A Hierarchical Analysis of 1,710 English Personality-Descriptive Adjectives

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The structure of the English personality lexicon was investigated using self-ratings ($N = 310$) on a set of 1,710 personality-trait adjectives. The 5-factor solution resembled the Big Five structure, but included rotational variants of Agreeableness and Emotional Stability similar to those of other languages. In the 6-factor solution an additional factor, defined by terms such as *unpretentious* versus *sly*, resembled an Honesty–Humility factor observed in other languages. The 6-factor solution also produced an especially clear 5th factor, defined by Intellect, Imagination, and Unconventionality content. The hierarchical emergence of factors from 1 to 7 was explored, and the 7-factor solution yielded a Religiosity factor, adding to the diverse array of 7th factors observed in other languages.

Personality researchers have long been engaged in attempts to find the optimal taxonomy of personality characteristics. By finding an adequate structural model of human personality variation, researchers will be able to take steps toward an eventual theory of personality and to assess human individual differences with improved thoroughness and efficiency.

The chief problem associated with efforts to identify the major dimensions of personality has been that of obtaining a representative set of personality variables. One of the most promising potential solutions to that problem is based on the lexical hypothesis (Goldberg, 1981). According to the logic of the lexical strategy, the most important elements of personality variation should be represented, in any human language, by a large number of similar but distinct words (generally adjectives) that are used by lay people in everyday description of their own and others' personalities. Therefore, factor analyses of self- or peer ratings on the familiar personality adjectives of any language would be expected to reveal the fundamental vectors of personality. (For criticisms of the assumptions, methods, and results of the lexical strategy, see Block, 1995; for a defense, see Ashton & Lee, 2003; Goldberg & Saucier, 1995).

Lexical Studies of Personality Structure in English and Other Languages

The first lexical studies of personality structure were conducted in the English language, and these investigations revealed the well-known Big Five factor structure (Digman & Takemoto-Chock, 1981; Goldberg, 1990; Norman, 1963; Saucier & Goldberg, 1996; Tupes & Christal, 1961, 1992). This structure consists of dimensions named (I) Extraversion (or Surgency), (II) Agreeableness, (III) Conscientiousness, (IV) Emotional Stability (vs. Neuroticism), and (V) Intellect–Imagination (also known in questionnaire-based research as Openness to Experience; e.g., Costa & McCrae, 1992).

Since the late 1980s, lexical investigations of personality structure have been conducted in many other languages. "Standard" lexical studies, containing personality-descriptive terms only, have been conducted in such languages as Czech (Hrebickova, 1995), Dutch (De Raad, 1992; De Raad, Hendriks, & Hofstee, 1992), French (Boies, Lee, Ashton, Pascal, & Nicol, 2001), German (Angleitner & Ostendorf, 1989; Ostendorf & Angleitner, 1993), Hungarian (De Raad & Szirmak, 1994; Szirmak & De Raad, 1994), Italian (Caprara & Perugini, 1994; Di Blas & Forzi, 1998, 1999; Di Blas & Perugini, 2002), Korean (Hahn, Lee, & Ashton, 1999), and Polish (Szarota, 1995, 1996).[1]

Overall, these studies have provided support for many aspects of the Big Five model. The investigations listed above have generally recovered variants of the first four of the Big Five factors (De Raad, Perugini, Hrebickova, & Szarota, 1998), but recovery of all

[1] In addition, thorough lexical investigations of person-descriptive terms have been carried out in languages such as Filipino or Tagalog (e.g., Church, Katigbak, & Reyes, 1998) and Turkish (Goldberg & Somer, 2000). However, because these projects have included non-personality-descriptive terms within their variable sets, such as purely evaluative terms of insult or praise and/or terms describing physical appearance, their results are less directly comparable to those of the other projects described here.

five factors in their classic form has been less than clear (Peabody & De Raad, 2002). For example, results in Hungarian and in Italian revealed a fifth factor that was defined by honesty-related content, not by Intellect or Imagination. However, a recent review of these studies (Ashton, Lee, et al., 2004) has suggested that at least seven languages—Dutch, French, German, Hungarian, Italian, Korean, and Polish—apparently contain a common set of *six* personality factors.

Of these six dimensions, two are close to the traditional Extraversion and Conscientiousness constructs. Two others represent variants of Agreeableness and Emotional Stability, which consistently emerge in positions rotated such that (a) anger- and temper-related terms join with low Agreeableness rather than with low Emotional Stability as in the classic English Big Five (e.g., Saucier & Goldberg, 1996) and (b) sentimentality- and femininity-related terms join with low Emotional Stability (which might therefore be called Emotionality) rather than with high Agreeableness as in the Big Five (e.g., Saucier & Goldberg, 1996). Another factor corresponds closely to Intellect–Imagination but is sometimes heavily defined by terms describing unconventionality. Finally, the remaining factor, Honesty–Humility, is defined by terms such as *sincere, fair,* and *unassuming* versus *sly, deceitful,* and *pretentious.*[2]

The Puzzle of the English Personality Lexicon

The fact that a similar set of exactly six factors has emerged in such a diverse array of languages—representing the Germanic, Romance, and Slavic branches of the Indo-European family as well as two mutually unrelated non-Indo-European languages—suggests that this six-factor structure may be a strong candidate to be an optimal taxonomy of human personality variation. However, the fact that this structure was not found in the previous English-language studies is rather puzzling, particularly in light of the close relations between English and several other languages that did recover that six-factor solution. The English language belongs to the Germanic branch of the Indo-European family, along with Dutch and German, but has also been heavily influenced by languages of the Romance branch, which includes French and Italian. Moreover, these combined Germanic and Romance contributions have given the English language the largest vocabulary of any language in the world, so it seems unlikely that the failure to recover the cross-language six-factor structure is due to limitations in the English personality lexicon as such. Certainly, the terms defining all six factors obtained in other languages appear to be readily translated into English.

If the English personality lexicon does in fact contain a six-dimensional structure similar to that of other languages, the failure to recover that structure might be explained in part by adjective clustering or adjective selection procedures used in English lexical investigations. Given the size of the English personality lexicon, previous studies in that language were forced either (a) to form clusters of synonymous adjectives in order to produce a number of variables that was small enough to be factor-analyzed by computers of that era (Goldberg, 1990) or (b) to select smaller sets of adjectives, numbering roughly 500, to be sufficiently brief as to allow administration in a single session to research participants who provided self- or peer ratings (Hofstee, De Raad, & Goldberg, 1992; Saucier & Goldberg, 1996). However, the size of the English personality lexicon made these procedures not only necessary but

also somewhat risky, in the sense that the extensive reductions achieved by adjective clustering or adjective selection may have been achieved at some cost in terms of representativeness of the final variable sets. That is, in spite of the reasonably formulated and carefully executed procedures for reducing the set of English-language personality variables to manageable proportions, there remains the possibility that the reduced variable sets tended to over- or underrepresent some aspects of the English personality lexicon.

Such loss of representativeness would presumably not have been so great as to interfere with the emergence of the space underlying the largest personality dimensions. However, the consequences might have been more serious for (a) the exact locations of axes within certain regions, such as the highly circumplexical plane spanned by Agreeableness and Emotional Stability (e.g., Hofstee et al., 1992; Saucier, 1992), and (b) the survival of smaller factors, particularly Honesty–Humility, which in other languages has sometimes been the smallest of the six factors and the last to emerge. Therefore, it would be useful to investigate the factor structure of a larger and more representative variable set consisting of single, unclustered English personality-descriptive adjectives that exceed a reasonable minimum level of familiarity. If the English personality lexicon does in fact contain a six-dimensional structure similar to that observed in other languages, then such an analysis would be more likely to reveal it than any previous studies have been.

Goldberg's (1982) Set of 1,710 Personality-Descriptive Adjectives

Fortunately, there exists an archival data set that meets the above requirements. During the 1970s, Goldberg (1982) obtained self-ratings on a set of 1,710 English personality-descriptive adjectives from research participants in the United States and in Australia. Goldberg constructed this variable set by reducing the set of 2,797 personality descriptors that was compiled by Norman (1967). Norman had in turn developed his set by supplementing the earlier list of Allport and Odbert (1936), who had extracted person descriptors from the second edition of Webster's unabridged dictionary. Specifically, Norman added to Allport and Odbert's list of 17,954 terms by including 171 terms from the third edition of Webster's unabridged dictionary. This set of 18,125 terms was then reduced to 2,797 by Norman's research team, who discarded terms that were extremely obscure or extremely ambiguous for personality description; terms that described physical appearance; terms that were purely evaluative; terms that primarily described temporary states, moods, or activities; and terms that described social roles, relationships, or effects. Goldberg then removed from this list 231 terms that were nouns rather than adjectives, 250 terms that were very difficult or obscure, and 650 terms that were particularly awkward or slangy. Four nouns from Norman's list were converted to their adjective form, and 40 additional terms judged to be familiar and personality descriptive

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[2] The Czech study by Hrebickova (1995) produced a six-factor solution that contained a small factor defined in part by arguably non-personality-descriptive terms such as *agile, nimble,* and *skillful.* Interestingly, Hrebickova's seven-factor solution suggests possible similarities with the six-factor structure observed in other languages, apart from the additional Czech factor describing motor skills.

were also added. These procedures generated the final set of 1,710 personality-descriptive adjectives.

Of course, the selection procedures that are used to generate any compilation of the personality-descriptive terms of a language can easily be criticized, because researchers may reasonably disagree about the precise boundaries of the personality domain. However, the 1,710-adjective set compiled by Goldberg (1982) has three crucial strengths for the purpose of the present study. First, the definition of the personality domain and the criteria for adjective selection are in general quite similar to those of the other standard lexical studies that have been summarized above; as a result, comparisons with those investigations are likely to be meaningful. Second, the size of the adjective set is very large, and it may reasonably be said to approximate the entire *population* of English personality-descriptive adjectives that are at least moderately familiar to speakers of the language; consequently, this variable set is likely to provide a more accurate representation of the structure of the English personality lexicon than has so far been available. Third, this variable set was constructed—and the data collected—more than a quarter of a century before the preparation of the present report; therefore, this eliminates the possibility that researcher biases of any kind might have influenced the results of the present study in such a way as to favor a particular structure, such as the six-factor solution observed recently in several other languages.

Overview of the Present Study

In the present research we planned to factor-analyze self-ratings on the full set of 1,710 adjectives assembled by Goldberg (1982). As explained below, we were particularly interested in the results of the five- and six-factor solutions; in addition, we also wanted to investigate the hierarchical emergence of factors, from the first unrotated factor down to the seven-factor solution. Our specific research questions are discussed in the following paragraphs.

Five-Factor Solution

With regard to the five-factor solution, we wanted to determine whether the space of the Big Five factor structure would be recovered. In particular, we were interested in two specific issues related to that structure. One of these issues involves the rotational orientation of Agreeableness and Emotional Stability. On the one hand, it is possible that the classic Big Five rotation would emerge: In this case, terms such as *sensitive* versus *tough* would load alongside kindness-related terms on an Agreeableness factor, and terms such as *quarrelsome* versus *patient* would load alongside fearfulness-related terms on a (low) Emotional Stability factor. On the other hand, if the alternative rotation of these factors were to emerge, then terms such as *sensitive* versus *tough* would load alongside fearfulness-related terms on an Emotionality factor, and terms such as *patient* versus *quarrelsome* would load alongside kindness-related terms on a variant of the Agreeableness factor.

Another issue related to the five-factor solution involves the nature of the fifth factor: Would this dimension represent a variant of the Intellect–Imagination–Unconventionality factor that has been found in several languages? Although a factor defined by Intellect, Imagination, and Unconventionality has been consistently recovered in English lexical research (e.g., Saucier & Goldberg, 1996), investigations in at least two other languages—Italian

and Hungarian—have instead recovered an Honesty–Humility-related dimension at the five-factor level. Therefore, these results raise the possibility that Honesty–Humility might displace Intellect–Imagination–Unconventionality as the English fifth factor or that Honesty–Humility-related content might at least "contaminate" that factor somewhat within the five-factor solution.

Six-Factor Solution

With regard to the six-factor solution, we were again interested in investigating the rotational orientation of Agreeableness and Emotional Stability, as well as the nature of the fifth factor. In addition, however, we were also interested in determining whether this solution would recover the six-factor space that has emerged in several other languages. As noted above, this space contains five dimensions resembling the Big Five—albeit with the alternative rotation of Agreeableness and Emotional Stability—but also a sixth factor defined by terms suggesting Honesty–Humility, such as (at the negative pole) *sly* and *pretentious*.

Hierarchical Emergence of Factors, From 1 to 7

Although the five- and six-factor solutions were of greatest a priori interest, we also wanted to investigate several questions related to the nature of the factors that emerged at different levels of the hierarchy of solutions between one and seven factors, inclusive. The specific questions associated with each level of the hierarchy are described below.

At the level of the first unrotated factor, we expected that this dimension would contrast traits that are evaluated positively with those that are evaluated negatively (Osgood, May, & Miron, 1975). Such a factor, which combines elements of Big Five Agreeableness, Conscientiousness, and (to some extent) Emotional Stability, has been recovered as the first unrotated factor in some previous lexical studies (e.g., Boies et al., 2001).

At the two-factor level, we wanted to compare the obtained factors with the Alpha and Beta factors postulated by Digman (1997). Digman's Alpha factor corresponds to socialization; his Beta factor corresponds to self-actualization, which represents a blend of Big Five Extraversion and Intellect–Imagination–Unconventionality.

At the level of three factors, we were interested in the possibility that these factors would represent broad variants of the first three of the Big Five—Extraversion, Agreeableness, and Conscientiousness. Such a result has emerged in lexical studies from languages such as Hungarian (De Raad & Szirmak, 1994), Italian (Di Blas & Forzi, 1999), and Korean (Hahn et al., 1999), but not French (Boies et al., 2001).

At the four-factor level, we planned to compare the four obtained dimensions with the four large factors that have been recovered almost universally across languages (e.g., Ashton, Lee, et al., 2004; De Raad et al., 1998), both within four-factor solutions and as the four largest factors of five- or six-factor solutions. This set of four dimensions includes the Big Five Extraversion and Conscientiousness factors, as well as rotated variants of the Big Five Agreeableness and Emotional Stability factors.

Our questions related to the five- and six-factor solutions have been described above. With regard to the seven-factor solution, we were chiefly interested in exploring the content of whatever seventh factor might emerge and comparing it with the seventh factors

that have been obtained in other languages. Thus far, there has been little if any cross-language consistency in the nature of the seventh factor (see the review by Ashton, Lee, et al., 2004), which in lexical studies to date has represented such diverse constructs as meanness, sophistication, creativity, energy, romanticism, and relaxedness.

Method

Participants

Undergraduate university students from the United States and from Australia were the research participants in this project. In total, there were 310 participants, of whom 187 were American (117 women and 70 men) and 123 were Australian (83 women and 40 men), thus giving an overall gender ratio of 200 women to 110 men. The American data were collected at the University of Oregon by Lewis R. Goldberg, and the Australian data were collected at the University of Western Australia by the late Warren Norman.

Some of the descriptive statistics for these participant samples were reported by Goldberg (1982), and a factor analysis of 75 adjective synonym clusters based on the American sample was reported by Goldberg (1990). In addition, Poiesz and Hofstee (1976), also using the American sample, examined a set of 20 dimensions obtained by removing the first unrotated factor and then rotating the 2nd through 21st factors. The present investigation reports, for the first time, factor analyses of unclustered adjectives based on the combined American–Australian sample.

Materials and Procedure

Participants were instructed to provide self-ratings on each of the 1,710 adjectives, working no more than 1 hr at a time. Ratings were made using an 8-point response scale ranging from *extremely inaccurate* to *extremely accurate*; omitted responses were given the middle value (5) on a transformed 1 to 9 rating scale. The order of presentation of the adjectives was roughly alphabetical.

Note that the low ratio of participants (310) to variables (1,710) in the present study is not of concern, because the stability of a factor solution depends on the sampling error of the correlation coefficient, which decreases with the square root of sample size, regardless of the number of variables. As shown by Guadagnoli and Velicer (1988), a sample size of 300 is generally adequate to ensure stability of factor loading patterns, and a high ratio of variables to factors, as exists in the present study, actually contributes to that stability.

Ipsatization of Adjectives

To eliminate individual differences in the use of the response scale—that is, in the elevation and extremity of participants' responses—we planned to standardize responses within each participant. (Recall that this involves, for each adjective, subtracting the participant's mean self-rating across all adjectives from his or her self-rating on the adjective in question and then dividing this difference by his or her standard deviation of self-ratings across all adjectives.)

However, one possible difficulty with this ipsatization procedure in the present variable set is that this set contains more undesirable than desirable adjectives,[3] a fact that is closely reflected in the distribution of mean responses across all participants in the present sample: 65% of the 1,710 adjectives had mean self-ratings below the neutral point (5.00). As a result of this imbalance, the elevation of each participant's responses—as indexed by his or her mean self-rating across all adjectives—is confounded with the social undesirability of his or her responses, and hence, the usual ipsatization procedure removes some variance that is not due simply to individual differences in elevation and extremity of responses.

In order to prevent the confounding of elevation and desirability when performing the ipsatization procedure, we used the following approach. For each participant, we first calculated (a) his or her mean self-rating across the 1,109 adjectives whose self-rating means for the entire participant sample were below 5.00 and (b) his or her mean self-rating across the 601 adjectives whose self-rating means for the entire participant sample were 5.00 or above. We then averaged these two means for each participant, and this result was used as the participant's mean self-rating for the purpose of standardizing adjective self-ratings within each participant.

We should note that, although we consider the above procedure to be useful for ensuring that elevation of responses is not confounded with desirability of responses, the results obtained using this method are virtually identical to those obtained using the traditional method of ipsatization. For all of the factors reported in the Results section, correlations with corresponding factors calculated using the traditional method of ipsatization of adjectives were at least .99.[4]

Results

Eigenvalues and Scree Plot

Eigenvalues for the first 12 factors were 88.1, 80.9, 62.9, 52.4, 33.4, 27.2, 25.2, 20.9, 18.7, 17.4, 16.6, and 15.7, respectively. The scree plot of eigenvalues (see Figure 1) suggests as many as seven factors. Below, we first describe and discuss the five- and six-factor solutions, which are of considerable a priori interest given the replicated findings from other languages. We then investigate the hierarchical emergence of factors from the one-factor solution to the seven-factor solution. (Recall that the seven-factor solution is of interest not only because of the results of the scree plot, but also for the purpose of comparisons with the various seventh factors obtained in lexical studies of other languages.) All analyses below are principal-components analyses, but for the sake of simplicity, we refer to the components as factors. Also, we report all analyses on the basis of varimax rotations of the factors, but all results based on oblique rotations (e.g., promax) were very similar.

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[3] Goldberg (1982) noted that the English personality lexicon can be characterized by at least three kinds of adjectives: root terms, negations (e.g., *un*), and amplifications (e.g., *over*). He showed that the social-desirability distribution of personality-descriptive root terms is roughly symmetric around the neutral point, whereas amplifications are all undesirable by definition. The interesting case is negations: In the English language desirable adjectives tend to be negated about twice as often as undesirable ones; as a consequence, English negations are twice as likely to be undesirable than desirable. Thus, in a large collection of English trait adjectives such as those in the 1,710, there will be more undesirable than desirable terms because of the inclusion of many negations and amplifications. Note that when smaller adjective sets are constructed by selecting only the most familiar terms, the result tends to be a more desirability-balanced set of terms, because most negations and amplifications are rated as less familiar than are their root terms and are less likely to be included within these smaller adjective sets.

[4] Another method of ipsatization, as described by Hofstee, Ten Berge, and Hendriks (1998), controls for the overall desirability of the item pool by correcting for acquiescence as assessed by the average rating across all antonym pairs (e.g., *kind–unkind*). When we ipsatized the adjectives in this way, using the 344 pairs of antonyms that we identified in the 1,710-adjective set, the resulting factors were highly similar to those reported here, with all convergent correlations exceeding .90; the small differences that exist are presumably attributable to the fact that only 40% of the adjectives could be assigned to an antonym pair.
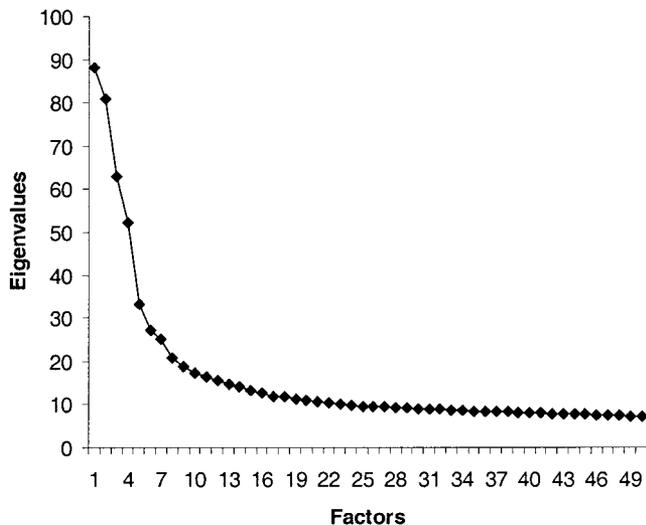
Figure 1. Scree plot of the eigenvalues of the first 50 factors extracted from the set of 1,710 personality-descriptive adjectives in the combined American–Australian sample.

Description of Five-Factor Solution

The highest loading terms on each factor of the varimax-rotated five-factor solution are listed in Table 1.[5] The largest factor was defined most strongly by terms suggesting the absence versus the presence of hostility. This factor can therefore be identified as Agreeableness, but its content—particularly its inclusion of several terms associated with Big Five Emotional Stability (e.g., *patient, undemanding,* and *uncritical* vs. *quarrelsome*; Hofstee et al., 1992; Saucier & Goldberg, 1996)—indicates that it represents the rotated variant of Agreeableness that has emerged in other languages rather than the classic Big Five variant of the factor. The name Agreeableness seems appropriate for the English version of the factor, but some valid alternative names might be Tolerance or Temper (i.e., Good vs. Bad Temper).

Terms with high loadings on the second largest factor included *organized, thorough, efficient,* and *responsible* versus *undisciplined, unsystematic, haphazard,* and *unreliable.* Thus, the second factor represented a Conscientiousness dimension.

On the third largest factor, high-loading terms included *outgoing, jolly, talkative,* and *extraverted* versus *uncheerful, withdrawn, quiet,* and *introverted.* This factor therefore represented an Extraversion dimension.[6]

The fourth factor was defined by terms such as *emotional, feminine, worrying,* and *sensitive* versus *unfeeling, masculine, fearless,* and *unsentimental.* With its emphasis on sensitivity and femininity versus toughness and masculinity, this factor therefore corresponded closely to the Emotionality dimension found in several other languages. The English version of this factor might also be called Sensitivity, given the loadings on this factor of terms such as *sensitive, supersensitive, hypersensitive,* and *oversensitive* versus *insensitive.* Interestingly, each pole of this factor was defined by terms that varied widely in their desirability (e.g., *sensitive, cowardly* versus *unfeeling, fearless*).

Terms with high loadings on the fifth factor included *penetrative, rebellious, philosophical,* and *nonconforming* versus *tame, uningenious, uninquisitive,* and *shallow.* Thus, the fifth factor was

roughly a variant of the Intellect–Imagination–Unconventionality factor that has emerged in previous English investigations and in those of other languages. Interestingly, though, content related to Imagination was somewhat weakly represented on this factor, with few clearly "imaginative" terms being represented among the highest loading variables. Another interesting feature of this factor was the prominence of content related to defiance versus submissiveness, as expressed in terms such as *untamable* versus *submissive* and *tame.* In this regard, the English fifth factor resembled that of the Dutch five-factor solution (e.g., De Raad, 1992; De Raad et al., 1992). It is difficult to summarize the fifth factor with a single name, but here we use the label Openness to Experience to summarize the diverse array of content—including non-Intellect-related content such as nonconformity and unconventionality—on this English version of the factor.

To summarize, the five-factor solution derived from the 1,710-variable set of English personality-descriptive adjectives corresponded closely to the Big Five factor space. Interestingly, however, that solution did not produce the classic Big Five Agreeableness and Emotional Stability axes, but rather the alternative rotation of these factors that has emerged in several other languages. In addition, the five-factor solution produced an Openness to Experience factor defined by terms related to Intellect and Unconventionality, but Imagination-related content was somewhat weakly represented, and content related to defiance versus submissiveness was rather prominent.

Description of Six-Factor Solution

The highest loading terms on each factor of the varimax-rotated six-factor solution are listed in Table 2. The content of the four largest factors was nearly identical across the five- and six-factor solutions. However, one small change was that the interpretation of the first factor as the alternative variant of Agreeableness became somewhat stronger in the six-factor solution, because terms such as *good-tempered* and *nonirritable* versus *quick-tempered* and *hot-tempered* were among the highest loading variables; in the five-factor solution, these adjectives showed slightly lower loadings on the Agreeableness factor and were not among its highest loading variables.

The content of the fifth (Openness to Experience) factor was generally quite similar across the five- and six-factor solutions, but there were some noteworthy shifts in the ranking of the highest loading variables. One important change was that, even though terms suggesting Unconventionality maintained high loadings in

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[5] Readers who are interested in examining the defining content of each factor in more detail may obtain from the authors a set of seven tables listing the loadings of all 1,710 adjectives on the varimax-rotated factors of the two- through seven-factor solutions and on the first unrotated factor.

[6] In previous English-language investigations (e.g., Saucier & Goldberg, 1996), terms suggesting assertiveness, confidence, and self-assurance have been among the highest loading adjectives on an Extraversion factor. In the present study, these terms tended to divide their loadings between Extraversion and low Emotionality, within the four- through seven-factor solutions. Specifically, the adjectives *confident, self-confident, assured,* and *self-assured* versus *unconfident* and *unassured* had roughly equal loadings, in the .30s and low .40s, on Extraversion and low Emotionality, whereas the adjectives *assertive* versus *unassertive* had somewhat weaker loadings on the Emotionality factor.

Table 1
Highest Loading Terms on Varimax-Rotated Factors of Five-Factor Solution Derived From 1,710 Personality-Descriptive Adjectives in the Combined American–Australian Sample

					Factor				
(1) Agreeableness (4.34% of variance)		(2) Conscientiousness (4.24% of variance)		(3) Extraversion (4.16% of variance)		(4) Emotionality (3.45% of variance)		(5) Openness to Experience (2.37% of variance)	
Adjective	Load	Adjective	Load	Adjective	Load	Adjective	Load	Adjective	Load
Spiteful	−.54	Undisciplined	−.61	Uncheery	−.66	Emotional	.60	Tame	−.48
Quarrelsome	−.54	Organized	.57	Untalkative	−.64	Unemotional$_{-3}$	−.60	Penetrative	.48
Vengeful	−.54	Irresponsible	−.56	Uncheerful	−.64	Hypersensitive	.55	Unphilosophical	−.48
Unvindictive	.52	Thorough	.56	Withdrawn	−.62	Unfeeling	−.55	Rebellious$_{-1}$	.46
Revengeful	−.50	Undignified	−.55	Unmerry	−.62	Unmasculine$_1$	.53	Uninquisitive	−.43
Nonhostile	.50	Unsystematic	−.54	Outgoing	.61	Feminine$_1$	.53	Unsearching	−.43
Antagonistic	−.50	Unthorough	−.54	Unsparkling	−.61	Overemotional	.52	Uningenious	−.43
Ruthless	−.50	Unreliable	−.53	Jolly	.60	Fearful	.52	Unquestioning	−.43
Tolerant	.50	Haphazard	−.53	Bubbly	.59	Supersensitive	.52	Philosophical	.42
Harsh	−.50	Orderly	.52	Withdrawing	−.59	Weepy	.52	Shallow	−.41
Uncalculating	.49	Undutiful	−.52	Unenthusiastic	−.59	Masculine$_{-1}$	−.52	Unreflective	−.41
Dictatorial	−.49	Proper	.52	Talkative	.59	Sensitive	.51	Uninquiring	−.40
Hostile	−.48	Thorough-going	.51	Uncommunicative	−.58	Unfeminine	−.51	Unconventional$_{-2}$	.39
Belligerent	−.48	Disorganized	−.51	Overquiet	−.58	Oversensitive	.51	Underwitted	−.39
Nonexplosive	.48	Inexact	−.51	Conversational	.58	Worrying	.50	Nonconforming$_{-2}$	.39
Uncritical	.47	Efficient	.51	Peppy	.58	Unfearing	−.50	Submissive	−.39
Vindictive	−.47	Untidy	−.50	Unsociable	−.57	Manly$_{-1}$	−.50	Traditional	−.39
Abrupt	−.47	Constant	.50	Merry	.57	Girlish$_1$	.50	Unintrospective	−.39
Slanderous	−.47	Uncareful	−.50	Quiet	−.57	Womanly$_1$	.50	Sharp-witted	.38
Patient	.47	Incautious	−.50	Unlively	−.56	Ladylike$_1$	.49	Untamable	.38
Rude$_{-2}$	−.46	Undiligent	−.50	Introverted	−.56	Self-pitying	.49	Incurious	−.38
Unexplosive	.46	Precise	.50	Inward	−.56	Undisturbable	−.49	Uninventive	−.38
Overfiery	−.46	Unbusinesslike	−.49	Extraverted	.56	Overfearful	.49	Intense	.38
Fair-natured	.46	Disorderly	−.49	Effervescent	.56	High-strung	.49	Mild	−.38
Unrevengeful	.45	Unstudious	−.49	Quiet-spoken$_1$	−.55	Fretful	.48	Unperceptive	−.37
Unwarlike	.45	Responsible	.49	Vocal	.55	Tense	.48	Unbookish	−.36
Retaliative	−.45	Polished	.48	Frisky	.54	Unmanly$_1$	.48	Irrepressible	.36
Overviolent	−.45	Inconsistent	−.48	Sparkling	.54	Maternal	.48	Insuppressible	.36
Tyrannical	−.45	Unmannerly	−.48	Lively	.54	Overnervous	.47	Intellectual	.36
Tricky	−.45	Undependable	−.48	Frolicsome	.54	Unexcitable$_{-3}$	−.47	Sugary	−.36
Sharp-tongued$_{-5}$	−.45	Uncautious	−.48	Unsunny	−.54	Fearless	−.47	Conventional$_2$	−.36
				Reserved	−.54	Emotionless$_{-3}$	−.47		
				Vibrant	.54	Undisappointable	−.47		
				Perky	.54	Tough	−.46		
						Self-doubting	.46		
						Fretless	−.46		
						Cowardly	.46		
						Unsentimental	−.46		
						Frightenable	.46		
						Iron-hearted	−.46		

Note. N = 310. Terms having a secondary loading whose absolute value exceeds −.30 are noted with a subscript that indicates the factor and the direction of the loading. For example, "Unconventional$_{-2}$" indicates that *unconventional* had a negative loading of at least −.30 on Factor 2.

the six-factor solution, terms such as *untamable* versus *tame* and *submissive* were no longer among the highest loading adjectives. Another important change was that terms related to Imagination, such as *imaginative* and *poetic* versus *unoriginal*, were now among the highest loading adjectives. Thus, the interpretation of this Openness to Experience factor became clearer in the six-factor solution, with roughly equal representation of Intellect, Imagination, and Unconventionality content. Interestingly, this finding is very similar to that of a recent investigation (Ashton, De Vries, & Lee, 2004) of the terms that had defined the fifth factor in Dutch five- and six-factor solutions (De Raad, 1992, De Raad et al., 1992).

On the sixth factor, the list of highest-loading terms included *unaffected, unpretending, unmercenary,* and *undevious* versus

cunning, sly, pretentious, and *pompous*. This factor, although relatively small, therefore showed much overlap of content with the variants of the Honesty–Humility dimension obtained in several other languages (Ashton, Lee, et al., 2004). This English version of the factor might be named Genuineness, in light of its particular emphasis of content.

To summarize, the six-factor solution derived from the 1,710-variable set of English personality-descriptive adjectives corresponded closely to the six-dimensional space that has emerged in several other languages. The alternative rotation of the Agreeableness and Emotional Stability axes was perhaps even clearer in the six-factor solution than in the five-factor solution. Moreover, the Openness to Experience factor showed higher loadings for Imagination-related terms, and lower loadings for terms suggesting

Table 2

Highest Loading Terms on Varimax-Rotated Factors of Six-Factor Solution Derived From 1,710 Personality-Descriptive Adjectives in the Combined American–Australian Sample

					Factor						
(1) Agreeableness (4.26% of variance)		(2) Extraversion (4.09% of variance)		(3) Conscientiousness (4.08% of variance)		(4) Emotionality (3.50% of variance)		(5) Openness to Experience (2.26% of variance)		(6) Honesty-Humility (1.97% of variance)	
Adjective	Load	Adjective	Load	Adjective	Load	Adjective	Load	Adjective	Load	Adjective	Load
Quarrelsome	−.58	Withdrawn	−.66	Undisciplined	−.60	Unemotional	−.60	Unphilosophical	−.54	Unsly	.43
Patient	.53	Untalkative	−.65	Thorough	.58	Emotional	.59	Uninventive	−.49	Slick	−.43
Sharp-tongued	−.53	Uncheery	−.65	Irresponsible	−.57	Hypersensitive	.55	Uningenious	−.48	Uncunning$_1$	.42
Nonhostile	.53	Overquiet	−.63	Organized	.57	Unfeeling$_{-2}$	−.55	Unsearching	−.48	Affected	−.42
Tolerant	.53	Outgoing	.63	Unthorough	−.54	Fearful	.53	Unperceptive	−.48	Unaffected	.42
Nonexplosive	.53	Uncheerful	−.62	Haphazard	−.54	Supersensitive	.52	Penetrative	.47	Courtly	−.42
Spiteful	−.52	Quiet	−.62	Orderly	.53	Feminine$_1$	.52	Unintelligent	−.47	Cunning	−.42
Good-tempered	.52	Talkative	.61	Unsystematic	−.52	Unmasculine$_6$	.52	Uninquisitive	−.46	Unpretentious	.41
Hostile	−.51	Withdrawing	−.60	Constant	.52	Weepy	.51	Ingenious	.45	Polished$_3$	−.41
Revengeful	−.51	Uncommunicative	−.59	Proper	.52	Overemotional	.51	Unintrospective	−.45	Sugary	−.40
Vengeful	−.50	Unmerry	−.59	Undutiful	−.52	Oversensitive	.51	Rebellious$_{-1}$	.44	Posed	−.40
Hot-tempered	−.50	Conversational	.59	Inexact	−.52	Sensitive	.51	Philosophical	.43	Unsophisticated	.40
Antagonistic	−.50	Silent	−.59	Unreliable	−.52	Unfeminine	−.50	Narrow	−.43	Uncrafty	.40
Harsh	−.50	Introverted	−.59	Thorough-going	.51	Masculine	−.50	Traditional	−.42	Crafty	−.39
Ruthless	−.49	Quiet-spoken$_1$	−.59	Disorganized	−.51	Worrying	.50	Sharp-witted	.41	Unwise$_{-3}$	.39
Belligerent	−.49	Peppy	.58	Efficient	.51	Unfearing	−.50	Complex	.41	Tricky$_{-1}$	−.39
Dictatorial	−.49	Inward	−.58	Purposeful	.51	Girlish$_1$	.50	Unimaginative	−.41	Unfeigning$_1$	.38
Overviolent	−.49	Bubbly	.58	Responsible	.51	Ladylike$_1$	.49	Unquestioning	−.41	Sneaky$_{-1}$	−.38
Quick-tempered	−.49	Extraverted	.57	Inconsistent	−.50	Self-pitying	.49	Uninquiring	−.41	Sly	−.38
Good-hearted	.49	Unsociable	−.57	Precise	.49	Overfearful	.49	Closed-minded	−.41	Undevious$_1$	.38
Explosive	−.49	Unsparkling	−.57	Consistent$_{-4}$	.49	Manly	−.48	Unoriginal	−.41	Suave	−.37
Undemanding	.49	Unenthusiastic	−.57	Disorderly	−.49	Womanly	.48	Unreflective	−.41	Ungraceful$_{-3}$	.36
Gentle	.49	Vocal	.57	Unstudious	−.49	Undisturbable$_1$	−.48	Conventional$_3$	−.40	Pretentious$_{-1}$	−.36
Abrupt	−.48	Shy	−.56	Undignified$_6$	−.49	Fretful	.48	Unvisioned	−.40	Unpretending	.35
Rude$_{-3}$	−.48	Jolly	.55	Undiligent	−.49	Self-doubting	.48	Narrow-minded$_{-1}$	−.40	Unlearned$_{-5}$	.35
Resentful	−.48	Nonvocal	−.55	Inconstant	−.49	Maternal	.48	Unconventional$_{-3}$	.39	Heroic	−.35
Nonirritable$_{-4}$	.47	Merry	.55	Diligent	.49	Overnervous	.47	Perceptive	.39	Unmercenary	.35
Unimpatient	.47	Unvocal	−.55	Incautious	−.49	Cowardly	.47	Poetic	.39	Foxy	−.35
Violent	−.47	Effervescent	.54	Stable$_{-4}$	.48	Tough	−.47	Unliterary	−.39	Wise	−.34
Argumentative	−.47	Unlively	−.54	Exact	.48	Unmanly$_1$	.47	Uninformed	−.38	Undeceptive$_1$	.34
Unexplosive	.47	Unspeaking	−.54	Untidy	−.48	High-strung	.47	Profound	.37	Uneducated$_{-3}$	.34
Demanding	−.47	Perky	.54	Undependable	−.48	Fearless	−.47	Intense	.37	Pompous	−.34
Retaliative	−.47	Reserved	−.54	Indefinite$_4$	−.48	Gullible	.47	Shallow	−.37		
Bossy	−.47			Uncareful	−.48	Unsentimental	−.47	Underwitted	−.37		
Overfiery	−.47					Frightenable	.46	Imaginative	.37		
Grumpy	−.47					Unexcitable$_{-2}$	−.46	Uninvestigative	−.37		
						Tense	.46				
						Undisappointable	−.46				
						Fretless	−.46				

Note. $N = 310$. Terms having a secondary loading whose absolute value exceeds −.30 are noted with a subscript that indicates the factor and the direction of the loading. For example, "Uneducated$_{-3}$" indicates that *uneducated* had a negative loading of at least −.30 on Factor 3.

defiance versus submissiveness, than it did in the five-factor so-
lution. Finally, the English sixth factor was a plausible variant of
the sixth factor obtained in other languages, being defined at the
opposite pole by content related to slyness and pretentiousness.

Possible Concerns Regarding the Interpretations of the Five- and Six-Factor Solutions

The dimensions summarized above and in Tables 1 and 2
indicate that the structure of the English personality lexicon is
quite similar overall to the structures obtained in various other
languages. However, there are at least four features of the English
five- and six-factor solutions that might raise concerns regarding
the interpretation of that structure.

Gender differences and the fourth factor.   Many of the terms
defining the fourth factor were overtly gender-related terms (e.g.,
masculine, feminine, manly, womanly), and gender differences on
this factor were rather large ($d = 1.35$ in the six-factor solution).
These facts raise the possibility that the location of this factor was
determined by the large gender differences on several terms; that
is, one might speculate that the fourth factor would not emerge in
the same location if the overtly gender-linked terms were removed
or if gender differences on all terms were controlled. We tested
both of these possibilities.

First, we computed a new varimax-rotated six-factor solution
after first removing all 17 overtly gender-linked terms from the
variable set. Factor scores on the resulting factors all correlated .99
or above with those derived from all 1,710 terms, and the defining
content of the Emotionality factor was essentially identical to that
of Table 2, except for the elimination of all overtly gender-linked
terms.

Next, we computed a new varimax-rotated six-factor solution
based on ipsatized responses to all 1,710 terms, after having first
eliminated gender differences by standardizing those responses
within each sex. The six factors derived from this analysis were in
fact very highly correlated with those of the original analysis:
Convergent correlations ranged from .90 to .98, except that the
convergent correlation involving the fourth factor was only .81,
owing to the removal of variance due to gender and the corre-
sponding sharp reduction in the loadings of overtly gender-related
terms. Otherwise, however, the substantive content of the factor
was still very similar: The highest-loading terms were still those
related to emotionality, sensitivity, and fearfulness versus their
opposites. Thus, the location and interpretation of the fourth factor
cannot be attributed in any large part to gender differences on its
defining terms.

Anomalies in the sixth factor.   Several of the terms defining the
sixth factor tend to weaken its similarity to the sixth factors
obtained in various other languages. For example, terms such as
unwise, ungraceful, and *uneducated* versus *heroic* do not have any
clear link to the honesty- and humility-related content associated
with the variants of this factor seen in other languages. However,
these anomalies may be explained in terms of the rotational ori-
entation of the small English sixth factor in relation to the large
English first factor; that is, the interpretation of the English sixth
factor as a variant of Honesty–Humility is clarified by rerotating
the first and sixth factors approximately 30° (i.e., Factor 6′ =
cos30 × Factor 6 + sin30 × Factor 1; Factor 1′ = cos30 × Factor
1 – sin30 × Factor 6).

When we computed this rerotation (see Table 3), it had little
influence on the interpretation of the first factor, whose defining
terms tended to have near-zero loadings on the sixth factor within
the varimax solution. In contrast, the rerotation of these factors
improved the interpretability of the sixth factor, which gained
terms such as *uncalculating, unostentatious, fair-minded*, and *un-
assuming* and lost terms such as *unwise, ungraceful*, and *unedu-
cated*. This rerotation does not diminish the fact that the English
sixth factor was relatively small in the varimax solution, but it
demonstrates that a vector corresponding closely to Honesty–
Humility exists within the six-factor space defined by English
personality adjectives and that this vector is orthogonal to five
other axes that are also very similar to those obtained in other
languages.[7]

Negation terms and the fifth and sixth factors.   Inspection of
the factors of Table 2 reveals that one of the poles of both the fifth
and sixth factors is dominated by terms that begin with the prefix
"*un.*" This raises the possibility that these factors emerge chiefly as
a result of individual differences in the tendency to endorse nega-
tions. However, there are two reasons to discount this possibility.
One reason is that the terms defining the negative poles of the fifth
and sixth factors are easily differentiated with regard to their
content, particularly after the rerotation of the first and sixth
factors: Terms suggesting shallowness and lack of reflection gen-
erally load on the negative pole of the fifth factor, and terms
suggesting deception and pretentiousness generally load on the
negative pole of the sixth factor. A few anomalies in the varimax-
rotated solution (e.g., *unlearned*) are eliminated by rerotating the
first and sixth factors, as described above.

Another reason to reject the hypothesis that the fifth and sixth
factors are artifacts of the inclusion of negations is provided by the
results of analyses in which all terms beginning with the prefix
"*un*" are excluded. In a varimax-rotated six-factor solution, both
factors became smaller, and the sixth factor was defined by terms
related to religiosity in addition to low Honesty–Humility. In a
varimax-rotated seven-factor solution, factors representing Open-
ness to Experience, Honesty–Humility, and Religiosity all
emerged; convergent correlations between factor scores on these
three factors and those on the fifth, sixth, and seventh factors
derived from the full variable set ranged from .87 to .93. There-
fore, although the presence of negations contributed to the size of
the fifth and sixth factors, it was not responsible for the emergence
of those factors.

Naming the fifth factor.   Some readers might question the
naming of the fifth-largest factor as Openness to Experience,
because the combination of Intellect, Imagination, and Unconven-
tionality that characterizes the fifth factor does not correspond
perfectly to the Openness to Experience construct as conceptual-

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[7] One anomaly associated with these results is that even after rerotation,
the term *humble* loaded on the first factor rather than on the sixth factor.
This may raise some question regarding the suitability of the name
Honesty–Humility as a descriptor of the sixth factor, especially given that
humble was not among the highest loading terms on this factor in the other
languages summarized by Ashton, Lee, et al. (2004). On the other hand,
however, the term *Humility* does seem to capture the lack of ostentatious-
ness and lack of pretentiousness that typically characterize the sixth factor
in various languages, including English. Moreover, the interpretation of self-
reports on terms such as *humble* is somewhat difficult, because persons who
are truly humble are likely to be reluctant to claim high levels of these traits.

Table 3

Highest Loading Terms on First and Sixth Factors of Six-Factor Solution After 30° Rerotation of Varimax Rotated Factors

	Factor		
(1′) Agreeableness (3.25% of variance)		(6′) Honesty-Humility (2.99% of variance)	
Adjective	Load	Adjective	Load
Good-tempered	.55	Uncunning	.52
Sharp-tongued	−.53	Uncalculating	.52
Hot-tempered	−.51	Unsly	.51
Patient	.50	Tricky	−.50
Quarrelsome$_{-6'}$	−.50	Unvindictive	.49
Gentle	.49	Cunning	−.49
Quick-tempered	−.49	Unfeigning	.49
Nonexplosive	.46	Sneaky	−.49
Bossy	−.46	Uncrafty	.48
Good-natured	.46	Undevious	.48
Grumpy	−.46	Sly	−.47
Serene	.46	Unpretentious	.46
Good-hearted	.46	Pretentious	−.46
Argumentative	−.45	Undeceptive	.46
Gentle-hearted	.45	Slick	−.44
Explosive	−.45	Surly	−.44
Nonhostile	.45	Unwily	.43
Stormy	−.45	Crafty	−.43
Hostile	−.44	Unmercenary	.43
Undemanding	.44	Posed	−.43
Resentful	−.44	Overcunning	−.43
Peaceful	.44	Affected	−.43
Overviolent	−.44	Unaffected	.42
Nonirritable$_{-4}$	.43	Vindictive	−.41
Tolerant$_{6'}$	.43	Vengeful$_{-1'}$	−.41
Irritable$_4$	−.43	Unpresuming	.40
Demanding	−.42	Unostentatious	.40
Violent	−.42	Unsuspicious	.40
Humble	.42	Scheming	−.40
Unargumentative	.42	Unwild	.39
Crabby	−.42	Foxy	−.39
Tame$_{-5}$	.42	Fair-minded	.39
Ill-tempered	−.42	Unsophisticated	.39
Cranky	−.42	Brawlsome	−.39
		Spiteful$_{-1'}$	−.39
		Unassuming	−.39

Note. $N = 310$. Terms having a secondary loading whose absolute value exceeds −.30 are noted with a subscript that indicates the factor and the direction of the loading. For example, "Spiteful$_{-1}$" indicates that *spiteful* has a negative loading of at least −.30 on Factor 1. Rerotated factors were calculated as follows from the varimax-rotated solution of Table 2: Factor 1′ = cos30 × Factor 1 − sin30 × Factor 6; Factor 6′ = cos30 × Factor 6 + sin30 × Factor 1.

ized by Costa and McCrae (1992). On the other hand, there is clearly some reasonably close correspondence between the two constructs, and there is also some convenience in adopting this well-known name instead of the more unwieldy Intellect–Imagination–Unconventionality. Nevertheless, we agree that the name Openness to Experience is less than ideal, and we invite readers to suggest a name that concisely summarizes the range of content that defines this factor.

Hierarchical Emergence of Factors

Below, we describe and discuss the content of the first unrotated principal component and of the varimax-rotated factors of the solutions containing two, three, four, and seven factors. (The five- and six-factor solutions were described in detail in the previous sections, but here we describe the relations of the factors of those solutions with each other and with the factors of the four- and seven-factor solutions.) Correlations between the factor scores from the factors at adjacent levels of the factor hierarchy are shown in Figure 2.

One factor. The first unrotated principal component was defined most strongly by terms such as *constant, stable, polite, courteous,* and *consistent* versus *rude* and *erratic.* The content of this dimension is generally consistent with an interpretation of overall social desirability. Interestingly, this factor was also defined modestly by terms that are suggestive of socialization but that are rather neutral in their desirability, such as *conservative* and *conventional* versus *rebellious* and *wild.* The latter content suggests some similarity to Digman's alpha factor, although that factor would be expected to emerge at the two-factor level rather than as the first unrotated factor.

Two factors. In the two-factor solution, one factor was defined most strongly by terms such as *unwild* and *nonexplosive* versus *loud* and *noisy.* The other factor was defined by terms such as *dynamic* and *self-assured* versus *unconfident* and *unassertive.* Thus, these two factors do not have any clear one-to-one relationship with the Alpha and Beta factors suggested by Digman (1997). However, a 30° rerotation of these factors produces one dimension that aligns closely with the first unrotated factor and, thus, resembles Alpha (see above). The other rerotated dimension continues to be defined most strongly by terms suggesting dynamism and assertiveness, which are relevant to Beta, but is not defined by the imagination and creativity that are also supposed to characterize Beta (see Digman, 1997).

Three factors. In the three-factor solution, the Quietness factor of the two-factor solution emerged largely intact, and the Self-Confidence factor of the two-factor solution also emerged in roughly similar form. The third factor was defined by terms suggesting femininity and warmth versus masculinity and coldness. Therefore, these factors do not simply represent broad variants of the three largest Big Five dimensions, namely Extraversion, Agreeableness, and Conscientiousness. This result is contrary to the findings of several previous studies (e.g., De Raad & Szirmak, 1994; Di Blas & Forzi, 1999; Hahn et al., 1999), but not all (e.g., Boies et al., 2000).

Four factors. The content represented in the three-factor solution was entirely rearranged at the four-factor level, with each of the four dimensions being related to two or more of the dimensions obtained at the three-factor level. These four factors were all very similar to the four largest factors of the five- and six-factor solutions, described above, with convergent correlations of .94 or higher for all four factors. (Note that Emotionality was reversed in the four-factor solution; hence $r = −.94$ with the five-factor version of the factor.) Thus, these vectors represent the same four factors that have emerged repeatedly across languages as the four largest factors (e.g., Ashton, Lee, et al., 2004; De Raad et al., 1998).

Five factors. The five-factor solution was described in detail in the previous sections, but here we note the relations between the four- and five-factor solutions. The dimensions of the four-factor level were largely unchanged at the five-factor level, with the only very small difference being that the fourth factor of the four-factor solution (Emotionality or Sensitivity) lost a small amount of vari-
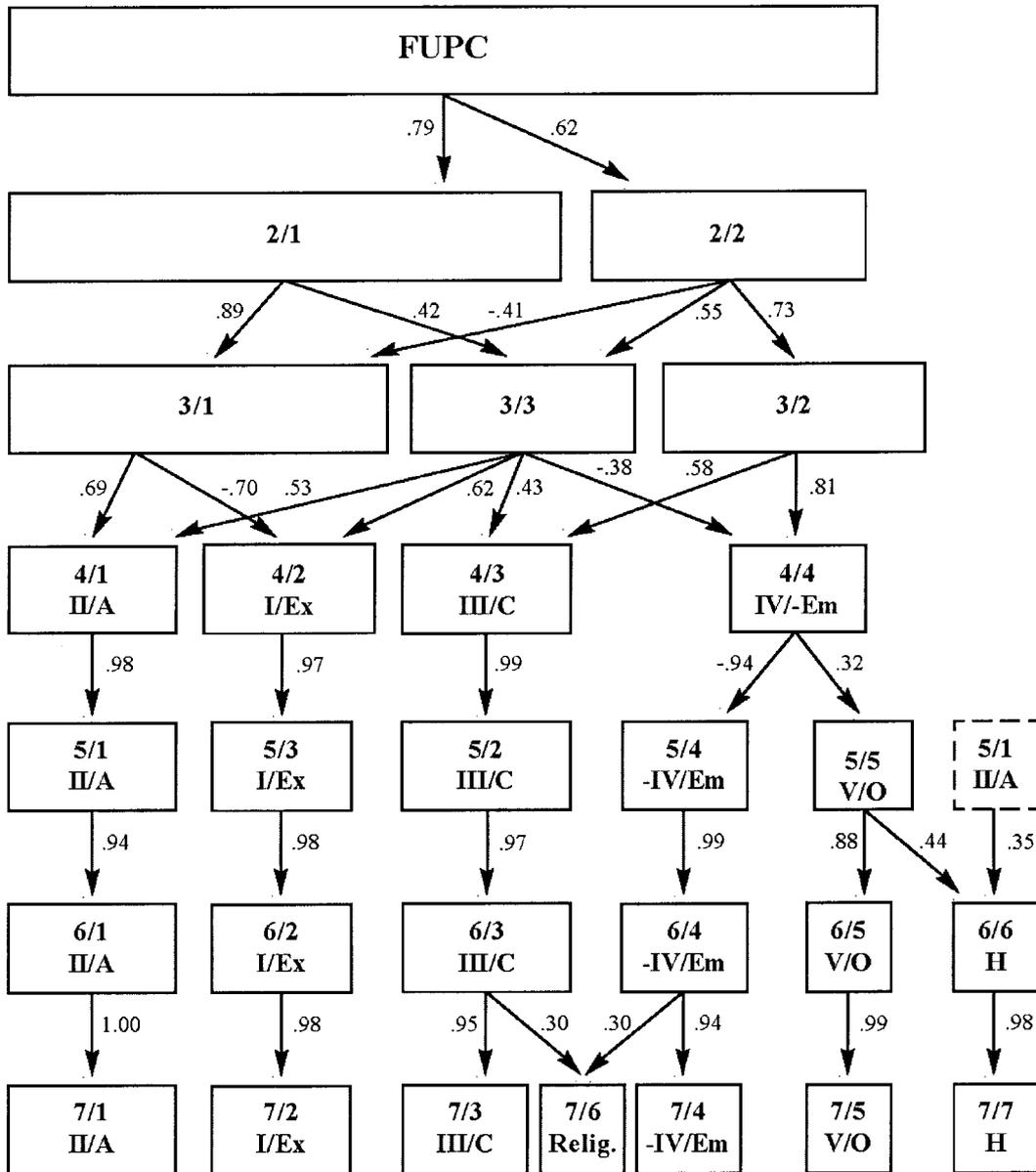
Figure 2. The hierarchical structure of 1,710 personality-descriptive adjectives in the combined American-Australian sample. Numbers in boxes represent rank of factor size within solution (before slash) and number of factors in solution (after slash). Numbers corresponding to arrows are correlations between factor scores on the factors linked by the arrows. The broken-line box repeats the factor from the opposite side of the figure. FUPC = first unrotated principal component; I = Extraversion (or Surgency); II = Agreeableness; III = Conscientious-ness; IV = Emotional Stability (vs. Neuroticism); V = Intellect–Imagination; A = Agreeableness, Ex = Extraversion, C = Conscientiousness, Em = Emotionality, O = Openness to Experience, H = Honesty-Humility, Relig = Religiosity.

ance to the fifth factor of the five-factor solution (Openness to Experience).

Six factors. The six-factor solution was described in detail in the previous sections, but here we note the relations between the five- and six-factor solutions. The dimensions of the five-factor solution were largely unchanged at the six-factor level, except that the convergent correlations were slightly lower for the first and fifth factors, thus reflecting the slight improvements in the inter-

pretability of these factors at the six-factor level. The first and fifth factors of the five-factor solution were both modestly correlated (.35 and .44, respectively) with the sixth factor of the six-factor solution, but that factor was otherwise unrelated to the dimensions of the five-factor solution.

Seven factors. The factors of the six-factor solution emerged in almost identical form in the seven-factor solution, except that the third (Conscientiousness) and fourth (Emotionality or Sensi-

tivity) factors each lost a small amount of variance to the new factor of the seven-factor solution. This new factor was clearly interpretable as Religiosity, with its highest-loading terms being *religious, prayerful, reverent, spiritual, devout, ultrareligious*, and *ultraspiritual* versus *unreligious, irreligious, nonreligious, unspiritual*, and *undevout*. This factor thus adds to the list of seventh factors that have been obtained in the standard lexical studies of various languages (see Ashton, Lee, et al., 2004).[8] Some readers might suggest that Religiosity belongs more properly in the domain of social attitudes than in the domain of personality traits; we consider this issue in the Discussion section below.

Discussion

The most prominent feature of the present lexical study of personality structure is that it is based on a variable set that approaches the full population of English personality-descriptive adjectives. The factor structure that emerged from this investigation is more similar to those found in other languages than to those found in previous English-language studies based on reduced sets of variables, such as synonym clusters (Goldberg, 1990) or highly familiar terms (Saucier & Goldberg, 1996).

The recovery of this structure is impressive in light of a few potential disadvantages associated with the use of the 1,710-adjective variable set. One such drawback is the presence of many synonymous terms, which tend to predominate among the highest loading variables on the various factors and which may influence the location and interpretation of those factors. In addition, this adjective set contains several subsets of adjectives that share prefixes, and the near-alphabetical presentation of adjectives to the research participants might have tended to inflate the correlations within these subsets of terms. Despite these potentially problematic features, however, the present variable set produced a factor structure that closely resembles that obtained in several other languages (e.g., Ashton, Lee, et al., 2004). Below, we discuss several implications of these results.

Rotational Positions in the Big Five Agreeableness and Emotional Stability Plane

This investigation shows that the English personality lexicon produces the same rotational variants of Agreeableness and Emotional Stability that are obtained in other languages, rather than the classic Big Five variants of those factors. Recall that whereas the classic Big Five structure—along with questionnaire measures of the Five-Factor Model (Costa & McCrae, 1992)—places anger-related traits at the low pole of an Emotional Stability factor, the lexical evidence shows that such content typically joins instead with traits related to low Agreeableness. Similarly, traits suggestive of sensitivity are primarily associated with Agreeableness in the classic Big Five structure, but the lexical evidence shows that such content typically aligns instead with other traits related to Emotionality, such as anxiety and fearfulness. In light of the evidence provided by the present study of a very large set of English trait adjectives, it now appears that the simple structure criterion favors the "alternative" rotation of the Agreeableness and Emotional Stability axes in English, just as it has in other languages.

The consistent emergence of these rotated variants of Agreeableness and Emotional Stability may be due at least in part to the distribution of evaluatively neutral and nonneutral terms within this plane. In many languages, including English, there are many terms in the evaluatively positive versus negative quadrants of the plane, in which terms such as *patient* and *tolerant* versus *quarrelsome* and *hostile* are located. As a result, this region is particularly likely to attract a factor axis whenever a simple structure-seeking algorithm such as varimax is applied. Consequently, the other, orthogonal vector within this plane is likely to be located through a region of evaluatively neutral terms, such as *emotional* and *feminine* versus *unemotional* and *masculine*.

To some extent, the location of factor axes in the Agreeableness–Emotional Stability plane (or any other) is arbitrary; because the vectors are rotational variants of each other, multiple regression-based prediction equations from either pair will predict any external criterion with equal validity. An interesting issue, however, is the question of which rotational position is most useful conceptually or theoretically. For reasons discussed below, Ashton and Lee prefer the alternative rotation that has now emerged as the simple-structure location of the axes, whereas Goldberg prefers the classic Big Five versions of Agreeableness and Emotional Stability.

Two of us have argued that, regardless of which axis location typically emerges, the alternative rotation allows the most parsimonious interpretation of the Agreeableness–Emotional Stability plane (Ashton, Jackson, Helmes, & Paunonen, 1998; Ashton & Lee, 2001; Ashton, Paunonen, Helmes, & Jackson, 1998; Lee & Ashton, 2004). Specifically, the Emotionality (or Sensitivity) axis can be understood with reference to variation in kin altruism-related behaviors, and the rotated Agreeableness (or Tolerance) axis can be understood with reference to variation in one aspect of reciprocal altruism; namely, that of forgiveness. In addition, the position of the latter axis thereby also allows simple interpretation of the Honesty–Humility factor as the vector related to the *other* aspect of reciprocal altruism; namely, that of fairness.

On the other hand, there are reasons to prefer the traditional Big Five Agreeableness and Emotional Stability vectors as the theoretically optimal axis locations. For example, the classic Big Five Agreeableness factor provides a single axis of prosocial versus antisocial tendency that is neutral with regard to emotional reactivity. Also, the classic Emotional Stability axis has, at its negative pole, an array of "neurotic" content that is readily linked with the Negative Affectivity construct, whose biological basis has been examined extensively (e.g., Watson & Clark, 1984).

The Fifth Factor in the English Personality Lexicon

The results of this study show that the English personality lexicon contains an Openness to Experience dimension within five-factor solutions and as the fifth-largest factor of six-factor solutions. Interestingly, however, the interpretation of the fifth factor is clearer within the six-factor solution than within the five-factor solution. This improvement in clarity is due both to the more nearly equal representation of Intellect, Imagination, and Unconventionality on the Openness to Experience factor of the

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[8] Interestingly, a Religiosity factor was previously obtained in solutions involving larger numbers of factors in some Filipino (Tagalog) investigations (e.g., Church et al., 1998) and in French (Boies et al., 2001). In the English language, some analyses reported by Goldberg (1990) also produced a Religiosity factor in solutions involving more than five factors.

six-factor solution and to the weaker representation of terms suggesting defiance versus submissiveness on that same factor. As noted in the Results section, a very similar modification of an Openness to Experience-like factor between five- and six-factor solutions has characterized the Dutch personality lexicon (Ashton, de Vries, & Lee, 2004). This purification of the fifth factor is an interesting and unexpected residual advantage of the extraction and rotation of a sixth factor.

The Sixth Factor in the English Personality Lexicon

An important result of this study is the finding that the English personality lexicon does contain a sixth factor broadly similar to the Honesty–Humility dimension that has been obtained in other languages, such as Dutch, French, German, Hungarian, Italian, Korean, and Polish. The English version of the factor contained many terms that had defined the analogous factors of other languages (cf. Ashton, Lee, et al., 2004), including adjectives such as *sly, cunning, pretentious, pompous, unassuming, (un)mercenary, (un)calculating, (un)pretending,* and *(un)ostentatious.* Previous English lexical studies (e.g., Goldberg, 1990; Saucier & Goldberg, 1996) had not revealed such a factor, and so it is interesting to consider reasons why this factor had not previously been observed in the English language.

The failure to find a sixth factor in previous studies is likely attributable, in large part, to the relative weakness of this dimension in the English lexicon. The English counterpart of the Honesty–Humility factor was the smallest dimension of the six-factor solution, whereas in several other languages (see Ashton, Lee, et al., 2004), this factor was either the fifth-largest (in French, Hungarian, Italian, and Korean) or even the fourth-largest (in Polish). Moreover, the English variant of this factor was somewhat narrow in scope and rather impure in its content; despite the broad interpretability of this English sixth factor, a rerotation of the factor axes was necessary to "clarify" the dimension.

Given the relatively small size of the sixth dimension that is derived from such a vast array of English trait adjectives, it is not especially surprising that analyses of smaller variable sets have failed to recover this factor. For example, the process of sorting the 1,710 variables into a set of synonym clusters that was computationally manageable during the 1980s (Goldberg, 1990) may have tended to weaken the proportional representation of sixth-factor content. Similarly, the process of selecting a subset of the most familiar adjectives from the larger variable set (Saucier & Goldberg, 1996) may have had the same effect. Because the English sixth factor is relatively small, any such effects in the variable reduction process could potentially have been sufficient to preclude the emergence of that factor.

Empirical and Conceptual Links Between Agreeableness and Honesty–Humility

Recall that six-factor solutions from lexical studies of personality structure usually produce an Honesty–Humility factor and the alternative variant of Agreeableness (i.e., containing patience but not sensitivity). Relations between these two dimensions are of some interest both empirically and conceptually. In some previous investigations, notably those in the German and Hungarian languages, the emergence of an Honesty–Humility-like factor within six- (or five-) factor solutions has resulted from a division of a very broad Agreeableness factor into two parts. In other investigations, including Dutch, French, and Korean, an Honesty–Humility-like factor has not simply divided from a broad Agreeableness factor, but has instead emerged in the six-factor solution largely as a new factor, with some small contributions from one or more other factors of the five-factor solution.

In the present study, the emergence of the English sixth factor resembled the latter case, as this factor correlated modestly with the Agreeableness factor of the five-factor solution, and actually correlated more strongly with the Openness to Experience factor of the five-factor solution. However, as noted above, the interpretation of the English sixth factor as an Honesty–Humility-like dimension was clarified by rotating this factor with respect to the Agreeableness axis. Therefore, the present results do provide some support for a special link between the Honesty–Humility and Agreeableness factors of the six-factor solution.

The tendency for Agreeableness and Honesty–Humility to coalesce into a single factor when few factors are extracted is consistent with the theoretical interpretations made by Ashton and Lee (2001; Lee & Ashton, 2004). According to these interpretations, the Agreeableness and Honesty–Humility dimensions represent two distinct aspects of individual differences in reciprocal altruistic tendencies. Specifically, Agreeableness is thought to represent a "forgiving" tendency to continue cooperating with another even when his or her behavior suggests a low likelihood of reciprocation, and Honesty–Humility is thought to represent a "fair-minded" tendency to continue cooperating with another even when he or she seems unlikely to retaliate against exploitation (Ashton & Lee, 2001; see also Perugini, Gallucci, Presaghi, & Ercolani, 2003). To the extent that an individual has a high level of both tendencies, he or she can be said to have a strong inclination toward reciprocal altruism, and it is this compound that is likely to correspond closely to the broad Agreeableness (plus Honesty–Humility) factor that is sometimes found in four- and five-factor solutions.

Before leaving this topic, we should note two important points about the occasional division of a very broad Agreeableness factor into the narrower (but still broad) Agreeableness and Honesty–Humility factors. First, this division is not an inevitable consequence of the large size of the Agreeableness factor, because the Extraversion and Conscientiousness factors of four- and five-factor solutions are generally equally as large as Agreeableness. Second, this division is not merely due to any extreme distributional properties of the terms defining Honesty–Humility, because typically the mean responses to the terms defining this factor are not much different from those of the terms defining Agreeableness. For a discussion of these and related issues, see the exchange between Ashton and Lee (2001, 2002) and Saucier (2002).

Higher Order Factors

The results of this study have some implications for the various suggestions that have been made regarding the existence of higher order personality factors. First, the one-factor solution shows that a dimension related to overall evaluation does exist in the English lexicon, although this English version of the factor is also defined by some evaluatively neutral terms that suggest high versus low levels of socialization.

The two-factor solution reported here does not support the existence of Alpha and Beta factors such as those described by

Digman (1997). Instead of producing dimensions related to socialization and self-actualization, the two-factor solution instead yielded factors defined by quietness and self-confidence. The results of this study indicate that the emergence of alpha and beta as the simple-structure axes of two-dimensional solutions is not a universal phenomenon, although much of the variance of alpha and beta may still be accommodated within those solutions.

Similarly, the three-factor solution did not produce the expanded versions of the Big Five Agreeableness, Extraversion, and Conscientiousness factors that have been found in many previous studies. Instead, all of the three factors observed here, like those obtained in the French lexical study (Boies et al., 2001), were complex combinations of the four largest factors that emerged in subsequent solutions. This finding suggests that the classic three-dimensional structure might not be as robust as it had once appeared, although it remains the case that this structure has been recovered in most languages studied so far (e.g., Hungarian, Italian, Korean, and previous English investigations). Also with regard to the three-factor solution of the present study, it should be noted that this solution does not resemble the three-dimensional structures proposed by Eysenck and Eysenck (1975) and by Tellegen (1982), which contain factors labeled Extraversion, Neuroticism, and Psychoticism and as Positive Emotionality, Negative Emotionality, and Constraint, respectively.

Interestingly, the four-factor solution obtained in the present study does match very closely the sets of four factors that have been observed in several other languages, both as the dimensions of the four-factor solution and as the four largest factors of subsequent solutions. It now seems clear that Extraversion, Conscientiousness, and the rotated variants of Agreeableness and Emotional Stability have a special status as the four largest personality factors.

Religiosity as a Personality Factor?

Another noteworthy result of the present study was the emergence of a Religiosity dimension within the seven-factor solution. This finding is interesting for at least two reasons. First, Religiosity can now be added to the diverse array of seventh factors that have emerged, additional to the six widely replicated dimensions, within seven-factor solutions derived from personality-descriptive terms (see Ashton, Lee, et al., 2004). Future lexical studies should investigate seven-factor solutions, so that any robust seventh factor can be identified, but the highly varied results of those studies thus far have not suggested any strong candidate as a potential seventh factor.

In addition, the emergence of Religiosity as the seventh factor of the English personality lexicon raises the question of whether Religiosity should be viewed as part of the personality domain. In developing the list of personality-descriptive adjectives used in the present research, Norman and Goldberg chose to include adjectives that described social attitudes, including many synonymous adjectives describing religiosity. This decision is consistent with those made by many subsequent researchers who have also included religiosity-related terms within their lexical studies of personality structure. In the present data set, the emergence of a Religiosity factor reflected both the large number of those religiosity-related terms and also the very wide interindividual variation in self-rated religiosity, as participants tended to describe themselves either as very religious or as very nonreligious. Thus,

although the Religiosity factor was among the seven largest factors obtained from this variable set, this factor is nonetheless somewhat narrow in the content of its defining terms, and its size is due in part to the wide bimodal distribution of self-ratings on those terms.

It should be noted that constructs very similar to Religiosity have previously been proposed as major dimensions of personality. For example, Cloninger, Svrakic, and Przybeck (1993) proposed a Self-Transcendence dimension, and Piedmont (1999) proposed a Spirituality dimension, both of which are largely independent of the major personality factors. Most researchers would probably agree that Religiosity is a very important dimension of individual differences, but many of them might consider Religiosity to be qualitatively different from the major dimensions of personality and, thus, to fall outside the domain of personality proper. For example, Religiosity is unlike those personality factors in the sense that it is based on systems of beliefs and social attitudes (Saucier, 2000). Interestingly, assortative mating is much stronger for religion-related variables than for personality traits (Lykken & Tellegen, 1993), and shared environment influences are apparently much stronger for religious attitudes than for personality variables (Abrahamson, Baker, & Caspi, 2002). Also, some researchers who have studied religiosity have implicitly treated it as a dependent variable to be predicted by personality, rather than as a variable located within the boundaries of the personality domain (e.g., McCullough, Tsang, & Brion, 2003; Saroglou, 2003).

Conclusions

The present study of the factor structure of 1,710 personality-descriptive adjectives of the English language revealed results similar to those generally obtained in lexical studies conducted in other languages. In the five-factor solution, the five-dimensional space of the Big Five factor structure was largely recovered, albeit with the alternative rotation of the Agreeableness and Emotional Stability factors, and with some minor differences in the highest loading terms on the Extraversion and Openness to Experience (Intellect–Imagination) factors. In the six-factor solution, a small sixth factor represented a variant of the Honesty–Humility factor. These results, therefore, should help to resolve the inconsistencies between the results of lexical studies of personality structure in English and those of similar investigations in other languages.

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