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The factor structure of Lithuanian personality-descriptive adjectives of the highest frequency of use

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We developed the Lithuanian taxonomy of personality traits according to the psycho-lexical approach. This was done in two studies. First, trait descriptive terms were selected from a Lithuanian dictionary. This selection led to a list of 435 personality-relevant adjectives was thus collected. This list was reduced to the more useful terms and ultimately led to the 194 most frequently used trait adjectives. Second, self-ratings from 212 participants were collected on both those 194 terms and on the 44-item BFI. Principal Components Analysis followed by Varimax rotation was applied on the collected ratings, and also on the ratings after ipsatization. For both these types of analysis structures with two up to seven factors were discussed. Each of the structures was also related to the five BFI-scales. The slightly clearer structure was found in the ipsatized ratings, in which clear support was found for the two-factor model (with Dynamism and Social Propriety), for the three-factor model (Dynamism, Affiliation and Order). A five-factor solution was fully presented with the Big Five factors Extraversion, Agreeableness and Conscientiousness and with a factor that had Intellect traits on the one pole and Neurotic traits on the other, and finally a factor called Toughness.

Keywords: Trait-taxonomy; Lexical approach; Personality; Structure.

The psycho-lexical approach to personality, that exploits ordinary language for scientific purposes, has been applied in a good number of languages in Europe, as compared with the languages outside of Europe (for an overview, see De Raad et al., 2014). Of the Indo-European languages in Europe, just a few branches have not yet been subjected to a psycho-lexical study of personality traits. These are the Thracian branch (with Armenian) and the Baltic branch (with Latvian and Lithuanian), both located on the fringe of the European borders. A third branch is Illyric (with Albanian); for this language a psycho-lexical trait study has been performed (Ademi-Shala & De Raad, in preparation). Of the Baltic branch, Lithuanian is one of the oldest Indo-European languages.

While the Balts had trade connections for thousands of years along the ancient amber roads, the Baltic languages have long been oral languages; Lithuanian writings began to appear in the 16th century, and a uniform written Lithuanian came into use only at the end of the 19th and the beginning of the 20th century.

The psycho-lexical approach follows the rationale that "All significant individual differences are embodied in language" (De Raad, 2000, pp. 16). Goldberg (1981, pp. 141–142) referred to this rationale as the lexical hypothesis. This means that all relevant trait descriptive words are expected to have sedimented in the lexicon of a language, practically in a dictionary of that language. In order to arrive at a full listing of such trait words, a dictionary may be scanned for all relevant words, to be subjected to steps of classification and of structuring, ultimately leading to a taxonomy of personality traits.

The approach has generated a great number of taxonomic studies in many languages around the world (see, e.g., De Raad, 2000; Saucier, Hampson, & Goldberg, 2000; Ashton et al., 2004). The approach has gained influence through its most known result in the form of the Big Five model (Goldberg, 1981; Norman, 1963). Its dimensions, Extraversion, Agreeableness, Conscientiousness, Emotional Stability and Intellect, are supposed to capture in an economic format all that can be said of a person's psychological traits. Especially in Western or Western-European languages support was found for model. But there are also other voices, most notably those that claim an additional sixth factor Honesty-Humility (*sincere*, *unselfish*) (e.g., Ashton et al., 2004) or a

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seven-factor model that includes versions of the Big Five amplified with two more factors Negative Valence (*wicked*, *dangerous*) and Positive Valence (*excellent*, *important*) (e.g., Benet-Martinez & Waller, 1995).

While early supportive evidence for the Big Five was found in European Germanic languages (Angleitner, Ostendorf, & John, 1990; De Raad, 1992), repeated supportive evidence was next found in Slavic languages, especially in Polish (Szarota, 1996) and in Croatian (Mlačić & Ostendorf, 2005). A Czech study (Hřebíčková, 2007) gave support of four of the Big Five factors. The Baltic languages, together with the Slavic languages, form subgroups from the Balto-Slavic family of language. This historical relation may give an extra dimension to the interest in the Lithuanian trait structure.

It is important to complete the description of trait vocabularies in Europe, in order to be able to get to conclusive evidence about the trait model and its facets and nuances. Especially, when new languages are explored, often certain facets of trait domains that may hitherto receive little attention, get emphasised and other facets may be of less interest in a particular new language. In both Dutch (De Raad, 1992) and in Italian (Caprara & Perugini, 1994), a progressiveness versus conventionality facet of the Intellect factor was found, and in Hungarian (Szirmák & De Raad, 1994), an additional factor called Integrity was found. Such information is important to finally be able to arrive at a consensually accepted assessment of the Big Five model or its competitors.

Additional psycho-lexical studies are also important for deciding about the optimal trait structure cross-culturally. In more recent years, a growing body of literature has given more support for three trait factors to be tenable across languages and cultures, including studies based on comparisons of trait content and studies in which psychometric means were applied to get to a decision about the number of factors (De Raad et al., 2010; De Raad et al., 2014; Di Blas & Forzi, 1999; Peabody & De Raad, 2002; Peabody & Goldberg, 1989; Saucier et al., 2000). Those three factors are defined by traits that are typical of Extraversion, Agreeableness and Conscientiousness.

With this Lithuanian taxonomy of traits different options may find confirmation in the data to collect: (a) a two-factor solution with a factor describing Agentic or Dynamic traits and another factor describing Communal or Social Propriety traits (cf. Bakan, 1966; Digman, 1997; Hogan, 1983), (b) a three-factor solution with an additional factor describing traits of Order and Organization (cf. cf, De Raad et al., 2014), (c) a five-factor solution with the Big Five factors, (d) a six-factor solution with an additional Honesty-Humility factor beyond the Big Five (cf. Ashton et al., 2004) and (e) a seven-factor solution with versions of the Big Five plus two factors describing Positive Valence and Negative Valence (cf. Benet-Martinez & Waller, 1995). This seven-factor solution is not simply the six-solution plus one. The five and six solutions are based on ipsatized (standardised per person), while the seven-solution suggested by Benet-Martinez and Waller (1995) is based on raw data with an explicit inclusion of evaluative and appraisive trait descriptors. Four-factor solutions are hardly discussed in the psycho-lexical literature.

In this article, we present the Lithuanian psycho-lexical project and its first findings. This report involves two subsequent steps, henceforth called Study 1 and Study 2. In Study 1, the selection of personality trait words from a Lithuanian dictionary and a reduction of the list to manageable proportions is described, and in Study 2, the structuring of the obtained trait vocabulary is described. Study 2 also includes an analysis of the relations between the Lithuanian trait structure and the BFI (John & Srivastava, 1999).

STUDY 1: SELECTION OF REPRESENTATIVE SET OF LITHUANIAN PERSONALITY ADJECTIVES

The newest edition of *Lithuanian-English Dictionary* (Piesarskas & Svecevicius, 2006), with about 50,000 entries, was examined. This was done by the first author of this article. Because there was only one judge available to do this job at the time of the project, much care was taken in evaluating possible words for personality-descriptive use. Words were thoroughly evaluated one by one, and when a word was accepted as being relevant for personality on the basis of explicit criteria, it was tabulated together with its English translation. For the selection, a two-stage procedure was followed, the first being the selection of possibly relevant words, the second involving a further reduction.

Stage 1: selection of words for personality-descriptive use

In order to reduce subjective bias in the selection of the words, the judge made use of an explicit list of three criteria which were continuously available in writing. Those criteria form a good summary of selection criteria used elsewhere in the psycho-lexical literature. First, a word was evaluated on whether it fitted both the two sentences as formulated in Brokken (1978). Second, a word had to pass the other two criteria, each specified in a few exclusion criteria. Most of these criteria could unambiguously be made, but in case of doubt, a word was retained. The criteria were as follows:

(1) Fit into the sentences "He/she is [adjective] by nature" and 'What kind of person he/she is? — [adjective].

(2) Excluded should be terms in any of the following categories:

   (a) non-distinctive and applicable for all individuals (e.g., human).
   (b) referring to geographical origin (e.g., Athenian), to nationality (e.g., Lithuanian) or to professional or job-related identities (e.g., student).
   (c) referring to only a part of the person (e.g., shining eyes).
   (d) having personality implications that are both metaphorical and tenuous (e.g., mouse, rose).

(3) Excluded should be terms in any of the following categories:

   (a) describing physical characteristics and appearance (e.g., tall, thin)
   (b) mere evaluations (e.g., good)
   (c) social attitudes (e.g., racist)
   (d) special abilities (e.g., good dancer)
   (e) overly slang terms.

A set of 435 personality-relevant adjectives was thus collected. These adjectives were subjected to a more detailed evaluation and a further reduction.

Stage 2: Reducing the list

This second stage involved an evaluation of redundancy and a closer evaluation of words that were retained but for which there was still doubt whether they fitted the criteria. This part of the reduction process was first done by the first author, with the results being checked by two others, who finally made some corrections. The first type of redundancy was found in quite a number of words that formed antonyms. Antonyms were considered to be those trait descriptive words that had both opposite semantics and corresponding opposite psychological meanings. Of each such a pair, the positive word was retained. A second type of redundancy was found in sets of synonyms; of each of these sets those words were retained that had the more general meaning and that had little emotional shade. Moreover, there were still a few words for which doubts about their usefulness remained at this stage; these were removed. This reduction stage involved a reduction with exactly 190 words, thus yielding a list of 245 personality adjectives for further use.

Ratings of frequency of use for describing personality

The list of 245 personality adjectives was subjected to an evaluation of its relevance. This was done by obtaining ratings of frequency of use (cf. Saucier, Georgiades, Tsaousis, & Goldberg, 2005). A group 24 judges was asked to rate each of the 245 adjectives. These judges were Lithuanians aged 25–58 years (8 males and 16 females), most with a higher (lawyers, informatics, teachers, engineers, mechanists, an accountant, a biologist, salespeople, people with secondary education). The judges were instructed to rate the personality words on a 5-point frequency-of-use scale, with the following scale points: 1 *(this word is never used for describing a person)*, 2 *(rarely used)*, 3 *(sometimes)*, 4 *(often)* and 5 *(extremely often used for personality description)*. The reliability of these ratings was high with a coefficient alpha of .95. Words that obtained scores of 3 or higher from at least 18 of the 24 judges were selected for further use. On the basis of the frequency ratings, the list was reduced with another 51 adjectives, thus yielding a final list of 194 adjectives for Study 2.

DISCUSSION STUDY 1

A problem with the two-stage selection and reduction procedure was that it was done by only one judge. Most psycho-lexical studies used at least two judges, who provide rough selections of words that are merged into one. However, with two judges or more, the procedure is often relaxed, the aim being to catch rapidly the words that might possibly be relevant for personality description. Such a procedure usually leads to much longer lists of possibly relevant words than in this study, but it also needs strong additional reduction steps. In this study, the single judge evaluated each word with the explicit criteria at hand. This is a slow but thorough procedure, but one that was directed at reaching a relatively final set of relevant personality descriptors. Therefore, the list of 435 may well be taken as a thoroughly constructed list that pretty much exhausts what is contained in the dictionary as personality descriptive. The two additional reductions on the basis of redundancy do not allow for much subjectivity, for which reason the reduced list of 245 descriptors should also be considered as covering the semantics of personality traits sufficiently. It should be added that the relatively strong reduction by 190 descriptors was also guided by restrictions of the research situation which did not allow much time from the participants in Study 2.

STUDY 2: THE STRUCTURE OF LITHUANIAN TRAITS AND ITS RELATION TO THE BIG FIVE

Materials

We used two questionnaires, namely the list with the 194 adjectives that had the highest frequency of use, referred to as the 194 High Frequency Descriptors (194-HFD), and the Lithuanian version of the Big Five Inventory

(BFI) constructed by John and Srivastava (1999) with 44 items. The BFI is a widely used, imported measure of the Big Five, with good psychometric statistics. The internal consistencies of the BFI scales were reported to be .88 (Extraversion), .79 for Agreeableness, .82 for Conscientiousness, .84 for Neuroticism and .81 for Openness.

Participants and procedure

Participants were 213 students (56 males, 157 females) from the Vytautas Magnus University (Kaunas, Lithuania) and the University of Siauliai (Lithuania). Their age ranged from 18 to 25 years (mean 20.7; sd = 1.3). The participants were asked to rate themselves on each of the items of the two questionnaires. The 194-HFD, with items put in a random order, was provided with the instruction to give a self-rating using a 7-point Likert scale; although we preferred the 7-point scale because of enabling more nuance, the BFI was provided with a 5-point Likert scale, because that came with its original package. Feedback was promised to the students in return for their participation. Anticipating the results, one participant was found with too many missing data and thus excluded from further analyses.

RESULTS

Big Five Inventory

Because the BFI is also useful as an aid in the identification of factors, the results of this instrument are reviewed first. The details are given in Table 1. The internal consistencies were quite acceptable, and the intercorrelations were sufficiently low to guarantee independence among the scales.

Markers of the six-factor model and of negative valence

As an additional aid in interpreting the factors, we constructed marker scales of the Six-Factor model based on the markers listed in De Raad et al. (2010), and of Negative Valence (markers-NV) as listed in De Raad and Barelds (2008). The alpha-coefficients of these marker scales were .82 for Extraversion (10 items: markers-E), .79 for Agreeableness (13 items: (markers-A), .80 for Conscientiousness (13 items: markers-C), .66 for Emotional Stability (10 items: markers-ES), .82 for Intellect/Openness (10 items: (markers-I/O), .71 for Honesty-Humility (10 items: markers-HH) and .78 for markers-NV (6 items). There were substantial correlations between markers-HH and markers-A (.61), markers-NV and markers-A (−.68) and markers-HH and markers-NV (−.47). The other correlations among the marker scales ranged from −. 29 to +.39. These seven marker scales were only used in case of ambiguities with respect to the factor interpretations.

TABLE 1
BFI scale reliabilities and intercorrelations

BFI scales	*N of items*	*Cronbach* α	*E*	*A*	*C*	*N*
E	8	.70				
A	9	.69	.00			
C	9	.72	.15	.09		
N	8	.74	−.23	−.26	−.12	
O	10	.78	.29	.13	.01	−.17

Note: A = agreeableness; C = conscientiousness; E = extraversion; N = Neuroticism; O = Openness.

The Lithuanian structure of personality traits

A recurrent issue with factoring psycho-lexically derived trait structures has been whether one should ipsatize the ratings (standardise per person) before factoring or not. The vast majority of psycho-lexical study has used ipsatized data. Some have used both ipsatized ratings and raw data to arrive at the clearest structure (e.g., Benet-Martinez & Waller, 1995; De Raad & Barelds, 2008). An effect of ipsatization would be the removal of a large part of the first un-rotated component which would largely reveal response bias (acquiescence). In this study, we both factored the raw data and the ipsatized data, in order to find out which procedure would provide the clearest structure.

Factoring the raw data

The self-ratings of the 212 participants on the 194-HFD were factored using Principal Components Analysis, followed by Varimax rotation. The first 10 eigenvalues were 23.1, 15.8, 10.9, 7.2, 5.6, 4.8, 3.9, 3.7, 3.4 and 3.1, (42% of the variance), suggesting no more than four to six factors on the basis of the scree test. We extracted two up to seven factors for further inspection, thus remaining within the range of 11 factors found significant ($p = .05$) using Parallel analysis with raw data permutation (O'Connor, 2000), and made further decisions on the factors based on interpretability, and on the basis of their position and meaning in the hierarchy of factors (Figures 1 and 2). The factors were interpreted on the basis of the highest loading variables per factor and on the basis of their correlations with the BFI scales. To enable full use of the correlations with the BFI scales for the interpretation of the factors, we included those correlations for the factors with two, three, four, five and six factors in Table 2. Correlations for seven factors were not included in the table because they did not add much beyond what was presented in Figures 1 and 2. Only occasional correlations were mentioned in the text.

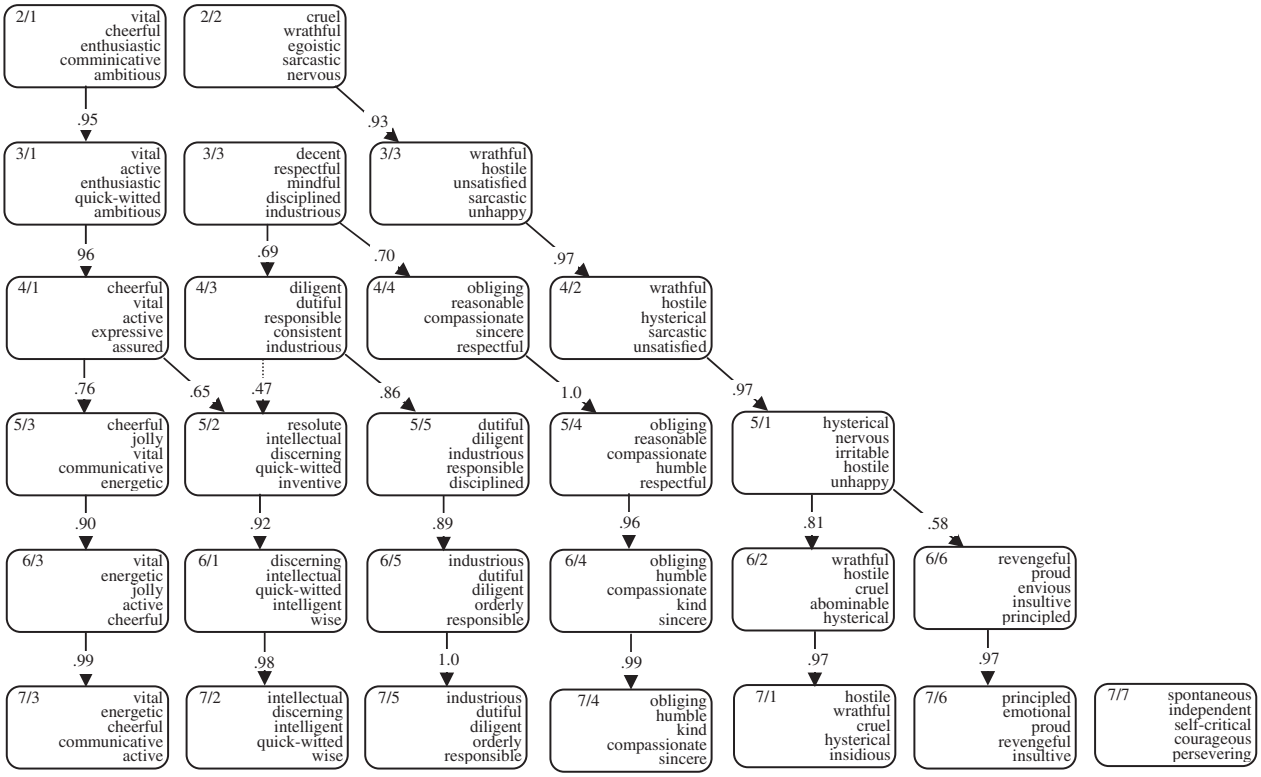

Figure 1. Hierarchical structure, raw data.

For a more detailed picture of the various possible solutions based on raw data, and to facilitate decisions about the appropriate number of factors, factor solutions with two up to seven factors were ordered in a hierarchy, with correlations between the factors from adjacent levels of extraction. This hierarchy was given in Figure 1. Correlations below |.40| were not given. Factors were identified by their hierarchical level (1 through 7) and by their size (and their order); thus, 5/2 refers to the second largest factor in the five-factor solution.

The first factor of the two-factor solution (2/1) described Dynamism, with traits typical of extraversion (*lively, cheerful, communicable, expressive*), and, to a lesser extent, traits typical of Intellect or Openness (*intellectual, quick-witted*) and of Conscientiousness (*persistent, ambitious*). The correlation of .55 with BFI-Extraversion (Table 2) confirmed the Extraversion connection. The factor 2/2 represented in part Negative Valence. It correlated .81 with markers-NV, but also −.81 with markers-A and −.68 with markers-HH. The correlation of −.60 with BFI-A agreed with this picture (see also the smaller but still significant correlations with BFI-C (negative) and BFI-N.

The Dynamism factor remained the same in the three-factor solution (3/1) and the four-solution (4/1), as was confirmed by the correlations in Figure 1. With 5/3, the Dynamism factor turned into a rather typical Extraversion factor, remaining the same in 6/3 and 7/3. The Negative Valence-Disagreeableness factor (2/2) remained the same in 3/2, 4/2, 5/1, 6/2 and 7/6. The factors 6/6 and 7/6 correlated substantially with N, but the traits were far from typical of the Neuroticism factor. Factor 7/7 was of positive, yet otherwise rather unclear nature. The third factor of this three-solution (3/3) loaded with Conscientiousness traits and also with Agreeableness traits, to split into these two factors (4/3, and 4/4, respectively) at the four-level solution. The 4/4-Agreeableness remained the same in 5/4, 6/4 and 7/4. The 4/3-Conscientiousness factor remained virtually the same in 5/5, 6/5 and 7/5. Factor 5/2 was mainly characterised by Intellect traits, and to a lesser extent by low N traits, C traits and E traits.

It was of interest to know whether the Six-Factor model, especially with its characteristic Honesty-Humility factor, was supported in these data. The factor coming closest to Honesty-Humility was 6/4 (or 5/4, 4/4 and 7/4, which had the same content), correlating .53 with BFI-Agreeableness, but also .59 with the markers-A and .50 with markers-HH. Distinct Agreeableness and Honesty-Humility factors did not emerge. Factor 6/4 best approached an Agreeableness factor, one that included Honesty-Humility semantics.

The seventh factor of the seven-solution was uninterpretable with no correlation of substance with any of the BFI scales. Without the Positive Valence factor, the seven-factor structure as suggested by Benet-Martinez

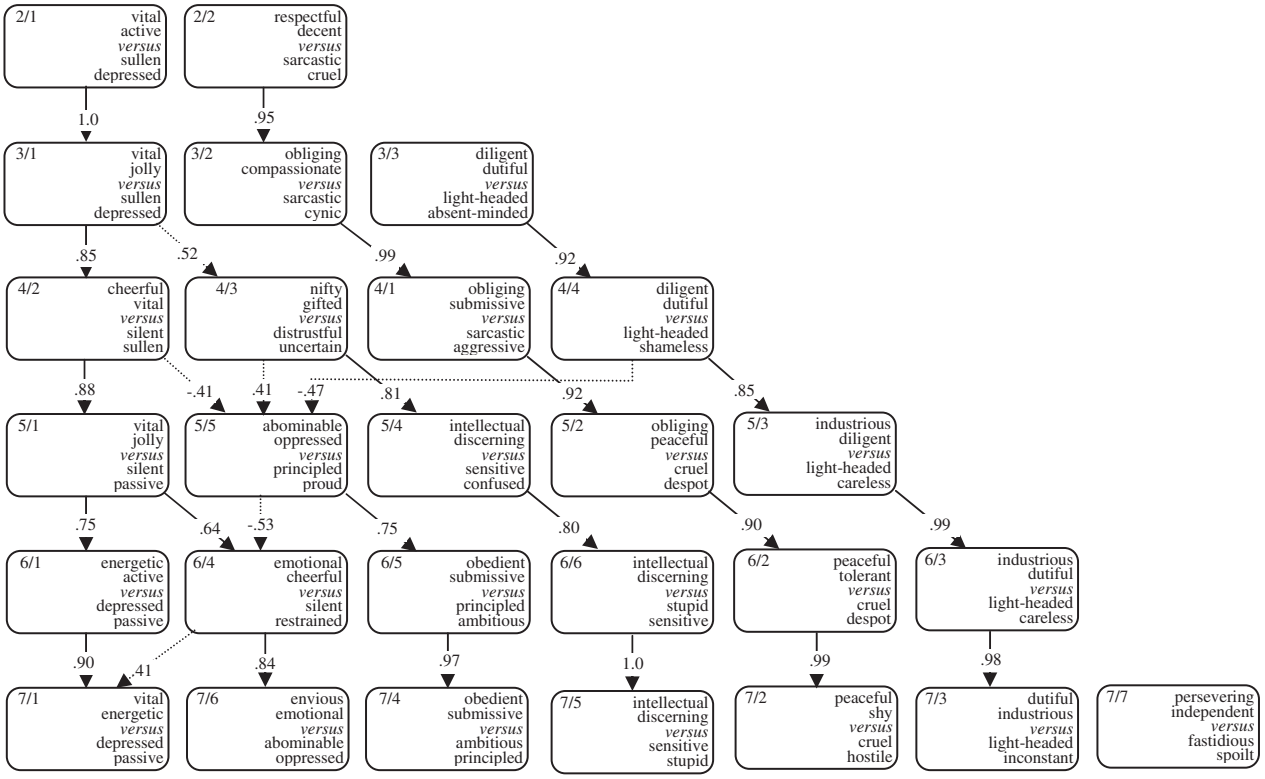

Figure 2. Hierarchical structure, ipsatized data.

and Waller (1995) was thus not confirmed. Of the six-solution, five were indeed related to the Big Five, with some reticence regarding Neuroticism.

Factoring the ipsatized data

The self-ratings of the 212 participants on the 194-HFD were ipsatized (standardised per person), and subsequently Principal Components Analyses was applied, followed by Varimax rotation. The first 10 eigenvalues were 16.8, 13.1, 8.6, 6.2, 5.3, 4.3, 4.0, 3.8, 3.5 and 3.3 (36% of the variance), suggesting five to six factors at most. Parallel analysis suggested 15 factors to be significant (at $p = .05$). Also in this case, we extracted two up to seven factors, and correlated those factors with the BFI scales. In addition, factor solutions with two up to seven factors were ordered in a hierarchy, with correlations between the factors from adjacent levels of extraction. This hierarchy is given in Figure 2. Correlations below |.40| are not given.

The two-factor solution formed a confirmation of the distinction discussed extensively elsewhere between (2/1) Dynamism or "getting ahead" and (2/2) Social Propriety or "getting along" (e.g., De Raad et al., 2014; Digman, 1997; Hogan, 1983). The three-factor solution adds a factor characterised by Conscientiousness traits, thus forming a confirmation of the "Pan-cultural personality structure" with Dynamism, Affiliation and Order, as put forward in De Raad et al. (2014). Of the four-factor solution, the factors 4/1, 4/2 and 4/4 were virtually the same as the factors 3/2, 3/1 and 3/3, respectively, to which now was added a factor 4/3 that correlated substantially (−.64) with BFI-N, and that was loaded by such trait terms as *crafty, gifted, resolute, intellectual, inventive* and *fearless* versus *distrustful, uncertain, nervous, sensitive* and *irritable*. At first sight, this factor 4/3 looked like an Intellect factor, in terms of loading traits, but the correlation with BFI-O was only .29 (Table 2). The negative correlation with BFI-N emphasised the opposite of being stressed, tensed, worried, and so forth, to be understood as being calm and imperturbable. These latter traits indeed agreed with being resolute, fearless and assured, which also loaded high on this fourth factor. Moreover, BFI-O not only included typical "Intellect" traits (original, ingenious, inventive) but also typical Openness traits (emphasising artistic interests). This is possibly the reason why the fourth factor correlated rather low with BFI-O. The positive correlations of factor 4/3 with E, C, O and the negative correlation with N, together suggested more of a Competence factor (cf. De Raad & Barelds, 2008). Nevertheless, we named it here Intellect.

Of the five-factor solution, 5/1 was clearly an Extraversion factor, both in terms of traits and in terms of its correlation with BFI-E. Factor 5/2 was an Agreeableness factor, both in terms of traits and in terms of its correlation with BFI-A. Factor 5/3 was a Conscientiousness factor,

TABLE 2
Correlations between psycho-lexical factors and BFI scales

	BFI scales						*BFI scales*				
Lexical factors raw	*E*	*A*	*C*	*N*	*O*	*Lexical factors ipsatized*	*E*	*A*	*C*	*N*	*O*
F21	**.55**	.03	.39	−.13	.38	F21	**.76**	.15	.21	**−.44**	.39
F22	.00	**−.60**	−.27	.33	−.04	F22	−.23	**.65**	.31	−.15	−.04
F31	**.70**	−.03	.27	−.22	**.40**	F31	**.77**	.13	.16	**−.44**	.39
F32	−.16	**−.53**	−.13	**.43**	−.06	F32	−.19	**.70**	.10	−.18	−.03
F33	−.34	.30	**.46**	.15	.01	F33	−.06	−.04	**.72**	−.01	.02
F41	**.75**	.04	.09	−.27	**.40**	F42	**.69**	.12	.03	−.12	.27
F42	−.11	**−.46**	−.24	**.41**	−.02	F41	−.22	**.70**	.06	−.23	−.03
F43	−.06	−.11	**.70**	.06	.05	F44	−.09	−.02	**.66**	.20	−.05
F44	−.24	**.51**	−.03	.11	.06	F43	.33	.09	.35	**−.64**	.29
F53	**.64**	.06	−.03	.03	.14	F51	**.78**	.13	.15	−.33	.24
F51	−.09	**−.46**	−.21	**.53**	−.08	F52	−.19	**.65**	.03	−.10	.05
F55	−.12	−.08	**.64**	.27	−.13	F53	−.05	.02	**.75**	.07	−.17
F54	−.24	**.53**	−.03	.07	.08	F54	.12	.06	.21	**−.50**	.39
F52	**.40**	−.03	.32	−.38	**.43**	F55	−.11	.27	−.02	−.38	−.15
F63	**.76**	.03	.09	−.17	.15	F61	**.59**	.16	.24	**−.54**	.26
F64	−.11	**.53**	−.02	.06	.05	F62	−.22	**.51**	.02	−.08	.14
F65	−.06	−.03	**.71**	.16	−.19	F63	−.09	.07	**.72**	.11	−.20
F66	−.05	−.29	−.15	**.57**	−.04	F64	**.49**	.05	−.01	.16	.10
F61	.26	−.04	.28	−.27	**.45**	F65	−.09	**.47**	−.10	−.24	−.16
F62	.02	−.38	−.12	.24	−.08	F66	.14	.04	.18	−.36	.33

Note: To enhance readability, correlations above |.40| are given in boldface.

correlating substantially with BFI-C. Factor 5/4 had the same colouring as 4/3, this time with a somewhat stronger correlation with BFI-O (.39). This factor 5/4 correlated .64 with markers-I/O and .52 with markers-ES. Factor 5/5 was more difficult to interpret; trait terms loading on this factor were *disgusting, oppressed* and *pitiful* versus *principled, proud, ambitious, stubborn, envious* and *selfish*. There seemed to be a certain similarity to Mental Toughness (e.g., Gucciardi, Hanton, Gordon, Mallett, & Temby, 2014; Shafer, 1999). With six and seven factors the situation did not get clearer. Factor 6/4 was somewhat similar to 6/1 and 6/5 looked like 6/2. While factor 5/3 (Agreeableness) included some Honesty-related terms (*sincere* and *honest* versus *egoistic,* with loadings around .40), their influence reduced in the related factor 6/2 (with loadings around .30). None of the other factors of the six-solution was Agreeableness or Honesty related, as can be seen in Figure 2. The factor 7/7 was difficult to interpret, with no substantial correlations of the BFI scales. The Negative Valence factor had disappeared.

The final structure of Lithuanian trait adjectives

Of the various factor solutions, both based on raw data and on ipsatized data, the clearest configurations with a maximum of psychologically relevant traits were found in solutions based on ipsatized data. Whereas, both raw data and ipsatized data gave five-factor solutions Extraversion, Agreeableness (including some Honesty-Humility traits), Conscientiousness, Intellect and a factor that was more difficult to interpret, the ipsatized data gave clear evidence of the Big Two and of the Big Three. For this reason, we gave a full portrait of the five-factor solution in Table 3, in which maximally 20 traits per factor pole were given that loaded above |.30| with no competing loadings on another factor.[1]

DISCUSSION STUDY 2

The five-factor solution did not form a clear cut confirmation of the Big Five. The first three factors of the Big Five, Extraversion, Agreeableness and Conscientiousness were clearly recovered in the material, both visible in the raw data and in the ipsatized data. The raw data allowed also for a Negative Valence factor, which did not appear in the ipsatized data. There were indeed clusters of Neurotic traits and of Intellect traits in the ipsatized data, but they appeared to load on opposite poles of the same factor. A fifth factor, called Toughness, was included, reminiscent of "Mental Toughness", a concept discussed extensively in the literature.

Neither the Six-factor model nor the Seven-factor model was recovered in the material, although Negative Valence was identified in the raw data set. Part of the

[1]Full factor loading matrices for any solution are available from the authors upon request.

TABLE 3
Five factors based on ipsatized ratings

E	gyvybingas, linksmas, aktyvus, energingas, nuotaikingas, komunikabilus, entuziastingas, apsukrus, idomus, laimingas, aistringas, juokaujantis, iniciatyvus, pasitikintis, populiarus, israiskingas, zavus, drasus, isdykes, plepus	lively, cheerful, active, energetic, vivacious, communicative, enthusiastic, nimble, entertaining, happy, passionate, joking, taking initiative, confident, popular, expressive, charismatic, courageous, naughty, garrulous
	prieš	versus
	nekalbus, pasyvus, flegmatiskas, paniures, pesimistas, nuobodus, ramus, nelaimingas, prislegtas, letas, nepasikintis, uzdaras, liudnas, niurus, santurus, abejojantis, bailus, kuklus, drovus, nepatenkintas	silent, passive, phlegmatic, sullen, pessimistic, boring, calm, unhappy, depressed, slow, distrustful, reserved, sad, glum, restrained, uncertain, cowardly, modest, shy, unsatisfied
A	paslaugus, takus, pagarbus, mielas, gailestingas, malonus, supratingas, padurus, nuosirdus, tolerantiskas, prisitaikantis, meilus, doras, nuolankus, atlaidus, demesingas, korektiskas, paklusnus, pasiaukojantis, kilnus	obliging, peaceful, respectful, nice, compassionate, pleasant, reasonable, decent, sincere, tolerant, flexible, kind, honest, humble, indulgent, attentive, correct, obedient, selfless, generous
	prieš	versus
	ziaurus, despotiskas, agresyvus, rustus, priesiskas, klastingas, ciniskas, kandus, passaipus, negailestingas, isteriskas, arsus, grubus, piktas, egoistiskas, valdingas, begedis, nesugyvenamas, nesivaldantis, vulgarus	cruel, despotic, aggressive, wrathful, hostile, insidious, cynical, mordant, sarcastic, pitiless, hysterical, savage, gruff, angry, egoistic, overbearing, shameless, cross-gained, intemperate, vulgar
C	darbstus, stropus, pareigingas, tvarkingas, pastovus, atsakingas, drausmingas, pedantiskas, punktualus, grieztas, kruopstus, rupestingas, nuoseklus, valingas, patikimas, atidus, smulkmeniskas	industrious, diligent, dutiful, orderly, consistent, responsible, disciplined, scrupulous, punctual, strict, thorough, mindful, volitional, reliable, considerate, meticulous
	prieš	versus
	lengvabudiskas, nerupestingas, nepastovus, issiblaskes, aplaidus, tingus, istvirkes, veidmainiskas	light-headed, careless, inconstant, absent-minded, remiss, lazy, debauched, hypocritical
I	intelektualus, izvalgus, gabus, gudrus, isradingas, genealus, ismintingas, sumanus, protingas, kurybingas, ryztingas, nasus, nuovokus, racionalus	intellectual, discerning, gifted, nifty, inventive, genius, wise, quick-witted, intelligent, creative, resolute, efficient, perceptive, rational
	prieš	versus
	jautrus, sumises, nervingas, irzlus, isizeidziantis	sensitive, confused, nervous, irritable, insultive
T	principingas, isdudus, ambicingas, emocingas, uzsyspyres, pavydus, savanaudiskas, kerstingas, orus	principled, proud, ambitious, emotional, stubborn, envious, selfish, revengeful, sober-sides
	prieš	versus
	pasibjauretinas, uzguitas, pasigailetinas	disgusting, oppressed, pitiful

explanation for not finding the Big Five, the Six-factor model and the Seven-factor model could be in the relatively small set of trait descriptors. The vast majority of psycho-lexical studies have often used up to double the number of adjectives.

GENERAL DISCUSSION

This study on the Lithuanian trait structure helps to complete the picture that has emerged from psycho-lexically based taxonomies in the Indo-European languages in Europe. While most of the support for the Big Five model was found in this European Indo-European context, full confirmation has been hard to find. Yet, from a wider cross-cultural perspective, support was found for both the Two-factor model and the Three-factor model, and the present data do form no exception. The two-factor structure with the general dimensions of Dynamism (or Agency) and Social Propriety (or Communion) (Bakan, 1966; DeYoung, 2006; Digman, 1997; Hogan, 1983), repeatedly found across the majority of psycho-lexical studies, was confirmed in this data. The three-factor structure with traits characteristic of Extraversion, Agreeableness and Conscientiousness (De Raad et al., 2014; Di Blas & Forzi, 1999; Peabody & De Raad, 2002; Peabody & Goldberg, 1989; Saucier et al., 2000) was also given support in this data. Beyond those three factors, unequivocal support for the Big Five was not found, although clusters of Neuroticism traits and of Intellect traits were clearly identifiable in the five-solution.

In this study, use was made of the Big Five Inventory (BFI; John & Srivastava, 1999) for the purpose of validating the findings. The instrument was certainly helpful in identifying the various factors from the two types of analyses (raw data and ipsatized data). Yet, it also turned out that the BFI may not be capable of detecting the different facets of the Big Five factors. This was most obvious in the correlations of the Openness scale with Lithuanian factors. Short scales, such as that of the BFI, may function well in certain contexts, but in the taxonomic domain it may be wiser to make use of external systems with much wider coverage of the various facets of the Big Five dimensions.

Compared with the vast majority of psycho-lexical studies, the final set of trait variables used to collect

ratings was rather small. Most taxonomic studies have used two to three times this set of variables. This relatively small set might imply that not all important facets in trait semantics in the Lithuanian language are well captured, in relation to what one might expect on the basis of other psycho-lexical studies. Yet, the number of traits should be enough to at least describe the kernel of the factors to be expected, and in this regard the selection did a remarkably good job in lending support for the three factors that were found replicable across languages elsewhere (De Raad et al., 2010). Moreover, there are no strict rules for the number of trait variables to sufficiently cover the trait domain. The early Norman Five (Norman, 1963) was, for example, based on a set of no more than 20 variables, which in turn were based on a larger set of 171 trait variables, carefully selected by Cattell (1943). Also the number of participants was relatively small; yet, both the number of trait variables and the number of participants did not prevent to yield stable factors. Eigenvalues are generally indicative of the reliability of the factors (Ten Berge & Hofstee, 1999), and the present eigenvalues, especially the higher ones before change in the pattern, should be considered as reliable.

The main principles of the psycho-lexical approach have been followed thoroughly in this study, thus making possible the detection of the most important underlying dimensions of traits. With a relatively restrictive set of trait adjectives, these psycho-lexical findings for Lithuanian form a good argument in favour of the cross-cultural replicability of the both the two-factor model and the three-actor model.

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