

Only Three Factors of Personality Description Are Fully Replicable Across Languages: A Comparison of 14 Trait Taxonomies

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We tested the hypothesis that only 3 factors of personality description are replicable across many different languages if they are independently derived by a psycholexical approach. Our test was based on 14 trait taxonomies from 12 different languages. Factors were compared at each level of factor extraction with solutions with 1 to 6 factors. The 294 factors in the comparisons were identified using sets of markers of the 6-factor model by correlating the marker scales with the factors. The factor structures were pairwise compared in each case on the basis of the common variables that define the 2 sets of factors. Congruence coefficients were calculated between the varimax rotated structures after Procrustes rotation, where each structure in turn served as a target to which all other structures were rotated. On the basis of average congruence coefficients of all 91 comparisons, we conclude that factor solutions with 3 factors on average are replicable across languages; solutions with more factors are not.

Keywords: trait taxonomy, cross-cultural replicability, lexical approach to personality

One of the recurrent issues in the psycholexical approach to personality structure is the replicability of personality factors across languages. Internationally, consensus has grown over some of the most fundamental dimensions by which traits can be described (cf. De Raad, 2000; De Raad & Peabody, 2005). Although the Big Five factors—Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Intellect (Goldberg, 1981,

1990)—have built an international reputation for their usefulness in diverse contexts of research and application, it has been argued (De Raad & Peabody, 2005; Di Blas & Forzi, 1999) that a smaller number of three or four trait factors has a better chance of meeting criteria of cross-cultural generality and coherence. Claims for more than five factors have been made as well. Using a so-called “nonrestrictive” approach with respect to selecting personality

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The participation of Martina Hřebíčková is supported by Research Plan AV0Z0250504 of the Institute of Psychology, Academy of Sciences of the Czech Republic, and by Grant 406/07/1561 from the Grant Agency of the Czech Republic. The participation of Boris Mlačić is supported by Grant 194-1941558-1530 from the Ministry of Science, Education, and Sports in Croatia. The Filipino lexical studies were supported by Grant MH47343 from the National Institute of Mental Health.

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descriptors, Almagor, Tellegen, and Waller (1995) produced a Big Seven model that included versions of some of the Big Five factors and two additional factors called Negative Valence (e.g., *dangerous*, *vicious*, *malicious*, *cruel*, *maladjusted*, and *treacherous*) and Positive Valence (e.g., *refined*, *noble*, *sophisticated*, *brilliant*, *original*, and *captivating*; cf. Benet & Waller, 1995). Recently, a strong claim has been made favoring a six-factor structure, including the Big Five or versions of the Big Five and an additional sixth factor called Honesty-Humility (Ashton, Lee, Perugini, et al., 2004; Lee & Ashton, 2008). This Honesty-Humility factor is represented in such traits as *honest*, *sincere*, *fair*, and *just* versus *dishonest*, *conceited*, and *boasting*.

The suggestion that dimensions beyond the Big Five are cross-culturally tenable is at odds with earlier findings indicating that the Big Five factors are not all cross-culturally replicable (De Raad & Peabody, 2005; De Raad, Perugini, Hřebíčková, & Szarota, 1998; De Raad, Perugini, & Szirmák, 1997; Hofstee, Kiers, De Raad, Goldberg, & Ostendorf, 1997; Peabody & De Raad, 2002). In this article, we investigate the cross-cultural tenability and replicability of factor structures with one to six factors, using two procedures: a quantitative, psychometric procedure and a systematic, content-based factor-identification procedure.

The cross-cultural studies on psycholexical data have thus far been performed on varying sets of available published data. All cross-cultural studies mentioned in this article are presented in Table 1, together with an index (+) of the data-sets involved. Saucier, Hampson, and Goldberg (2000) reviewed all of the studies mentioned in Table 1 and in addition described lexical work in Russian (e.g., Shmelyov & Pokhil'ko, 1993). One of their conclusions was that structures with one, two, or three factors may be more generalizable cross-culturally than Big Five structures. We expect that there is a bigger chance for a factor structure with three factors to be tenable across languages than a structure with more than three factors.

One of the central goals of the psycholexical approach is to arrive at a common language of personality description, and that promise has been partly fulfilled. Although John (1990) summarized that researchers and assessors were “faced with a bewildering array of personality scales from which to choose, with little guidance and no overall rationale at hand” (p. 66), progress in psycholexical studies has geared the personality field toward taking the Big Five model as the main medium for discussing personality (cf. De Raad & Perugini, 2002). Nevertheless, the psycholexical approach and the Big Five model as its main spin-off have been the subject of serious criticisms, such as regarding its insufficiency in covering and representing the trait domain (e.g., Almagor et al., 1995; Ashton & Lee, 2001; cf. De Raad & Barelds, 2008) and its lack of universality (e.g., De Raad & Peabody, 2005; De Raad, Perugini, et al., 1998; Peabody & De Raad, 2002). These two issues form opposing forces operating under the law of diminishing returns. Striving toward full coverage of the trait domain by increasing the number of factors increases the chance of nonreplicability of such additional factors across languages.

According to Tellegen and Waller (1987), the Big Five do not fully capture the language of personality because most psycholexical studies precluded the emergence of certain dimensions—in particular because evaluative terms and state terms had usually been excluded. After applying a more liberal approach in selecting terms from the English lexicon, Tellegen and Waller produced a

Table 1
Psycholexically Based Cross-Cultural Studies

| Study | English-1 | Dutch | German | Italian | | Hungarian | Polish | Czech | Filipino | Korean | French | Greek | Croatian | English-2 | Turkish | Spanish | Hebrew |
|--------------------------------------|-----------|-------|--------|---------|------|-----------|--------|-------|----------|--------|--------|-------|----------|-----------|---------|---------|--------|
| | | | | (Tr) | (Ro) | | | | | | | | | | | | |
| Hofstee et al. (1997) | + | + | + | | | | | | | | | | | | | | |
| De Raad et al. (1997) | + | + | + | + | + | + | + | | | | | | | | | | |
| De Raad, Perugini, et al. (1998) | + | + | + | + | + | + | + | | | | | | | | | | |
| Peabody & De Raad (2002) | (+) | + | (+) | + | + | + | + | + | | (+) | (+) | | | | (+) | (+) | (+) |
| Ashton, Lee, Perugini, et al. (2004) | (+) | + | + | + | + | + | + | + | | (+) | (+) | | | | (+) | | |
| De Raad & Peabody (2005) | (+) | + | + | + | + | + | + | + | | (+) | (+) | | | | (+) | | |
| Present study | + | + | + | + | + | + | + | + | + | + | + | + | + | + | | | |

Note. Tr = Triestean; Ro = Roman. The Peabody & De Raad (2002) and De Raad & Peabody (2005) studies were primarily based on six lexical studies. The studies in parentheses were discussed after the main analyses had been performed. The two English studies refer to different sets of data. While as a rule studies involved both self- and other-ratings when available, the studies used by Ashton, Lee, Perugini, et al. (2004) were all based on self-ratings only. Besides that, some of the Ashton, Lee, Perugini, et al. (2004) studies had a somewhat different reference: The German and Hungarian materials were extracted from published tables; the Italian (Tr) and the Korean studies involved rerotations of two of the six factors.

seven-factor structure on the basis of the ratings on their selected descriptors. That structure was supported by Almagor et al. (1995) and by Benet-Martínez and Waller (1997), who applied the same liberal approach in Hebrew and Spanish, respectively (cf. Saucier, 2003). This liberal Tellegen and Waller approach was accompanied with a dictionary sampling procedure that deviated drastically from the selection procedure followed in most other trait taxonomies. For this reason, no effort was made to include these three studies in the present comparison of factor structures.

De Raad and Szirmák (1994; cf. Szirmák & De Raad, 1994) reported on a six-factor trait structure for Hungarian that included the Big Five and an additional factor called Integrity (with adjectives such as *veracious*, *just*, and *trustworthy* versus *hypocritical*, *swell-headed*, and *greedy*). De Raad and Szirmák tended to understand the occurrence of this factor as an isolated event, possibly related to a political preoccupation in the Hungarian context. A factor with similar contents (called Trustworthiness) was, however, found in Italian by Di Blas and Forzi (1999) and also emerged (as Truthfulness) in Korean (Hahn, Lee, & Ashton, 1999). The repeated occurrence of this additional factor made Ashton, Lee, and Son (2000) propose Honesty (capturing Integrity, Trustworthiness, and Truthfulness) to be the sixth factor of personality. This sixth factor was subsequently observed in French (Boies, Lee, Ashton, Pascal, & Nicol, 2001) and in Dutch, Italian, and Polish (Ashton, Lee, Perugini, et al., 2004).

There are various ways to arrive at an evaluation of the cross-cultural replicability of factors, roughly divided into qualitative procedures and quantitative procedures. The different psycholexical studies with the Big Five as their main product have often been performed with the expectation in mind that five factors would emerge. Such a position easily leads to circular reasoning, where factors are interpreted according to expectations (cf. De Raad & Peabody, 2005). Such a procedure may tend to impose the Big Five structure. The subjective element is often somewhat reduced through the availability of marker variables. If in new factors a certain number of hits of markers of expected constructs is observed, the new factors could be named according to those constructs. The procedures leading to the “generality of the Six-Factor solution” (Ashton, Lee, Perugini, et al., 2004, p. 364) were largely done according to similar qualitative evaluations.

Quantitative, psychometric procedures aimed at establishing similarity of the Big Five factors across languages or cultures have been applied by De Raad, Perugini, et al. (1998, De Raad et al. (1997), and Hofstee et al. (1997). In these studies, congruence coefficients were used to indicate similarity between factors considered nearly identical according to their English translations. It should be mentioned that such quantitative indices of factor similarity themselves require a certain specification of content. Hofstee et al. concluded that the Big Five factors recurred in a relative sense across the three Germanic languages (German, Dutch, English), but the factors did not all recur across the languages according to strict criteria of factor congruence. De Raad et al. (1997) concluded that the first three of the Big Five factors showed replicability across five languages (German, Dutch, English, Hungarian, Italian) and the fourth factor showed replicability in Dutch, Italian, and Hungarian. In De Raad, Perugini, et al. (1998), the American English Big Five structure was used as the target structure with which six other Big Five structures (Dutch, German, Hungarian, Italian, Czech, and Polish) were compared. The gen-

eral message from these studies is consistently that three, or at best four, of the Big Five factors are replicable across languages.

Peabody and De Raad (2002) and De Raad and Peabody (2005) systematically compared the contents from five-factor and three-factor analyses of six European psycholexical studies (Hungarian, Dutch, Polish, Czech, and two Italian studies, one from Rome and one from Trieste). The method involved defining categories of trait terms according to whether they tended to stay together or to split apart in comparisons of five and of three factors across languages. The two studies generally supported the Big Three—Extraversion, Agreeableness, and Conscientiousness—and not the Big Five.

In a study comparing 10 English trait factors (based on self-ratings from American and Australian samples on the 1,710 trait adjectives; see Ashton, Lee, & Goldberg, 2004) and 10 Dutch trait factors (based on self-ratings on 1,203 trait adjectives), Brokken (1978) combined a quantitative, psychometric procedure with a version of the *recaptured-item technique* (RIT), which was introduced by Meehl, Lykken, Schofield, and Tellegen (1971). The RIT was developed to reduce the subjective element in identification of factors. The technique borrows its name from the success with which sets of items loading on certain factors but not used for the factor naming are identified (recaptured) on the basis of the factor names.¹ To enable the psychometric comparison, a common base was constructed by translating the Dutch adjectives into English. The English and Dutch matrices of loadings on 10 factors for a common set of 300 trait adjectives were used for the comparison. Congruence coefficients calculated after rotating the English structure to the Dutch structure suggested two to four similar factors (with coefficients of 0.93, 0.88, 0.79, and 0.78). In addition, sets of trait adjectives representing the 10 Dutch and the 10 English factors were administered to subjects who were asked to match the 10 Dutch sets to the 10 English sets. This judging procedure resulted in an almost perfect match of the first seven factors. The discrepancy between the two to four replicable factors according to psychometric criteria and the seven replicable factors according to intersubjective criteria perfectly exemplifies the different attitudes toward factor recurrence across languages.

In the present study, we follow a route similar to that of Brokken (1978), a combination of a quantitative procedure to establish factor similarity and a version of the RIT to identify factors by evaluating their contents. To put the results in a proper perspective and to produce a baseline for comparison, one- to six-factor solutions based on the same data sets are compared. We compare 14 trait structures from 12 different languages. All these structures have a psycholexical origin. We use congruence coefficients as indicators of factor similarity. In addition, we identify factors by using lists of factor markers and combine the latter with suggestions made by the original authors and by scrutinizing the lists of trait variables loading on the factors. We use markers defining factors of a six-factor solution for all solutions, assuming that the

¹ Meehl et al. (1971) ordered items used in a factor analysis according to their loadings on a factor and split the items into a “naming” set and a “recapture” set by alternatively assigning each next item to one of the two sets. The naming set of items was used for naming the factors; the recapture set was given to judges with the request to match the items to the factor names.

specificity of the six factors is also helpful in identifying the contents of the factors at the various other levels of extraction.

It is the combination of a systematic and transparent nonsubjective procedure to identify factors, the use of psychometric routines to assess factor similarity, and the application of these procedures to almost all published trait taxonomies thus far that is expected to provide a proper context to find out whether indeed a three-factorial trait structure, presumably characterized by Extraversion, Agreeableness, and Emotional Stability, has the best chance to be cross-culturally replicable.

Method

We first briefly describe characteristics of the 14 taxonomies, which vary in several respects, namely in terms of numbers of participants, selection procedures, numbers of trait descriptors, and whether they involve self-ratings and other ratings or only self-ratings. These taxonomic differences could contribute to the differences between the various structures.

Materials

One- to six-factor structures were prepared for each of the 14 taxonomies. Ten taxonomies had been developed in German, Dutch, Hungarian, Polish, Czech, Filipino, Korean, French, Greek, and Croatian, respectively. For both American English and Italian, data of two different taxonomies were used, allowing both cross-language and within-language comparisons of taxonomies. The structures were all based on ipsatized data (standardized per person before the factoring was performed). In all cases principal components analysis was performed, followed by varimax rotation. For all factor loading matrices the lists of variable names, translated into English, were available.

The 14 Taxonomies

The first American English data set (ENG1) was collected by Goldberg (1990) and consisted of ratings from 636 participants on 540 trait adjectives (320 self-ratings; 316 other ratings). The second American English data set (ENG2) consisted of 449 trait adjectives on which self-ratings were available from a sample of 559 participants (Lee & Ashton, 2008). The Dutch data set (DUT) consisted of 551 trait adjectives on which self- and peer ratings were available from a sample of 600 participants (De Raad, Hendriks, & Hofstee, 1992). The German data set (GER) consisted of 430 trait adjectives on which self-ratings were available from a sample of 408 participants (Angleitner et al., 1990; Ostendorf, 1990). The Italian-Triestean data set (ITATr) consisted of 369 trait terms, for which 369 participants provided self-ratings (Di Blas & Forzi, 1999). The Italian-Roman data set (ITARo) comprised 285 adjectives that were provided with self-ratings and peer ratings from 961 participants (Caprara & Perugini, 1994). The Hungarian data set (HUN) comprised only self-ratings from 400 participants on a set of 561 trait adjectives (Szirmák & De Raad, 1994). The Polish data set (POL) consisted of 287 trait adjectives on which 716 participants provided ratings (347 self-ratings and 369 peer ratings; Szarota, 1996). The Czech data set (CZE) consisted of 358 trait adjectives on which 397 participants provided self-ratings (Hřebíčková, 2007). The Filipino data set (FIL) consisted of 405

trait adjectives on which 740 participants provided self-ratings (Church, Reyes, Katigbak, & Grimm, 1997). The Korean data set (KOR) consisted of 406 trait adjectives on which 435 participants provided self-ratings (Hahn et al., 1999). The French data set (FRE) consisted of self-ratings by 418 participants on 388 trait adjectives (Boies et al., 2001). The Greek data set (GRE) consisted of 400 trait adjectives on which 991 participants provided self-ratings (Saucier, Georgiades, Tsaousis, & Goldberg, 2005). The Croatian data set (CRO) consisted of 456 trait adjectives on which 515 participants had provided self-ratings (Mlačić & Ostendorf, 2005).

Identification of 294 Factors

For the comparison of the factors from the one- to six-factor solutions for the 14 trait taxonomies, it is important that they are as much as possible put in an order that corresponds to similarity in meaning. We assumed the logical order to be Extraversion (E), Agreeableness (A), Conscientiousness (C), Emotional Stability (S), Intellect (I), and Honesty-Humility (H). For the majority of the factors it was obvious which trait meanings they captured, but certain apparently corresponding factors were given labels by the original authors in publications on five- and six-factor structures that differed from the list above, and certain other factors seemed to deviate quite drastically from the list above.

Using Factor Markers

In order to arrive at a proper identification of all $14 \times (1 + 2 + 3 + 4 + 5 + 6) = 294$ factors, we followed an elaborate procedure to reduce the subjective element in factor identification. We also made use of the factor interpretations provided by the original authors and of the full sets of traits with absolute loadings ≥ 0.30 for each of the factors. This procedure involved the construction of lists of markers for each of the factors of the six-factor model, which were used as references for the evaluation and identification of all 294 factors. Although the marker scale method has some limitations (see De Raad & Peabody, 2005), it enabled an initial indication of cross-language coherence and replicability of factors.

To develop the lists of markers, Boele De Raad used the six-factor descriptions for seven languages as suggested by Ashton, Lee, Perugini, et al. (2004) as a starting-point. Ashton, Lee, Perugini, et al. had listed a maximum of 12 highest loading terms per factor pole for all factors of the seven structures. The way the markers were selected is of some consequence (De Raad & Peabody, 2005). In the present context, this particularly concerns the way the factor Honesty-Humility is distinguished from Agreeableness. One might follow two lines of reasoning. The first is that Honesty-Humility could be narrowly defined by its typical terms, most of which would be close synonyms of honesty and dishonesty (e.g., *honest, sincere, greedy, unfair*). This is the way Ashton and Lee (2001) defined Honesty. A second is that a broad definition is aimed at, much along the lines suggested by Ashton, Lee, Perugini, et al. In the latter, the Honesty-Humility factor is stretched to include traits hitherto considered typical of Agreeableness (e.g., *altruistic, helpful, modest, arrogant*). Because the latter, more comprising conceptualization was stipulated by Ashton, Lee, Perugini, et al. to have generality across languages, we effectuated this second option.

Trait adjectives that were used two or more times to represent a factor in the seven described languages were listed as possible markers of that factor. In addition, 13 of the 14 present six-factor structures were used to find additional terms (the second American English structure was included after this procedure was completed). We had the $13 \times 6 = 78$ factors represented by 20 terms each, 10 terms per factor pole. Terms that appeared three or more times across the 13 sets representing the six factors were added to the list of possible markers. The resulting list was sent to most of the coauthors with a request to find the 15 best markers for each of the 12 factor poles. Those coauthors were not informed about the final use of the markers. They were instructed to indicate which terms should be removed in case there were more than 15 markers listed per factor pole and which terms should be added in case less than 15 markers were listed. Moreover, they were given the opportunity to suggest better alternatives for the terms already listed. Markers with the most votes from the coauthors were finally chosen; in just three or four cases, subjective decisions were made by Boele De Raad. This procedure resulted in the lists of markers given in the Appendix, totaling 180 distinct markers. Finally, marker scales for each of the six factors were constructed for each of the 14 six-factor structures. Per structure, as many markers as possible from the Appendix were identified in the pertinent trait list and combined to obtain marker scales. The corresponding raw scores for the identified markers were combined to obtain marker scale scores.

Establishing Factor Similarity

Finding matches. For the 12 non-English lists of adjectives, the translations were provided by the authors of the pertaining 12 studies. In those translated lists, certain trait adjectives appeared more than once (different words had the same translation), some had more than one translation, some had no translation, and some translations seemed unintelligible. The pertaining lists with indicated ambiguities were sent back to the authors with a request to suggest the best translations or to give alternative translations. In

some cases, especially with familiar languages, Boele De Raad and Eveline Levert made these decisions themselves.

For each of the $14 \times 13/2 = 91$ pairs of taxonomies, matches were established, namely pairs of trait adjectives that had the same meaning; the criterion for a match was the same word in English. In some cases, additional matches were found by allowing different word forms as matches (e.g., *egoistic-egotistic*, *extroverted-extraverted*), and near synonyms as matches (e.g., *antisocial-asocial*, *shy-timid*). The numbers of matches varied from 73 (FIL-ITArO and FIL-POL) to 309 (ENG1-ENG2), with an average of 134 matches. This average corresponds to 36% of the trait adjectives in the shorter of the two lists in the comparison from which the matches were drawn. Table 2 gives these percentages per pair.

In previous studies in which a similar line of investigation was followed but confined to Big Five results (De Raad, Perugini, et al., 1998; De Raad et al., 1997; Hofstee et al., 1997), the pairwise matches comprised close to 50% of the trait adjectives in the shortest list in each comparison. However, the motivation in those studies was to maximize the number of pairs, a very labor-intensive procedure in which both psychological and semantic considerations played a role. That procedure was to some extent judgmental. In the present study, we aimed at optimizing objectivity by using only the corresponding words after translation. For this reason we considered the percentage of pairwise matches in the present study to be quite acceptable.

Analyses. For the 14 trait taxonomies, the factors at each level of extraction (solutions with one to six factors) were pairwise compared. All comparisons took place using the matching parts of the loading matrices (selected through the common trait adjectives per pair of matrices). Congruence coefficients (Tucker, 1951) were calculated for the pairs of the first unrotated factors and for the pairs of varimax-rotated solutions with two to six factors after orthogonal Procrustes rotations: Each varimax-rotated solution in turn fulfilled the role of target to which all the other solutions were rotated. The reason for using congruencies after target rotations is

Table 2
Percentages of Matches of Trait Adjectives

| Language | ENG1 | ENG2 | DUT | GER | ITAttr | ITArO | HUN | POL | CZE | FIL | KOR | FRE | GRE | CRO |
|--------------|------|------|-----|-----|--------|-------|-----|-----|-----|-----|-----|-----|-----|-----|
| ENG1 (540) | — | | | | | | | | | | | | | |
| ENG2 (449) | 69 | — | | | | | | | | | | | | |
| DUT (551) | 51 | 51 | — | | | | | | | | | | | |
| GER (430) | 44 | 37 | 45 | — | | | | | | | | | | |
| ITAttr (369) | 46 | 44 | 43 | 32 | — | | | | | | | | | |
| ITArO (285) | 55 | 48 | 52 | 33 | 42 | — | | | | | | | | |
| HUN (561) | 34 | 41 | 36 | 37 | 41 | 39 | — | | | | | | | |
| POL (287) | 41 | 38 | 42 | 37 | 33 | 26 | 38 | — | | | | | | |
| CZE (358) | 44 | 37 | 39 | 32 | 36 | 32 | 35 | 39 | — | | | | | |
| FIL (405) | 31 | 32 | 30 | 22 | 26 | 26 | 27 | 25 | 22 | — | | | | |
| KOR (406) | 35 | 36 | 31 | 25 | 29 | 31 | 27 | 27 | 25 | 20 | — | | | |
| FRE (388) | 51 | 51 | 44 | 30 | 41 | 46 | 36 | 28 | 29 | 27 | 32 | — | | |
| GRE (400) | 36 | 41 | 37 | 22 | 35 | 37 | 32 | 30 | 27 | 21 | 25 | 31 | — | |
| CRO (456) | 46 | 42 | 42 | 35 | 38 | 39 | 38 | 45 | 41 | 28 | 31 | 36 | 28 | — |

Note. The numbers in parentheses in the stub represent the numbers of trait adjectives available for the pertaining languages; the relatively small percentage of matches for the two Italian studies is due to the fact that English translations were used, and certain Italian words ended up with different translations. ENG = English; DUT = Dutch; GER = German; ITAttr = Italian-Triestean; ITArO = Italian-Roman; HUN = Hungarian; POL = Polish; CZE = Czech; FIL = Filipino; KOR = Korean; FRE = French; GRE = Greek; CRO = Croatian.

as follows: The taxonomies differ in numbers of trait words to cover the various facets in the trait domain. These varying trait densities codetermine the emphases in the different trait structures—more on certain trait areas and less on others. This may lead to a distortion of a taxonomic trait structure relative to another. Such relative distortions are expected to be directly visible in suboptimal congruence coefficients, and target rotations are expected to compensate for such distortions. Through the above procedure, information was obtained on the degree to which configurations in the one taxonomy accommodate the configurations in all other taxonomies.

The literature mentions congruence coefficients with a high of 0.90 to a low of 0.80 as thresholds below which factors are not considered identical (Haven & Ten Berge, 1977; Horn, Wanberg, & Appel, 1973; Lorenzo-Seva & Ten Berge, 2006; Mulaik, 1972; Van de Vijver & Leung, 1997). In the present study, the congruence coefficients are likely to be attenuated by differences in taxonomic procedures, by imperfect translations of trait adjectives, and most important, by the fact that the factors from the different taxonomies are not based on the same trait variables. This is an unusual situation that is dealt with here by restricting the congruence calculations to those parts of the loading matrices in the comparison for which the trait variables turned out to have the same translations in English (i.e., about a third of the trait adjectives in the various comparisons). For these reasons, we considered it justifiable to accept the lower congruence threshold of 0.80.

As a contrast, it is of interest to see what level congruence coefficients might reach by chance (cf. Barrett, Petrides, Eysenck, & Eysenck, 1998). For that purpose, we selected 10 pairs of taxonomies, such that almost all taxonomies (12 in fact) were used once or twice. For each pair, we selected the parts of the matrices corresponding to the alphabetical first parts of the variable list with numbers equal to the matching numbers in Table 2. Congruencies were calculated in the same manner. The average congruencies between the corresponding factors across the 12 taxonomies ran from 0.10 to 0.19. These values are quite similar to those reported for random data matrices by Barrett (1986).

Results

Factor Identifications

Table 3 contains, for each of the 14 structures, the number of markers per scale per factor and the alpha coefficients (N/α) per

scale. For the English structure, for example, 22 Extraversion markers were identified, which produced an alpha coefficient of 0.93. The corresponding figures for the Dutch structure were 25 (markers) and 0.89 (alpha coefficient). Only six alpha coefficients were moderate (between 0.70 and 0.60).

The correlations among the marker scales were calculated per taxonomy and subsequently averaged across all 14 taxonomies. Table 4 contains these averaged correlations among the marker scales. The average correlations are quite according to expectations, such as the moderate correlation between Extraversion and Emotional Stability and the positive correlations between Agreeableness, Conscientiousness, and Honesty-Humility. Note the relatively substantial correlation of 0.59 between the scales for Agreeableness and Honesty-Humility.

The 14 sets of marker scales were correlated with the corresponding 14 sets of 21 factors in order to identify the factors and to determine an appropriate order of the factors for further comparison. Table 5 summarizes the results. To ensure that factors are being defined by the highest correlating marker scales, as a rule, absolute correlations ≥ 0.50 with the six-factor marker scales were taken into consideration, represented by the six-factor letters E, A, C, S, I, and H. To explain the orders of the letters in Table 5, we take the marker scale correlations with the first unrotated factor for Italian-Roman (ITArO), represented by the letters ACSH in column 1.1. That factor turned out to correlate 0.75 with A, 0.67 with C, 0.59 with H, and 0.53 with S. For reasons of readability, in Table 6 the letters A, C, H, and S were put in the six-factor order ACSH.

In certain cases there were no correlations with the required magnitude, so lower correlations (in parentheses in Table 5) were used to have some estimation of the meaning of the factors. In three cases different symbols were used, corresponding to the different factor meanings in the publications of origin. For the Czech study, the letter L stands for Skills; for the first American English (ENG1) study, the letter M stands for Masculinity; and for the Greek study, the letter N stands for Negative Valence. The results are briefly discussed below per level of factor extraction.

Solutions with one factor. According to the correlations with the six-factor marker scales, the contents of the 14 unrotated first factors are almost exclusively determined by A, C, and H. To a lesser extent S also adds to their meanings. E and I rarely contributed substantially to their meanings. For purposes of summary of the factors across the 14 taxonomies, the average correlations per factor (column) in Table 5 with the marker scales were calculated

Table 3
Numbers of Markers Per Marker Scale Per Language, and Internal Consistencies (N/α)

| Marker | ENG1 | DUT | GER | ITAttr | ITArO | HUN | POL | CZE | FIL | KOR | FRE | GRE | CRO | ENG2 |
|--------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| E | 22/93 | 25/89 | 22/93 | 20/92 | 14/88 | 23/89 | 14/86 | 18/92 | 14/79 | 17/92 | 19/89 | 24/84 | 19/94 | 19/91 |
| A | 11/80 | 27/85 | 17/87 | 18/83 | 15/89 | 24/85 | 13/85 | 14/79 | 16/74 | 15/82 | 15/81 | 11/65 | 19/83 | 22/84 |
| C | 18/87 | 16/82 | 10/83 | 18/91 | 17/87 | 21/92 | 17/90 | 14/83 | 16/83 | 13/86 | 18/87 | 12/83 | 21/93 | 19/89 |
| S | 18/76 | 27/85 | 18/86 | 15/87 | 21/80 | 20/85 | 12/66 | 12/75 | 12/72 | 9/62 | 20/84 | 17/77 | 13/75 | 18/82 |
| I | 18/84 | 18/63 | 27/92 | 13/79 | 10/69 | 20/81 | 17/91 | 17/89 | 13/79 | 20/85 | 15/68 | 14/71 | 17/89 | 16/77 |
| H | 22/84 | 28/84 | 31/94 | 17/82 | 16/84 | 30/88 | 13/81 | 9/77 | 30/91 | 13/81 | 18/86 | 17/76 | 18/85 | 23/84 |

Note. ENG = English; DUT = Dutch; GER = German; ITAttr = Italian-Triestean; ITArO = Italian-Roman; HUN = Hungarian; POL = Polish; CZE = Czech; FIL = Filipino; KOR = Korean; FRE = French; GRE = Greek; CRO = Croatian; E = Extraversion; A = Agreeableness; C = Conscientiousness; S = Emotional Stability; I = Intellect; H = Honesty-Humility. Decimal points of alpha coefficients are omitted.

Table 4
Correlations Among the Six Marker Scales, Averaged Across 14 Taxonomies

| Marker | E | A | C | S | I |
|--------|------|-----|-----|-----|-----|
| A | -.02 | | | | |
| C | .10 | .31 | | | |
| S | .37 | .09 | .23 | | |
| I | .35 | .12 | .25 | .29 | |
| H | .13 | .59 | .37 | .07 | .19 |

Note. E = Extraversion; A = Agreeableness; C = Conscientiousness; S = Emotional Stability; I = Intellect; H = Honesty-Humility.

and represented in Table 6. Across the 14 factors, the three highest average correlations of the first unrotated factors (row 1.1) with the marker scales, were 0.54 (A), 0.57 (C), and 0.52 (H), respectively.

Solutions with two factors. With two varimax rotated factors, the identification of the factors was mostly either in terms of E, S, and I, or in terms of A, C, and H. Again, although the factors with those meanings were not always extracted in the same order, they were tabulated in Table 5 in a fixed order to enhance readability. The average correlations (see Table 6) with the marker scales for the first factor of the two-factor solutions were only substantial for E (0.76), S (0.55), and I (0.48). The second factors correlated on average 0.75 with A, 0.48 with C, and 0.64 with H.

Solutions with three factors. With three varimax rotated factors, one factor always related to E, with an average correlation of 0.78 (see Table 6), and to a lesser extent with S (0.36) and I (0.21). A second factor usually correlated with A (an average of 0.74) and H (0.68). A third factor turned out to be essentially a C factor. In the Greek case, the third factor correlated moderately with E and S, possibly due to an emphasis on Negative Valence in the Greek structure. There was no significant correlation with C for

Table 6
Average Correlations Per Factor (Rows) With the Marker Scales (Columns)

| Correlation | E | A | C | S | I | H |
|-------------|-----|-----|-----|-----|-----|-----|
| 1.1 | .09 | .54 | .57 | .29 | .10 | .52 |
| 2.1 | .76 | .00 | .08 | .55 | .48 | .00 |
| 2.2 | .00 | .75 | .48 | .00 | .00 | .64 |
| 3.1 | .78 | .00 | .00 | .36 | .21 | .00 |
| 3.2 | .00 | .74 | .04 | .00 | .00 | .68 |
| 3.3 | .04 | .00 | .60 | .27 | .18 | .00 |
| 4.1 | .82 | .00 | .00 | .09 | .08 | .00 |
| 4.2 | .00 | .77 | .00 | .00 | .00 | .68 |
| 4.3 | .00 | .04 | .73 | .15 | .09 | .00 |
| 4.4 | .00 | .00 | .00 | .44 | .29 | .04 |
| 5.1 | .85 | .00 | .00 | .08 | .00 | .00 |
| 5.2 | .00 | .77 | .00 | .00 | .00 | .54 |
| 5.3 | .00 | .00 | .70 | .00 | .00 | .04 |
| 5.4 | .00 | .04 | .00 | .65 | .09 | .04 |
| 5.5 | .00 | .00 | .05 | .00 | .56 | .10 |
| 6.1 | .80 | .00 | .00 | .00 | .00 | .00 |
| 6.2 | .00 | .70 | .00 | .00 | .00 | .26 |
| 6.3 | .00 | .00 | .70 | .00 | .00 | .00 |
| 6.4 | .00 | .00 | .00 | .67 | .13 | .00 |
| 6.5 | .00 | .00 | .05 | .00 | .48 | .00 |
| 6.6 | .00 | .08 | .00 | .00 | .00 | .40 |

Note. E = Extraversion; A = Agreeableness; C = Conscientiousness; S = Emotional Stability; I = Intellect; H = Honesty-Humility.

the German structure. Because the other two factors are clearly defined as related to E and A, respectively, the position of the third factor is fixed.

Solutions with four factors. Three of the four factors are easily identifiable as related to E (0.82), A and H (0.77 & 0.68), and C (0.73). Only for Filipino do the C correlations run below 0.50. The fourth factor is related to S (on average 0.44) and to I

Table 5
Factors Identified Through Correlations With Six-Factor Marker Scales

| Language | Number of factors | | | | | | | | | | | | | | | | | | | | |
|----------|-------------------|------|-----|-----|-----|-------|-----|-----|------|------|-----|-----|-------|------|------|-----|-----|-----|-----|------|------|
| | 1.1 | 2.1 | 2.2 | 3.1 | 3.2 | 3.3 | 4.1 | 4.2 | 4.3 | 4.4 | 5.1 | 5.2 | 5.3 | 5.4 | 5.5 | 6.1 | 6.2 | 6.3 | 6.4 | 6.5 | 6.6 |
| ENG1 | ACH | E | ACH | E | AH | CS | E | AH | C | S | E | AH | C | S | I | E | AH | C | S | I | (S)M |
| DUT | EASH | ESI | AH | ES | AH | CE | E | AH | C | S | E | AH | C | S | I | E | A | C | S | I | H |
| GER | AIH | ESI | AH | E | AH | SI | E | AH | CS | I | E | AH | C | S | I | E | AH | C | S | I | A' |
| ITAttr | ACS | ESI | AC | ESI | AH | C | E | AH | C | SI | E | A | C | SI | H | E | A | C | SI | (I) | H |
| ITARO | ACSH | ESI | ACH | ESI | AH | C | ESI | AH | C | H | ES | AH | C | SH | I | E | A | C | S | I | H |
| HUN | ACSH | ESI | ACH | EI | AH | CS | EI | AH | C | S | E | A | C | S | H | E | A | C | S | I | H |
| POL | C | ESI | ACH | EI | AH | C | ES | AH | C | I | ES | AH | C | A(S) | I | E | A | C | S | I | H |
| CZE | ECSI | ESIC | ACH | E | AH | CSI | E | AH | CS | I | E | AH | C | S | I | E | AH | C | S | I | (I)H |
| FIL | ACH | E | ACH | E | AH | CSI | E | AH | A(C) | SI | E | A | H(AC) | S | I | E | AH | C | SI | (I) | (A) |
| KOR | ACSH | ESI | AH | ES | AH | CI | E | AH | CI | S | E | AH | C | S | IC | E | A | (C) | S | IC | H |
| FRE | ACH | ES | ACH | ES | A | C | E | AH | C | S | E | AH | C | S | I | E | A | C | S | I | H |
| GRE | ACSH | ESI | ACH | ESI | ACH | (ES)N | E | AH | CSI | (S)N | E | AH | C | SI | (S)N | E | A | C | SI | (I)N | H |
| CRO | ACH | ESIC | ACH | E | AH | C | E | AH | C | I | E | AH | C | SI | I | E | AH | C | S | I | A' |
| ENG2 | ACH | ESI | ACH | ES | AH | CS | E | AH | C | S | E | AH | C | S | I | E | A | C | S | I | H |

Note. E = Extraversion; A = Agreeableness; C = Conscientiousness; S = Emotional Stability; I = Intellect; H = Honesty-Humility. For the Czech study, L = Skills; for the English (ENG1) study, M = Masculinity; for the Greek study, N = Negative Valence. In column 6.6, A' refers to a narrow A factor. The order of the labels per factor was according to the listing above. Labels in parentheses represent correlations just below |0.50|. For each factor solution, the factors are ordered according to the most appropriate fit to the most frequent order: E-A, E-A-C, E-A-C-S, E-A-C-S-I, and E-A-C-S-I-H. ENG = English; DUT = Dutch; GER = German; ITAttr = Italian-Triestean; ITARO = Italian-Roman; HUN = Hungarian; POL = Polish; CZE = Czech; FIL = Filipino; KOR = Korean; FRE = French; GRE = Greek; CRO = Croatian.

(0.29). For Italian-Roman factors, the last factor is H related (not expressed in Table 6).

Solutions with five factors. With five factors, most factors relate to the Big Five, E, A, C, S, and I. Some exceptions can be observed for Italian-Triestean, Hungarian, Polish, Filipino, and Greek.

Solutions with six factors. With six varimax rotated factors, again some exceptions are observed to the expected rule, namely for English, Czech, and Greek. Although the six-factor model would predict H as a single factor, in some cases both H and A scales correlate substantially to a broad and encompassing A-related factor, just as in the cases with five or four factors, where such factors are or would be labeled Agreeableness. In the German, Filipino, and Croatian six-factor solutions, instead of H a narrower A-related factor (annotated A' in Table 5) appears to have emancipated from the A-H cluster.

Congruencies After Target Rotation

For each pairwise comparison of taxonomies, the congruence coefficients between the corresponding sets of factors, those for the first unrotated factors and for the varimax rotated solutions with two to six factors, were calculated: The congruencies were calculated after orthogonal rotation (see Kiers & Groenen, 1996) of the one structure (the source) in a pair to the other structure in the pair (the target), and vice versa, where source and target had changed places.

In the following, a distinction is made between *pairwise* comparisons, comparisons summarized in *taxonomy-related averages*, and *general averages* across all taxonomies. Because of the huge number of pairwise comparisons (those between two single taxonomic structures) they are not tabulated here. Occasionally, pairwise congruencies are mentioned in the running text. Table 7 contains the taxonomy-related averages across the remaining 13 comparisons. The first column of Table 7 gives a stub with the different target taxonomies, and in the rows the average congruencies per target are given. The last row gives the general averages across all taxonomies, assuming that the column orders for each row taxonomy as established in the previous paragraphs are the same. In support of our expectations, those general averages approximately reached 0.80 for solutions with no more than three factors. In this case—after target rotation—157 of the 280 average congruencies reached the threshold of 0.80, of which 145 congruencies were related to the first three factors.

With two factors, the E factor related congruencies on average remained just below the threshold of 0.80, especially due to low congruencies for Filipino and French. With no more than three factors, the general averages in the last row all approximately reached 0.80, although some low figures can be observed at the level of the targets, especially for Filipino. Generally, this picture, with sufficient congruence levels for solutions with no more than three factors, remains the same in the comparisons with more than three factors.²

Each of the rows in Table 7 forms an indication of the extent to which the structural configurations in the pertaining taxonomy on average accommodate configurations of other taxonomies. The target rows contain the target factors with their original meanings. For example, the Greek fourth factor of the four-factor solution represents a Negative Valence factor (see Table 5), which deviates

from the ruling S interpretation (Emotional Stability) according to the matching interpretations assessed in the previous paragraphs. The average congruence of 0.55 (see Table 7) indicates that on average that Greek fourth factor is not replicated in other languages. The average congruence for the fourth factor of the Korean four-factor structure, which was assessed as a “regular” S-related factor, is even lower. More generally, factors that deviate in meaning from the modal meaning are just as good (or as bad) accommodators as the factors with regular (i.e., modal) meanings. There is no indication of a systematic difference, which means that no effect should be expected on the general column averages of Table 7.

Given the prominence of the Big Five model, the five-factor results are of special interest. With five factors, again on average across all targets (last row of Table 7) only the first three factors reached the 0.80 level. For none of the separate targets did the averages reach the 0.80 level for all five factors. Only six five-factor target structures had full replications pairwise. Both the two American English and the Dutch and Italian-Roman five-factor structures were similar after rotating one in the pair to the other as target and vice versa. The Italian-Roman structure perfectly corresponded to the Italian-Triestean after rotating the first to the second, and the Italian-Triestean structure corresponded to the Hungarian after rotating the first to the second.

It is of interest to compare average five-factor results summarized in the first rows of Table 7 (first American English target) to previously published results found for the Big Five, where the American English structure was also used as target, albeit with fewer structures in the comparison (De Raad, Perugini, et al., 1998). In Table 7, the average congruencies after target rotation are 0.84, 0.84, 0.84, 0.76, and 0.58. In De Raad, Perugini, et al. (1998), the corresponding congruencies were 0.80, 0.78, 0.82, 0.75, and 0.63. In both studies there is a clear fall after the first three coefficients.

The six-factor results are noteworthy because of the recent claim concerning their cross-cultural replicability. Taking the average of 0.79 for the C column as an approximate hit, three of the six factors were recovered on average. Only two of the six-factor target structures had full pairwise replications. The Croatian six-factor structure perfectly matched the Polish structure, with the Polish as the target. In addition, not surprisingly, the first American English six-factor structure matched the second American

²To find out whether differences in taxonomic procedures might be responsible for differences in results (cf. De Raad, Di Blas, & Perugini, 1998), we distinguished taxonomies using the categorization system of Angleitner et al. (1990), in which a “dispositions” category was divided into two subcategories, “traits” and “abilities and talents,” from other taxonomies. We separately calculated the average congruence coefficients for the four German-oriented taxonomies (German, Polish, Croatian, and Czech) and for the remaining taxonomies. There turned out to be no difference in relation to the general conclusion in this article. What struck us, though, were the relatively strong average congruencies for the Intellect factors for the German-oriented structures in both the five- and six-factor solutions, which is possibly due to the German emphasis on including abilities and talents for trait descriptive purposes.

Table 7
Congruencies After Target Rotations, Averaged Across Taxonomies

| Language | Factor | | | | | | | | | | | | | | | | | | | | | |
|----------|--------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|
| | 1 | | 2 | | 3 | | | 4 | | | | 5 | | | | | 6 | | | | | |
| | A | E | A | E | A | C | E | A | C | S | E | A | C | S | I | E | A | C | S | I | H | |
| ENG1 | 82 | 80 | 84 | 83 | 83 | 83 | 84 | 81 | 83 | 72 | 84 | 84 | 84 | 76 | 58 | 83 | 84 | 84 | 72 | 62 | 66 | |
| DUT | 80 | 80 | 81 | 81 | 83 | 80 | 79 | 83 | 76 | 78 | 79 | 85 | 80 | 78 | 69 | 80 | 85 | 80 | 80 | 70 | 68 | |
| GER | 76 | 78 | 82 | 77 | 84 | 79 | 77 | 85 | 77 | 49 | 78 | 86 | 79 | 59 | 65 | 79 | 86 | 79 | 68 | 72 | 56 | |
| ITAttr | 83 | 83 | 82 | 85 | 83 | 83 | 81 | 84 | 81 | 80 | 81 | 84 | 81 | 81 | 69 | 82 | 85 | 82 | 82 | 58 | 75 | |
| ITARO | 80 | 78 | 86 | 82 | 83 | 86 | 82 | 82 | 83 | 77 | 81 | 87 | 87 | 79 | 63 | 79 | 87 | 85 | 81 | 66 | 77 | |
| HUN | 82 | 78 | 85 | 78 | 84 | 81 | 78 | 83 | 79 | 69 | 79 | 77 | 80 | 76 | 71 | 79 | 80 | 80 | 77 | 47 | 76 | |
| POL | 82 | 78 | 85 | 84 | 82 | 81 | 81 | 83 | 82 | 72 | 80 | 83 | 82 | 76 | 64 | 78 | 77 | 83 | 73 | 71 | 79 | |
| CZE | 72 | 83 | 83 | 75 | 81 | 84 | 79 | 81 | 84 | 52 | 83 | 81 | 81 | 77 | 66 | 82 | 81 | 82 | 78 | 71 | 59 | |
| FIL | 76 | 73 | 79 | 66 | 80 | 77 | 67 | 72 | 66 | 78 | 67 | 71 | 69 | 72 | 72 | 64 | 78 | 65 | 77 | 42 | 68 | |
| KOR | 80 | 81 | 79 | 81 | 79 | 79 | 81 | 81 | 81 | 48 | 81 | 81 | 67 | 55 | 78 | 82 | 80 | 66 | 63 | 81 | 64 | |
| FRE | 81 | 76 | 84 | 83 | 83 | 82 | 74 | 84 | 77 | 82 | 80 | 85 | 81 | 83 | 59 | 80 | 85 | 73 | 84 | 60 | 72 | |
| GRE | 83 | 83 | 85 | 84 | 85 | 58 | 81 | 86 | 85 | 55 | 80 | 84 | 73 | 84 | 57 | 82 | 81 | 77 | 84 | 58 | 72 | |
| CRO | 85 | 81 | 87 | 83 | 86 | 86 | 84 | 86 | 85 | 60 | 85 | 87 | 84 | 71 | 63 | 83 | 81 | 85 | 74 | 70 | 78 | |
| ENG2 | 84 | 80 | 87 | 81 | 86 | 86 | 80 | 87 | 83 | 76 | 82 | 86 | 85 | 79 | 66 | 82 | 81 | 85 | 76 | 64 | 84 | |
| Average | 80 | 79 | 84 | 80 | 83 | 80 | 79 | 83 | 80 | 68 | 80 | 83 | 80 | 75 | 66 | 80 | 82 | 79 | 76 | 64 | 71 | |

Note. E = Extraversion; A = Agreeableness; C = Conscientiousness; S = Emotional Stability; I = Intellect; H = Honesty-Humility; ENG = English; DUT = Dutch; GER = German; ITAttr = Italian-Triestean; ITARO = Italian-Roman; HUN = Hungarian; POL = Polish; CZE = Czech; FIL = Filipino; KOR = Korean; FRE = French; GRE = Greek; CRO = Croatian.

English structure.³ The lowest congruencies were found in comparisons with the Filipino structure. The contents of Table 7, in combination with Table 5, should provide a detailed view on the cross-cultural strength or weakness of a six-factor structure. Three of the 14 six-factor structures had a sixth factor reference to a construct with Agreeableness characteristics with narrower scope (German, Filipino, Croatian). One might suggest that the second (AH related) and the sixth factors (A related) of the six-factor structures for German, Filipino, and Croatian should change position (in Tables 5 and 7), because those second factors contain Honesty-Humility content. In these second factors, however, Honesty is part of a larger cluster with mainly Agreeableness content. Such factors should be labeled Agreeableness, just as they are in five- or four-factor constellations. The factors that were clearly and distinctly Honesty-related in content did not replicate across languages on average, with the exception of the second American English sixth factor (0.84).

Comparisons of Taxonomies Within Languages

For two of the languages, American English and Italian, two trait taxonomies had been developed. Within those languages the two taxonomies have come about according to somewhat different procedures. The lexical procedure followed for the Italian-Triestean taxonomy shared some of the typical characteristics of the German program with an explicit description of trait relevant categories. The Italian-Roman taxonomy followed a procedure with an implicit definition of traits. Although both American English taxonomies used empirical trait lists originating in an extensive list of 1,710 trait words, the empirical list of 540 traits for the first American English taxonomy came about according to a relatively complex procedure in which different criteria of relevance were used. The second empirical American English list of

449 traits came about mainly according to a single criterion of familiarity or frequency of use.

Congruencies were calculated after target rotation, where within languages both taxonomies in turn functioned as target. The results are presented in Table 8. For purposes of comparison, the general averages (last row of Table 7) are repeated in a last row of Table 8. On average, the congruencies increased from close to 0.80 for the average target results across all other taxonomies (see Table 7) to close to 0.90 for the pairwise comparisons in Table 8. Cultural or language differences seem to bring off a clearly noticeable downsizing of the congruencies.

The Masculinity version of the sixth factor of the first American English taxonomy accommodates the sixth factor of the second American English taxonomy less well. The Honesty-Humility version of the second taxonomy performs better in this respect. Also, the I-related (Intellect) factors of the Italian taxonomies do not replicate with six-factor solutions.

Discussion

Summary of the Results

The emergence of the Big Five model has been accompanied by questions concerning its universality and its coverage of the trait domain. Although the model is widely accepted and applied, its cross-cultural replicability has not matched its cross-cultural popularity. From comparisons among different five-factor structures developed within the psycholexical tradition, no more than three or four of the Big Five factors have shown replicability across lan-

³ For economical reasons, the full sets of pairwise congruencies are not given here. They can be obtained from Boele De Raad upon request.

Table 8
Congruencies After Target Rotations

| Language | Factor | | | | | | | | | | | | | | | | | | | |
|---------------------------|--------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | 2 | | 3 | | | 4 | | | | 5 | | | | 6 | | | | | | |
| | E | A | E | A | C | E | A | C | S | E | A | C | S | I | E | A | C | S | I | H |
| ENG2 to ENG1 | 94 | 95 | 93 | 94 | 95 | 94 | 93 | 94 | 91 | 94 | 94 | 94 | 92 | 84 | 92 | 93 | 94 | 87 | 86 | 79 |
| ENG1 to ENG2 | 94 | 95 | 93 | 94 | 95 | 93 | 95 | 93 | 91 | 93 | 95 | 94 | 91 | 86 | 92 | 86 | 94 | 89 | 86 | 88 |
| ITAr to ITAtr | 88 | 93 | 88 | 95 | 94 | 91 | 96 | 94 | 85 | 90 | 96 | 94 | 84 | 89 | 91 | 96 | 94 | 85 | 72 | 93 |
| ITAr to ITAro | 88 | 93 | 89 | 94 | 94 | 88 | 96 | 94 | 87 | 89 | 96 | 94 | 90 | 78 | 90 | 96 | 94 | 86 | 76 | 92 |
| General average (Table 7) | 79 | 84 | 80 | 83 | 80 | 79 | 83 | 80 | 68 | 80 | 83 | 80 | 75 | 66 | 80 | 82 | 79 | 76 | 64 | 71 |

Note. E = Extraversion; A = Agreeableness; C = Conscientiousness; S = Emotional Stability; I = Intellect; H = Honesty-Humility; ENG = English; ITAr = Italian-Triestean; ITAro = Italian-Roman.

guages. Furthermore, strong claims have recently been made for a six-factor model that includes versions of the Big Five and an additional factor, called Honesty-Humility. Given the findings with respect to the Big Five factors, one wonders how factors beyond the Big Five (i.e., a six-factor structure) could claim a cross-cultural position at all. Indeed, the present findings did not support cross-cultural replicability of a six-factor structure. Rather, the findings support that, on average, only the first three factors of the Big Five or of the six-factor model are robustly replicable, thus suggesting substantial “universality” of a Big Three. These results are consistent with our expectation regarding the greater cross-cultural replicability of the three-factor structure.

The results from the initial factor identification procedure based on the six-factor marker scales indicate that factor solutions with one, two, or three factors are rather consistently identified as ACH related (one factor), ESI and ACH related (two factors), and E, AH, and C related (three factors), respectively. With four factors, the fourth factor is ambiguously and less substantially S or I related; with five factors kernel characteristics of the Big Five are identified consistently, but relatively less substantially for the I-related factor. Finally, with six factors, inconsistencies can be observed, especially for the sixth factor. In conclusion, broad versions of the Big Three with kernel characteristics of E, A, and C are most replicable.

The results from the factor comparisons using congruence coefficients point in the same direction. Generally, structures with no more than three factors are replicable across languages; for structures with more than three factors, on average only the first three reach an acceptable level of cross-cultural validity.

Relationship to Previous Findings

The history of psycholexical studies has demonstrated interest in the recurrence of trait structures with one to seven factors. We briefly review the relevant literature in relation to the present findings. Cross-language seven-factor structures refer to the dissonant Tellegen and Waller (1987) design applied in English and later in Spanish (Benet-Martínez & Waller, 1997) and Hebrew (Almagor et al., 1995). However, the Spanish (Benet-Martínez & Waller, 1997) and Hebrew (Almagor et al., 1995) lexical studies followed a dictionary sampling procedure, which reduced the representativeness of the trait terms. Moreover, these studies ex-

plicitly included highly evaluative and state descriptors. Therefore, seven-factor structures are not further discussed here.

One-factor model. Interest in the relevance of a single general factor of personality goes back to Webb (1915), who searched for a broad factor *w* of personality, comparable to a general factor of intelligence. Such a general factor, called the *p* factor by Hofstee (2001), results from taking the first principal component of a broad set of personality trait variables. The content is determined by the fact that the large majority of personality factors, scored in a socially desirable direction, intercorrelate positively. Some might want to call this factor Social Desirability, but there is more to this factor than being an artifact. According to Hofstee, the *p* factor combines stylistic intellect and other personality traits, enabling a person to react adequately to situations. Musek (2007) studied the Big One using Big Five scales and items, and he related that general factor to all of the Big Five factors. Rushton, Bons, and Hur (2008) reported similar findings using different sets of personality scales. In a comprehensive, large-scale psycholexical study in Dutch, De Raad and Barelds (2008) labeled the first factor in a hierarchy of factors Virtue, of which the content was mainly described in terms of Agreeableness-related items. The present findings (see Table 5), based on the study of 14 taxonomies, suggest that the kernel of the first unrotated factor is mainly characterized by Agreeableness, Conscientiousness, and, to a lesser extent, by Emotional Stability. There seems to be an overall robust emergence of a single factor. Further research should address the specific contents of that factor in detail and give a precise account of the extent to which such a first factor reflects trait content, judgment style, and choice of method.

Two-factor model. Digman (1997) factored Big Five correlations from 14 studies and distinguished two higher order factors called Alpha and Beta. Alpha combined the Big Five factors Agreeableness, Conscientiousness, and Emotional Stability, and Beta combined Extraversion and Intellect. The two higher order factors were related to a two-dimensional system—*agency* and *communion*—previously described by Bakan (1966) and Wiggins (1991) to summarize the domain of interpersonal behavior. Support for this two-dimensional system was reported in both Musek (2007) and Rushton et al. (2008). Typical of the Agency/Beta dimension is the emphasis on individual striving and personal achievement; typical of the Communion/Alpha dimension is the

emphasis on social interest and on being part of a larger whole. The two-factor solution in De Raad and Barelds (2008) does support such a general distinction. The present findings combine the Big Five factors somewhat differently than was done in Digman (1997), Musek (2007), and Rushton et al. (2008), with Emotional Stability clustering together with Extraversion and Intellect (see Table 5).

Three-factor model. With three factors, a rather coherent and cross-culturally replicated system emerged with Extraversion, Agreeableness, and Conscientiousness as the typical, distinguishing features. The emergence of this three-factor system agrees with the recent lexical history (cf. Saucier et al., 2000). Peabody and Goldberg (1989; cf. Saucier, 1998) concluded that the most robust version of the American English Big Five could consist of three large factors (Extraversion, Agreeableness, and Conscientiousness) and two smaller, less replicable factors. For both German (Ostendorf, 1990) and Croatian (Mlačić & Ostendorf, 2005), three-factor solutions were reported to be more replicable than five-factor solutions. In the Italian Triestean project (Di Blas & Forzi, 1998), the Big Three turned out to be identifiable in two different samples. This Big Three structure was replicated in still another sample (Di Blas & Forzi, 1999). A Turkish lexical study (Somer & Goldberg, 1999) produced a clean Big Five solution; in addition, for both self-ratings and peer ratings, a three-factor solution produced broad versions of the Big Three. On the Filipino study (Church, Katigbak, & Reyes, 1998), Saucier et al. (2000) suggested that a three-factor solution did not include broad versions of the Big Three but that instead “Agreeableness and Conscientiousness content remained intertwined until a lower level in the hierarchical structure” (p. 20). That observation was not definitively confirmed in the present study, where a general characterization in terms of the Big Three labels received support in the marker scale analysis (see Table 5).

Four-factor model. Because lexically based structures with four factors have not been published very frequently, such a possibility is also not discussed in this section.

Five-factor model. With five factors, the cross-cultural findings are very consistent. Studies that use interpretive evaluations of factors tend to report in an affirmative sense on the Big Five (cf. De Raad & Peabody, 2005). Nonetheless, studies in which several taxonomies were systematically compared confirmed no more than three or four of the Big Five factors. Such was the case in Hofstee et al. (1997), where in a comparison of three Germanic lexical studies the congruencies between corresponding factors clearly dropped below the level of similarity maintained in the present study after three factors. A similar pattern of average congruencies was reported in a comparison of five lexical studies (De Raad et al., 1997) and in a comparison of seven lexical studies with American English as the target (De Raad, Perugini, et al., 1998). In a systematic comparison of the item contents used in six lexical studies, Peabody and De Raad (2002) and De Raad and Peabody (2005) showed that a coherent classification of lexical items was possible with three factors, but not with five. The average results of five-factor comparisons from the present 14 taxonomies confirm these earlier findings.

Six-factor model. Also with six factors, the first three factors generally recur across languages, with congruencies clearly dropping below an acceptable threshold after three factors. In their review of eight six-factor structures, Ashton, Lee, Perugini, et al.

(2004) stated that “a similar six-factor solution has emerged from self-ratings on the familiar personality-descriptive adjectives” (p. 364). Why could Ashton, Lee, Perugini, et al. arrive at such a conclusion, when the present study could not? If we restrict ourselves to the eight structures that were used by Ashton, Lee, Perugini, et al. to reach their conclusion, our results for those eight structures do not warrant a conclusion different from the one we drew on the basis of the 14 structures. Also, if the restriction is made to self-ratings, no different conclusion is reached. We believe that the discrepancy between the findings is found in a combination of choice of structures to compare, rotations made of some factors in some structures toward a certain position of the factors, and evaluations of the factors at face value (on the basis of interpretations of factors only). As regards the latter, De Raad and Peabody (2005) have warned against the dangers of circular reasoning in the identification of factors. Just as it has happened with respect to the identification of Big Five factors in new data sets, assuming the generality of the six-factor structure (including the Honesty-Humility factor), which generality still needs to be demonstrated, may easily lead to a premature factor identification.

Emotional Stability

The finding that Emotional Stability (or Neuroticism) exhibits weaker replication in lexical studies contrasts with its historical prominence. From early personality psychology on, virtually all trait models and personality questionnaires included Neuroticism. Therefore, the failure of this dimension in particular, to replicate well across cultures warrants comment. One reason why Emotional Stability does not replicate well may be its lesser representation in most natural languages. As is also true for Intellect, Emotional Stability most typically does not belong to the first two or three factors extracted in the factor analyses, which is an indication of a smaller density of terms constituting those factors. In case of smaller sets of items, there is clearly less chance to capture the various possible facets of the construct.

The psycholexical approach is designed to elicit those attributes that are most talked about in a variety of socially relevant contexts. Neuroticism or Emotional Stability has a large constituency in clinical psychology, where its appreciation has grown in specific clinical contexts. To capture the many nuances of emotional experiences, questionnaire developers may sample widely from the rich variety of specific variables from the clinical field. Such a high level of specificity is possibly not matched in the context of every language.

Inclusion of Structures for the Comparison

The choice of structures for the comparison may make a difference. English, Filipino, and Czech were not included in the Ashton, Lee, Perugini, et al. (2004) study, and those three structures had a relatively negative effect on the general level of congruence coefficients found for the Honesty-Humility factor in the present comparisons. Greek, another structure not included in the Ashton, Lee, Perugini, et al. (2004) study, did not differ much from the general averages, and only one new structure, Croatian, contributed relatively positively toward the general level of congruence for Honesty-Humility. With the fewer structures studied by Ashton, Lee, Perugini, et al., there may have been a tendency to

interpret deviating results with more leniency. For English, additional efforts were made to find an articulate six-factor structure in new data sets, but with little success (Ashton, Lee, & Goldberg, 2004; Lee & Ashton, 2008).

Rotations of Factors

Ashton, Lee, Perugini, et al. (2004) rerotated the second- and sixth-largest factors of the Italian (Trieste) structure, and the third and sixth factors of the Korean structure, to arrive at a clearer version of the Intellect-Imagination factors in both studies. Such rerotations for the purposes of getting a clearer structure are just fine, the condition being that one could expect a structure to appear in the various languages on the basis of an established model, but that is exactly what has to be shown first. If such rotations had been applied in the present study, in particular on Factors II (Agreeableness) and VI (Honesty-Humility) in the different factor analyses before the structures were submitted to the present procedures, the outcomes would have been different. The 14 structures in the present study are all taken in their “natural” arrangement, which from an exploratory viewpoint best reflects the gist of the psycholexical approach. No effort was made to arrive at a better alignment to the contents of preconceived five- or six-factor models.

There is no doubt that Honesty-Humility should be considered as a cluster of traits with a certain level of coherence. The issue here is the interconnectedness of the factors Agreeableness (II) and Honesty-Humility (VI). Assuming a broad definition of Honesty-Humility as was done in this study, including references to honesty–sincerity and helpfulness–altruism (see Using factor markers), it is questionable whether Honesty-Humility can stand on its own feet as a separate factor. If so, this could probably be the case only if the traditional Agreeableness conceptualization is disposed of some hitherto characteristic facets. In the case of a narrow definition of Honesty-Humility (without the helpfulness–altruism reference), it would function well to occupy a distinct niche in the Big Five system. In the American English and Dutch Big Five circumplex configurations, for example, the kernel of such a cluster is represented in the II+III+ and III+II+ facets (and their counterparts II–III– and III–II–; Hofstee, De Raad, & Goldberg, 1992; De Raad et al., 1992). Such a narrow Honesty-Humility cluster is almost invariably part of a broad Big Five Agreeableness factor.

The Use of Markers

Using markers of factors should generally help improve objectivity in the identification of factors under investigation. Factors often consist of different facets—for example, *fearfulness*, *irritableness*, and *stability* as facets of the factor Emotional Stability (cf. De Raad & Peabody, 2005)—and it is important that markers identify all those factor-related facets. If all these facets are equally well represented both in the Emotional Stability factors stemming from different structures and in the markers, those factors have a good chance to be correctly evaluated as similar. If, however, the factors and the markers do not correspond in terms of representing facets, the danger of incorrect identification of factors easily arises. If, for example, the stability facet is identified in a factor and the fearfulness facet is identified in another factor, one might feel

tempted to interpret those factors as Emotional Stability factors, especially if markers are used implicitly. In the present study, we made explicit lists of markers to reduce the subjective element. Although such an explicit use of markers may reduce the subjective element, it is not a guarantee for correctly identifying factors.

Final Remarks

Using the absolute low criterion of 0.80 as a threshold congruence in the present context, this study shows that the factors IV (Emotional Stability), V (Intellect), and VI (Honesty-Humility) are not generally replicable across languages. A three-factor structure has a better chance of being replicated systematically and coherently in the various languages. This three-factor structure has Extraversion, Agreeableness, and Conscientiousness as its typical distinguishing features. The delineation of the specific semantics should, however, be taken to be of a broader nature than is indicated by the three Big Five labels. Further research is necessary to specify the contours of such a three-dimensional, cross-culturally replicable system. The capital question in the background of such research is whether the problem of cross-culturally replicable trait factors can be ultimately settled at all. We don't believe that a final canonical answer can be given, considering the incompatibility of the language-specific input structures, each with different trait variables and different participants. Finding a way around this will possibly involve improved psychometric procedures combined with an iterative process toward a consensually cross-culturally accepted model of traits. For such a project to be successful, more languages should be included to represent the many languages of the world. In terms of numbers of speakers, Asian and African languages in particular are clearly underrepresented in trait taxonomic research. The many trait lists need to be translated into a common language, presumably English, and a certain clustering should be made of the thousands of words into groups with similar meanings. The iterative part would involve going back and forth from the clusters in English to the original languages in which ratings have to be collected and items have to be formulated at a progressively smaller scale of this iterative process.

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Appendix

Markers of the Six Factors

Extraversion

(+) active, chatty, cheerful, dynamic, energetic, enthusiastic, extraverted, exuberant, lively, open, outgoing, sociable, talkative, vigorous, vivacious

(–) bashful, closed, introverted, lonely, passive, quiet, reserved, shy, silent, solitary, taciturn, timid, unsociable, untalkative, withdrawn

Agreeableness

(+) accommodating, agreeable, benevolent, conciliatory, friendly, gentle, good-natured, kind-hearted, lenient, meek, mild, patient, peaceful, sympathetic, tolerant

(–) aggressive, bossy, brusque, choleric, cold-hearted, despotic, domineering, fierce, hot-tempered, intolerant, irritable, overbearing, quarrelsome, short-tempered, stubborn

Conscientiousness

(+) careful, conscientious, diligent, disciplined, dutiful, hard-working, industrious, methodical, meticulous, orderly, organized, precise, scrupulous, thorough, tidy

(–) absent-minded, careless, chaotic, disorderly, disorganized, frivolous, imprudent, inaccurate, irresponsible, lax, lazy, negligent, rash, undisciplined, untidy

Emotional Stability

(+) brave, confident, courageous, imperturbable, insensitive, optimistic, resolute, secure, self-assured, self-confident, stable, steady, strong, unemotional, well-balanced

(–) anxious, delicate, depressive, emotional, fearful, fragile, indecisive, insecure, melancholic, nervous, oversensitive, sensitive, sentimental, vulnerable, worrying

Intellect

(+) artistic, bright, clever, creative, educated, gifted, intellectual, intelligent, inventive, original, receptive, sharp, smart, talented, wise

(–) backward, conservative, conventional, ignorant, narrow-minded, silly, simple, slow-witted, stupid, uneducated, ungifted, unimaginative, unintellectual, unintelligent, unsophisticated

Honesty-Humility

(+) altruistic, fair, faithful, frank, generous, helpful, honest, humane, just, loyal, modest, sincere, trustworthy, truthful, unassuming

(–) arrogant, boasting, calculating, conceited, cunning, dishonest, egoistic, greedy, haughty, hypocritical, pompous, pretending, pretentious, sly, stingy

Received March 11, 2008

Revision received July 7, 2009

Accepted July 8, 2009 ■