these two basics is on average according to the expected configuration, and from language to language the contributions of Big Five Extraversion and Big Five Agreeableness are stable, but the contributions of the other Big Five factors vary.

Restrictions

Problems with this type of research reside in the restrictions by which each of the input taxonomies is characterized and in the way of connecting those taxonomies. The different trait taxonomies have each been performed according to somewhat different rules, which forms an obstacle for a fair and detailed comparison. The sets of trait-variables used differ from language to language, in number and in content. As a result, the factor structures, both with two factors and with five factors, differ. The translations of the trait-variables into English have been done by different people in different contexts and with varying levels of success. Yet, considering all those differences, the resulting two- and five- factorial structures are almost surprisingly close in contents.

One shortcoming of this research is the coverage of languages, with nine languages from European origin, one American and one Filipino. The results have to be placed in that context. Yet, there are good reasons to believe that the final results can be confirmed in many other languages around the world. Along different lines, Saucier et al. (2014) extended the usefulness of the two-factor model to Chinese and Korean, and to two African languages (Maasai & Senoufo).

Relevance and further research

As noted in the introductory sections of this manuscript, the cross-culturally replicable two-factor structure can serve as a basis for multiple explanations. This may run from neurobiological contexts to the fields of mate-selection. DeYoung (2006; 2010; 2013) studied neuro-bio-physiological underpinnings of Stability and Plasticity. In a study by Adler (2012) it was confirmed that Agency is related to mental health and that changes of Agency narratives are positively related to improvements during therapy. Moroń (2015) investigated mate preferences with respect to agentic and communal characteristics in a partner, and found for example, that women showed higher expectations than men with respect to these two factors in a potential partner. In a study using parental ratings of children, Di Blas (2007) gave evidence that such ratings could well be summarized in two dimensions described as Dynamism and Social Appropriateness. Since their inception in the work of Bakan (1966), the Big-Two factors have proven useful in various fields of social psychology. A whole issue of Social Psychology has been devoted to those factors in social judgment (Abele & Wojciszke, 2013), covering themes such as structure, social perception (Cislak, 2013; Radkiewicz et al., 2013), self-esteem (Wojciszke & Sobiczewska, 2013), self-evaluation (Bi et al., 2013), gender roles (De Lemus et al., 2013), identity dimensions (Siman Tov-Nachlieli et al, 2013) and political communication (Bertolotti et al., 2013), among others.

Apart from its relevance in various fields of theorizing and application in the different disciplines of psychology, the Big Two model is central to a set of related models of which the specifications of the relations and of the substance are vital in the foundation of a cross-culturally valid structuring of important traits. Those related models include the Big One (Hofstee, 2001; Musek, 2007), of which the interpretation seems to vary (e.g., Dunkel & Van der Linden, 2014; Saucier, 2014; Hofstee, 2003). Hofstee (2003) suggested to define the Big One as the individual's desirability, reflecting "the extent to which an individual is assessed to have desirable versus undesirably qualities" (p. 249). There is also discussion on its relevance (e.g., Musek, 2007: Rushton & Irwing, 2008; Muncer, 2011; Revelle & Wilt, 2013), and on its position in the hierarchy of traits (Strus et al., 2014). The set of models referred to also includes the Big Three (De Raad et al, 2010; 2014), possibly the trait structure with the highest form of differentiation across the many languages and cultures of the world. It is crucial for the understanding and advancement of cross-cultural personality structure to specify the trait contents and the relations within this triangle of factors. Part of this further specification can be found in the discussion on the relations between Agency and Communion (e.g., Leonard, 1997) and the distinctions among these two concepts and unmitigated Agency and unmitigated Communion (e.g., Ghaed & Gallo, 2006; Helgeson & Fritz, 1999).

The findings in this study are in need of further testing in a fair representation of languages or language-families not yet covered in psycho-lexical studies, in some branches of Indo-European languages, but especially outside the confines of the Indo-European languages, such as those belonging to the Niger-Congo, Sino-Tibetan, and Austronesian language-families. This is what Goldberg (2008) referred to as the "next big challenge" for the psycho-lexical approach. It is not to be expected that a final and universal, canonical trait structure will be revealed. Each new language adds its own peculiarities to the international trait-vocabulary and it is impossible to study trait-structure in all languages. It is, however, possible to reach a certain level of consensus, and we expect that the chances to reach such consensus are greatly enhanced by focusing on a small set of two or three dimensions. Part of endeavor is a further study of the two factors in relation to the Primordial One, the Three-factor model, and the Big Five.

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